Information and Knowledge Management
ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
Vol 2, No.2, 2012

A Step towards Softbots: Easy2Shop- A Multi Agent based Shopping bot

Khalid Mahmood, Bashir Ahmad, Allah Nawaz, Ihsan Ullah, Muhammad Abid
ICIT, Gomal University, KPK, Pakistan
abid.gu@gmail.com

Abstract:

With the emergence and omnipresence of e-commerce on the internet, online purchasing assistants and applications have made their appearance. More commonly known as "shop bots" these intelligent agents facilitate the purchasing process, therefore saving time and money. Most shop bots provide you with a list of companies offering the best price and service for the product that you want. The first shop bot Bargain Finder was developed in 1995 by Andersen consulting and it was designed to help people find only musical CDs. Today, Shop bots are capable of finding a wide variety of products and services offered on the internet. These intelligent agents help you to make the best choice when looking for CDs, DVDs, books, computers, software, and cars.

Keywords: Intelligent agents, Shopping bots, E-Commerce, Multi agents, Robotics, Easy2Shop, Intelligent agent criteria, Soft bots.

1. Introduction

E-commerce has changed the way companies distribute their products and services to consumers. Traditional brick-and-mortar companies continue growing this segment of the economy by creating their own e-commerce presence. Some companies have created or reshaped their image by having their entire operations based strictly on e-commerce (Filipo 2002). An e-commerce strategy has many benefits for the company as well as the consumer. In the research presented here, we aim at improving the accessibility and expanding the benefits of e-commerce shopping to consumers and at aiding the move to a personalized and thus more efficient marketplace. Shopping bots are price comparison sites on the World Wide Web that automatically search the inventory of several different online merchants to find the lowest prices for consumers. Typically, these sites rank products by price and allow shoppers to link directly to an online merchant's site to actually make a purchase. Many shopping bots also include links to product reviews from evaluation sites like Gomez.com and Bizrate.com. Initially Search Engines were early solution to the problem of finding information spread over many different websites. This task was difficult as type, cost and organization of information provided by sites varies from companies to companies. The second approach is through alert services. Several services allow shoppers to sign up the service that notify the prices when it go up or fall below a specified range (Pattie 1999). A third approach is voluntary rating reviews of the products through vendors and customers. The drawback of these above approaches is lack of autonomy, personalization and privacy. Our research overcomes these shortfalls in such a way that all the operations are performed autonomously by the agents, without user interaction. Personalization means that the Easy2Shop learns the behavior and preferences of the shoppers by observing his actions while shopping. Privacy means to conceal the identity and private information of the shopper.

1.1 Environment

1. Sensor
   - As it is a soft bot, so it senses the environment through encoded binary bits. Input is supplied through interface which interacts directly with merchant websites.
2. Processing
   - Learning

- Knowledge
- Experience

3. Effectors

- Best possible price on the Internet, and also supports related search.

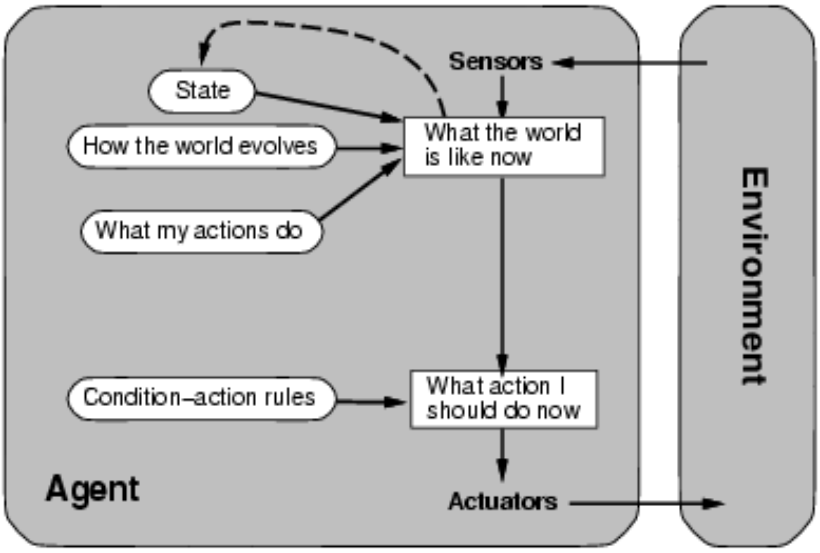


Figure 1.1: Schematic diagram of simple reflex agent (Stuart Russel, 1995)

2. Background

Research in the area of shopping agent's dates back to the early years of the Web. In 1995, Andersen Consulting developed Bargain Finder, the first of the shopping agents. It allowed users to compare prices of music CDs from stores selling over the Internet. At the time however, some of the retailers blocked access because they did not want to compete on price, and BargainFinder ceased operation. Since then, there have been additional shopping agents that started providing unbiased comparison of products from different shopping sites. In PersonaLogic, users created preference profile so describe their tastes. The approach allowed for the identification of products with features important to the users, but the vendors had to provide an interface that explicitly disclosed the features of the products in a way that could be matched with user profiles. PersonaLogic was acquired by AOL in 1998 and the technology disappeared. Ringo was an agent that recommended entertainment products (music, movies) based on collaborative filtering, i.e., on opinions of like-minded users. This was one of the earliest software agent technologies to be commercialized, when it was incorporated into a company named FireFly. FireFly also addressed the issue of privacy by initiating and promoting the P3P standard. FireFly was acquired by Microsoft in 1998 and the FireFly agent ceased operation shortly there after. However the concept of collaborative filtering has become widely used, by large commercial vendors such as Amazon. The ShopBot was an agent that could learn how to submit queries to e-commerce sites and interpret the resulting hits to identify lowest-priced items (Christian 2002). ShopBot automated the process of building "wrappers" to parse semi structured (HTML) documents and extract features such as product descriptions and prices. Our goals are similar but we focus on learning the user preferences (with respect to many features) and we use a different approach for extracting those features from vendor sites. The ShopBot technology had a similar fate to those of PersonaLogic and FireFly; it was acquired and commercialized by Excite (under the name Jango), and soon

replaced with a biased vendor-driven agent. Tete@Tete was an agent that integrated product brokering, merchant brokering, and negotiation. A start-up called Frictionless Commerce is applying the technology to B2B markets (e-sourcing) rather than to B2C markets. The only comparison shopping agents available to consumers that are surviving in the commercial realm are biased, presenting results only from companies with whom they collaborate. Examples include MySimon, DealTime, PriceScan, RoboShopper, and many others (Oen-Etzion 1994). Learning user behaviors and preferences by "looking over the user's shoulders" is an example of an interface agent. These have been widely employed in information filtering and Internet recommendation systems. Two user interface agents that learned from the actions taken by a user are Letizia and WebWatcher. Similarly to these agents, IntelliShopper presents information to the user in a way that allows her interaction to be easily incorporated into the learning process. In the area of Web querying and monitoring, the most relevant work is WebCQ . In WebCQ, specific pages can be monitored for changes to their content. The system can track changes on arbitrary pages by computing the difference between the page at some given time and the same

3. Guidelines, Criteria's and Properties of Intelligent Agents.

1. Agency-related Criteria	
1.1 Architecture Properties	
1.1.1 Organization	How good the methodology is in defining the organizational relationships between agents?
1.1.2 Mobility	How capable is the methodology in presenting and modeling agent's migration?
1.2 Basic Properties	
1.2.1 Autonomy	To what extent the methodology can support and present the autonomous features of agents?
1.2.2 Reactivity	To what extent the methodology supports reactivity?
1.2.3 Reasoning	In this context, to what degree the methodology supports proactivity?
1.2.4 Temporal continuity	To what degree the methodology can present and model temporal continuity in agents?
1.3 Advanced (mental) Properties	
1.3.1 Beliefs	To what extent the methodology can present and model this cognitive property?
1.3.2 Desires (goals)	To what extent the methodology can present and model the intended 'goals' of agents?
1.3.3 Intentions (actions)	To what extent the methodology can present and model 'intentions'?
1.4 Learning ability	To what extend the methodology can present and support the 'learning ability' of agents?
2. Modeling-related Criteria	
2.1 Notation	To what degree the methodology is effective in manipulating the notational components (i.e., syntax and semantics) and presenting texts and symbols?
2.2 Ease of use and understanding	How easy the notation and models are to understand and use with this methodology?

2.3 Expressiveness	To what degree the methodology's models and notation are capable for representing the desired multi-agent system with all the necessary concepts in an easily perceptible manner?
3. Communication-related Criteria	
3.1 Local Communication (Basic Sociability)	
3.1.1 Cooperation	How do you rate the methodology's support to define and present this feature?
3.1.2 Coordination	How do you rate the methodology's support to define and present this feature?
3.1.3 Competition	How do you rate the methodology's support to define and present this feature?
3.1.4 Negotiation	How do you rate the methodology's support to define and present negotiation?
3.2 Wide Communication (Advanced Sociability)	
3.2.1 Interaction with the external environment	To what extent you think the methodology can support and present the interaction of agents with an external environment? Note that we assume an external environment as a remote environment, which is usually heterogeneous, and/or having different ontology.
3.2.2 Agent-based user interface	To what extent you think the methodology can provide effective description of interfacing with its MAS' users (e.g. human agents)?
3.2.3 Subsystems interaction	To what extent the methodology can provide a tool for presenting and modeling subsystems of agents that collaboratively interacting together?
3.2.4 Bio-induction	To what extent the methodology can present and model this feature that concerns such a higher level of communications?
4. Process-related Criteria	
4.1 Development Lifecycle	
4.1.1 Architectural design	To what degree the methodology is effective in supporting the process of gathering, analyzing, and modeling the requirements of a potential MAS?
4.1.2 Detailed design	To what degree the methodology is effective in supporting the tasks associated with the process of carrying out the detailed design of a potential MAS?
4.1.3 Verification and Validation	To what extent the methodology is capable in supporting verification and validation?
4.2 Refineability	To what extent the methodology is effective in supporting clear procedures for refining models gradually in order to accomplish implementation?
4.3 Managing complexity	To what extent the methodology can provide effective modeling tools that facilitate the decomposition, assignment, and management of tasks among agents?

4.4 Ease of use and understanding	To what extent the methodology supports the following features: - Standard notation - Standard modeling language - Ease to understand and follow process steps and phases
5. Upgrading-related Criteria	
5.1 Modifiability	How easy is the methodology in supporting changes to an MAS after implementing it?
5.2 Scalability	How good is the methodology in handling and integrating the requirements for a large number of agents?
5.3 Open systems support	To what extent the methodology can provide support for open systems to allow dynamic integration (or removal) of new agents and/or resources?
5.4 Adaptability – Dynamic Structure	To what extent the methodology is effective in supporting reconfiguration in dynamic systems (e.g. when agents are created or destroyed)?
5.5 Integrate ability	To what extent the methodology is capable to support integrating data acquired from several platforms with the knowledge possessed by the current active agents?
6. Application-related Criteria	
6.1 Applicability	To what extent this methodology is NOT limited to a specific type of software domain (e.g., component-based systems or real time systems)?
6.2 Maturity	To what extent the methodology is mature, in terms of the availability of the recourses that describe it (e.g., documentation, publications, manuals, and supporting case studies)? Is there any records/feedback from stakeholders to recommend/oppose this methodology? On a ten-point scale, how it was rated?
6.3 Field history	To what degree the methodology is applied in practice, used by non-creators and used in developing real applications?
6.4 Cost concerns	In terms of costs, to what extent the methodology is economically feasible?
7. Supporting Properties	
7.1 Ontology	To what extent the methodology provides support for the specifying and modeling ontology in MAS?
7.2 Security	To what extent the methodology provides support for designing security features in MAS?
7.3 Collaborative Services	To what degree the methodology can support, presenting and modeling services, such as ‘yellow pages’ and ‘blackboards’ in a potential MAS.
8. Perception-related Criteria	
8.1 Perceived ease of use	To what degree you believe that using this methodology would be easy enough and free of effort?
8.2 Perceived usefulness	To what degree you believe that applying this methodology will be significantly effective in achieving its objectives?

8.3 Intention to use	If you were asked to adopt an AOSE methodology in developing an agent-based system, to what degree you intend to use this methodology?
9. What Kinds of Activities Can your Intelligent Agent Perform?	
• Search for information automatically • Answer specific questions • Inform you when an event (e.g., an article has been published, your favorite book is on sale, the road you travel is under construction, your name has been mentioned on the web) has occurred • Provide custom news to you on a just-in-time format • Provide intelligent tutoring • Find you the best prices on nearly any item • Provide automatic services, such as checking web pages for changes or broken links	

4. SYSTEM ARCHITECTURE:

Easy2Shop bot consist of four agents namely Form Agent, History Agent, Privacy Agent and Learning Agent.

4.1 Form Agent:

The Form agent has the job to accept request from shopper in a secure manner and handover these requests to History Agent to check the information against shopper request.

4.2 History Agent:

The history agent check the information already stored in its knowledge base data and response the user with the required information.

4.3 Learning Agent:

The learning agent learns the behavior, new updates about the product, experiences and information about new products directly from the vendor sites.

4.4 Privacy Agent:

The privacy agent conceals the private information about the customer, offer personalize services to customer.

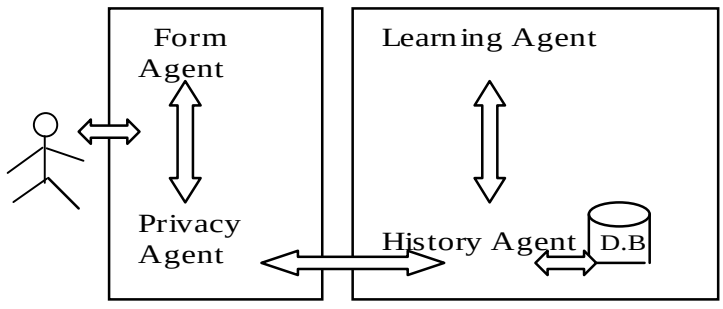


Figure: 4.1 Easy2Shop System Architecture

5.

Prototype describes the implementation of the system.

5.1 User Interface

When a user logs in, Easy2Shop displays the profile inferred by the history agent based on the previous shopping activity of the current user. The history of the shopper is also displayed. The user can click to examine new or old hits, or remove requests he no longer wants to view. Alternatively, the user can submit a new shopping request via the query interface. Here the user can specify a query string (to be forwarded to vendors) and the type of request, i.e., whether the user is interested in shopping at online stores or auctions sites. Each of these options corresponds to a set of vendor modules.
Once the results have been received from the various vendors, collated, parsed and stored in the database, the learning agent presents them to the user, all these formats are converted to common data domains before the value of each feature is stored in the database.

5.2 Vendor Modules

The vendor modules allow Easy2Shop to interface with the various online store/auction sites. There are two aspects to vendor logic from the Easy2Shop's perspective: (a) submitting queries, and (b) parsing results. Task (a) is simpler; it consists of identifying an appropriate form, submission protocol, and input syntax on each vendor site. Task (b) is more difficult; it consists of identifying items and extracting feature values for all desired features (e.g., product description, price, etc.). While vendors could readily simplify this task, say by using XML-based output, the opposite trend seems to be taking place; many vendors are not interested in competing on price alone, and therefore use complex and changing HTML markup to make it difficult for shopping bots to extract information from their sites.

5.3 Database Design:

Easy2Shop must store much data about its shopper personal information, their profiles, queries, product hits, and their features. The prototype stores all this information in a relational database. The references table stores the profile of each personal; for each feature (e.g. price). My SQL is selected as DBMS to store data.

5.4 Implementation of Intelligent agent's criteria by Easy2Shop bot.

Intelligent Agent	**Shopping Bot**
1.Agency related Criteria:	Facilitate the user in shopping by providing best possible price on the web.
1.1 Architecture Properties:	
1.1.1 Organization	A user friendly interface allowing user to enter the item/product, which he/she wants to search. The shopping bot then answer the user by providing the best price on the web.
1.1.2 Mobility:	Easily implemented on any computer system.
1.2 Basic Properties	
1.2.1 Autonomous	The agent can independently/automatically handle/mange its operations.
1.2.2 Reactivity	The agent rationally behave to the user requests/queries
1.2.3 Reasoning	If the user misspells the word, then the agent provides suggestions to the user about the search. It also provides related search options to enhance/facilitate/improve user search criteria.
1.3 Advanced (mental) Properties	
1.3.1 Beliefs	Knowledge based, History & Experience
1.3.2 Desires (Goals)	Providing best available price on the web Also saving time of the user, net surfing/searching

	the desired product
1.3.3 Intentions	Time saving, facilitating user.
1.3.4 Learning ability	Remembering the search patterns, providing help in user shopping. Automatically updating the database.
2. Modeling related criteria	
2.1 Notations	Very easy to use.
2.2.2 Ease of use and understanding	Very easy to use, user friendly interface
2.2.3 Expressiveness	Very effectively handles the related search criteria and response immediately
3. Communication related Criteria	
3.1 Local Communication(Basic scalability)	
3.1.1 Cooperation	As it is a multi aided agent based software, so it sub agents cooperated with each other in solving problems.
3.1.2 Coordination	The sub agents coordinates with each other
3.1.3 Competition	By evaluating the other shopping bots
3.1.4 Negotiation	Effective negotiation b/w agents
3.2 Wide Communication	
3.2.1 Interaction with the external environment	Through Form Agent
3.2.2 Agent based user interface	Communication with user through web
3.2.3 Subsystem interaction	Through multi agent setup
4. Process related Criteria	
4.1 Development Lifecycle	Agile Development mythologies, like Extreme Programming(XP)
4.1.1 Architectural Design	analysis and modeling requirements
4.1.2 Detailed Design	Detailed design of MAS can be achieved by first designing each agent independently and then integrating the whole design.
4.1.3 Verification and Validation	Support for verification and validation
4.1.4 Refine ability	Through Learning process
4.1.5 Managing Complexity	Handle complex situation
4.1.6 Ease to use and understanding	UML will be used for modeling
5. Upgrading related criteria	
5.1 Modifiability	Support of Modifiability
5.2 Scalability	Highly scalable
5.3 Open System Support	N.A.
5.4 Adaptability Dynamic Structure	Through Learning based agent
5.5 Integrate ability	As it is MAS, so it has integrated structure
6. Application related criteria	
6.1 Applicability	Component based system
6.2 Maturity	Documentation, material is available
6.3 Field History	With the growth of internet, these agents based websites are most commonly used by customers
6.4 Cost concerns	Economical in cost
7. Supporting Properties	
7.1 Ontology	Based on objects
7.2 Security	System is highly secure
7.3 Collaborative Services	Can be implemented
8. Perception-related Criteria	
8.1 Perceived ease of use	Because the project is software based, and did not require any hardware, so it will be easy

8.2 Perceived usefulness	For making decisions
8.3 Interaction to use	Through easy user friendly interfaces
9. What kind of Activities can your Intelligent agent perform	
Shopping bots are price comparison sites on the world wide web that automatically search the inventory of several different online merchants to find the lowest prices for consumers. Typically, these sites rank products by price and allow shoppers to link directly to an online merchant's site to actually make a purchase. Many shopping bots also include links to product reviews from evaluation sites like Gomez.com, exicet.com, kalkoo and Bizrate.com.	

Pseudo Code: describing working functionality of Easy2hop Multi-aided Shopping bot

Step1. *Customer Logon to the website*
Step2. *Customer enters the search item/product information in a form.*
Step3. *Agent accept the search item request through its **Form agent***
Step4. *The program checks the user search entry through its **history agent** and gives suggestion in case of misspelling, and facilitates the user with related search suggestions.*
Step5. *Agent checks the price of item from its Knowledge base data through vendor module.*
Step6. *Agent updates its knowledge, to get the up to date information about product, information about new products and vendors, through learning agent.*
Step7. *The agent provides the best available price on the web.*
Step8. *The agent requests another search option.*
Step9. *Finish*

6. Conclusion:

Shopping bots on the internet facilitate the user in shopping process. While shop bot based on the artificial intelligence concepts not also facilitate the shopping process, as well as through their intelligent agent structure modify and reshape the business. Easy2Shop bot has a multi agent based architecture which utilizes internet resources, to provide lowest available prices of the products; they are searching for, saving their precious time and money. Through its multiple agents structure which coordinates each other in system execution and moreover though learning agent the easy2shop updates its knowledge database for future assistance.

References:

Filipo Menczer et. al. (July 2002), *"Intellishopper: A Proactive, Personal, Private Shopping Assistant"*, ACM.

Pattie Maes, Robert H. Gutiman and Alexandros G. Moukas, (1999), *"Agents that Buy and Sell"*, ACM.
Stuart Russel and Peter Norving (1995), *"Artificial Intelligence: A Modern Approach"*, Prentice-Hall, Inc., Chapter No. 2 [online] Available at: http://www.cs.berkley.edu/~russell/aimala1e/chapter02.pdf

Christian Wagner (May 2002), *"Are Intelligent E-Commerce Agents Partners or Predators"*, ACM, Vol. 45, Issue No. 5.

Oen-Etzioni and Daniel Weld (July 1994) *"A Softbot-based interface to the Internet"*, ACM.

Information and Knowledge Management
ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
Vol 2, No.2, 2012

Information technology management practices: A descriptive analysis of the challenges facing information technology managers

Vincent Sabourin
GRES, University of Québec in Montreal (UQAM)
School of Management, University of Québec in Montreal (UQAM)
Correspondence: UQAM, ESG School of Management, 315 east St-Catherine Montreal Qc. Canada H3C 4P2. Suggestions are welcome: sabourin.vincent@uqam.ca

Abstract

The paper intended to study managerial impediments which may hinder effective managerial practices by IT managers and their co-workers. The managerial drivers included: rules, initiatives, emotions, immediate action and integrity. This paper described the drivers of managerial practices by managers in information technology departments. The findings on Perception of IT managers and administrators towards the drivers of managerial practices by IT managers put a lot of emphasis on immediate action with regards to emergencies and driver of rules (lack of commitment) to explain the impediments faced by IT managers.
Purpose: This research sought to find out if IT managers were facing challenges resulting from administration and management practices. This research was carried out to investigate on the impediments facing IT managers. The study involved effective drivers of management adopted from Sabourin (2009) experiential leadership model, with managerial drivers of; rules, initiatives, integrity, immediate action and emotions to better identify key obstacles that face information technology managers and their management practices.
Methodology: A mixed method of qualitative (focus group discussion) and quantitative (a survey with a questionnaire) approaches was applied to this study. These involved group discussion of IT technicians and administrators in the selected organizations in a Canadian province. The total number of surveyed managers was 149.
Findings: With regards to the drivers of management practices, it was established that the driver of immediate action holds the highest consideration towards managerial practices by IT managers. This driver had, a frequency recorded 131, mean of 3.1897, median of 3.200 and standard deviation of 0.75874. The driver of rules was after analysis found to have a frequency of 132, a mean of 2.5773, median of 2.500 and standard deviation of 0.72983. The driver of emotions had a frequency of 131, mean of 2.5530, median of 2.400 and standard deviation of 0.71773. The driver of integrity had a frequency of 130, mean of 2.6969, median of 2.600 and standard deviation of 0.70603. The driver of initiatives had a frequency of 130; mean score of 2.8923, median of 2.800 and standard deviation of 0.80602. The summary of the report has been presents in table 2.
Conclusion: This study focused on the challenges experienced by IT managers and co-workers as they execute their management practices. Taken as a whole, our findings suggest that, there are some impediments associated with drivers of Emotions, immediate action, Rules and initiatives as well as integrity. Even if these obstacles are in multiple levels to develop and promote IT management practices, it is imperative to study with more depth obstacles faced by IT managers in order to better understand how the obstacles they face represent an impediment to the development of their competencies and effective performance in IT.
Paper type: Research paper

Keywords: Managerial drivers, managerial practices, Information technology (IT), Information management

1.0 Introduction

The current field of management has through research, seen the need to study the rising challenges that impede information technology management practices. Due to globalization that has come as a result of the

society accepting and making use of the technological products and advancements, there have arisen a number of management hindrances that face the information technology specialists. According to Martin (2009), there is an urgent need to investigate and underscore the overall importance of information technology managers and their co-workers as away to help create effective management practices. These dimensions, as inferred by Yoo et al., (2006) are repository to human resource management in organizations and information technology management being an important department within the organization, will in one way be affected by management decisions and practices of the top decision making bodies within the organization (Huub, 2008; William, 1980; Barbara, 2001; Caudle, 1991).
The way and the manner in which information technology managers exhibit their management practices are determined by a number of factors and drivers. Some of these factors according to Bob (1994) include performance management, best management practices, information technology products, services and delivery processes.
Information technology (IT) products, services, and delivery processes are important resources for results-driven government programs and operations (Drucker, 2007; Gee-woo, 2005; Kara, 2007). For purposes of this research, information technology (IT) also includes the organizational units and contractors primarily responsible for delivering IT. Line managers, the operational customers relying on IT products and services and information technology managers themselves, want to know "How are information technology products and services, including the information infrastructure, supporting the delivery and effectiveness of the enterprise's (agency) programs?" As pointed by Philip (2003), successful organizations rely heavily on performance measures to operationalize mission goals and objectives, quantify problems, evaluate alternatives, allocate resources, track progress, and learn from mistakes (Lucas, 1975; Hal, 1992; Yoo, 2006; Thomas, 2009). Operational customers and IT managers in these organizations form partnerships to design, manage, and evaluate IT systems that are critical to achieving improved mission success coupled with effective managerial practices (Kling, 1980; Keen, 1992).
How IT performance management and practice is designed, implemented, and sustained in each organization depends on many factors, including; the organization's culture, whether the management practices supports information technology performance management (Lesile, 2007, Yoo, 2006; Huub, 2008) and reflects this support in its program and personnel appraisal and reward systems which include; the importance of IT to program (mission) delivery, the accepted utility of IT in the organization, the allocation of IT responsibilities in the organization, including whether IT is centrally managed or responsibility is dispersed and the availability of resources (e.g., skills, people, tools, money) to support performance management practices.

1.1 Purpose

The relevance and reliability of an Information technology system is evaluated based on the quality of products that comes out after successive training in managerial practices. The rise of IT managers has in a number of ways established the need to have review into their management theories and practices.
This research therefore, sought to find out if IT managers were facing challenges resulting from administration and management practices. This research was carried out to investigate on the impediments facing IT managers. The study involved effective drivers of management adopted from Sabourin (2009) experiential leadership model, with managerial drivers of; rules, initiatives, integrity, immediate action and emotions to better identify key obstacles that face information technology managers and their management practices.

1.1.2 Research Objectives

1.1.2.1 General objective

The general objective was to critically establish the managerial challenges that impede IT managers while executing their leadership and management functions.

1.1.1.2 Specific objectives

(i) To identify the status, problems and the needs of further managerial orientation within IT related organizations and departments.
(ii) To investigate how IT managers execute their functions as they motivate junior employees and personnel.
(iii) To establish how effective and relevant managerial drivers will be adopted by IT managers.

1.1.3 Hypothesis Formulation

H_1: Good and well structured policies and quality management approach by IT managers will have a positive impact on the performance of their employees in relation to driver of rules.

H_2: Given the nature of managerial impediments, IT managers and professionals would face challenges when initiating new changes in relation to driver of initiatives.

H_3: Stimulating the emotions of employees can help create better results and spur performance of an organization in relation to drivers of emotions.

H_4: Given the ever rising needs and decision to be made by managers, when faced with challenges managers will rely on the driver of immediate action.

1.1.4 Research Questions
In regards to the managerial practices adopted by IT managers and the impediments they face while exercising their managerial practices, the following questions were formulated,
Q_1 Would there be a tie-in between the IT professionals perceptions of their own organizations and the impediments related to drivers of rules?
Q_2 Would there be a link between the IT professionals perceptions of their own organizations and the impediments related to drivers of initiatives?
Q_3 Would there be a linkage between professionals perceptions of their own organizations and the impediments related to drivers related to emotions?
Q_4 Would there be a connection between the professionals perceptions of their own organizations and the impediments related to drivers related to immediate actions?

2.0 Literature Review

2.1 Overview of the Theoretical Framework

The current managerial requirements in technology development and innovations have installed a lot of pressure on IT managers to seek to perform to their best level. There are some key areas in IT that these managers have to monitor constantly and periodically to avoid any communication lapses and other technical hitches that accompany information delivery. These include; management practices, human resource control and information management
2.1.1 Management Practices: The Foundation of IT Performance Management practices

IT performance management and measures are considered subsets of overall performance management systems (Kara, 2007). In structuring an effective approach to performance management, it is also important to (i) differentiate between IT's impact on intermediate versus final program outcomes, (ii) use a good balance of different kinds of IT measures, (iii) understand that measures may differ by management tier within an organization, and (iv) evaluate both the overall performance of the IT function within an organization and the outcomes for individual IT investments (Gee-woo, 2005; Kara, 2007).

This approach suggests three primary practice areas that characterize IT performance management: IT systems with agency missions, goals, and programs; measures that determine how well IT is supporting strategic, customer, and internal business needs; and performance measurement mechanisms at various

decision-making levels within an organization. Two supporting practice areas are important to keep the overall IT measurement process working which provide performance data that is accessible, reliable, and collected in the least burdensome manner (Drucker, 2007; Gee-woo, 2005; Kara, 2007). The benefit of effective automated data and management information systems is that performance information can be effectively and efficiently used to make strategic, managerial, and day-to-day operational decisions. In addition, a commitment to the concept of continuous improvement used for organizations is essential for maintaining effective IT managerial practices (Keen, 1980).

Use of an IT results chain is only as good as the clarity and specificity of the overall organizational goals and objectives. Leading organizations build consensus among program managers, IT managers, customers, stakeholders, and staff to establish joint ownership for performance management. They work together to achieve a common understanding of goals, objectives, measures, and anticipated outcomes (Rapport, 1970). As a practical matter, those who will judge the success of programs and the supporting functions should agree on the links in the results chain from its purpose to the vital few measures (Wren, 1994). IT goals and measures flow directly from strategic goals. IT managers and staff do not develop performance management systems that optimize operational customer results without considering an enterprise wide perspective (Yoo, 2006). IT goals and measures in support of individual operational customers must meet IT department or unit objectives. In turn, IT department or unit objectives must map directly to both programmatic and enterprise wide strategic directions or goals (Drucker, 2007; Gee-woo, 2005; Kara, 2007). The result is that IT goals and measures track in a seamless fashion back to enterprise strategic directions or goals. If such mapping is not obvious when comparing measures and high-level goals, the IT function is probably not measuring the right things.

2.1.2 Information management

Implementing information technology solutions in a complex and ever-changing organizational environment is never easy (Graeme & Martin, 2009). The challenges inherent in information management projects mean that new approaches need to be taken, if they are to succeed. Users don't understand systems (Muhammad et al., 2009). When presented with six different information systems, each containing one-sixth of what they want, they generally rely on a piece of paper instead (or ask the person next to them). Educating staff in the purpose and use of a disparate set of information systems is difficult, and generally fruitless (Libicki 1995). The underlying goal should therefore be to deliver a seamless user experience, one that hides the systems that the information is coming from (Young-Mi, et al., 2007). This is not to say that there should be one enterprise-wide system that contains all information. There will always be a need to have multiple information systems, but the information contained within them should be presented in a human-friendly way (Libicki 1995; Tanya & Huub, 2008).

Successful information management is about organizational and cultural change, and this can only be achieved through strong leadership (Kendall et al 1987). The starting point is to create a clear vision of the desired outcomes of the information management strategy. This will describe how the organization will operate, more than just describing how the information systems themselves will work. Effort must then be put into generating a sufficient sense of urgency to drive the deployment and adoption of new systems and processes (Libicki 1995). Stakeholders must also be engaged and involved in the project, to ensure that there is support at all levels in the organization. This focus on leadership then underpins a range of communications activities that ensure that the organization has a clear understanding of the projects and the benefits they will deliver (Kraemer et al 1981). When projects are solely driven by the acquisition and deployment of new technology solutions, this leadership is often lacking. Without the engagement and support of key stakeholder outside the IT area, these projects often have little impact.

In practice, anyone looking to design the complete information management solution will be trapped by 'analysis paralysis': the inability to escape the planning process. Organizations are simply too complex to consider all the factors when developing strategies or planning activities. The answer is to let go of the

desire for a perfectly planned approach (Robert et al., 2009). Instead, project teams should take a 'journey of a thousand steps'. This approach recognizes that there are hundreds (or thousands) of often small changes that are needed to improve the information management practices across an organization. These changes will often be implemented in parallel (Gee-Woo et al., 2005).

2.1. 3 Conceptual framework

To develop our conceptual framework, the researcher explored the previous model developed by Sabourin (2009) on the drivers necessary for effective performance. This model consisted of the five drivers namely; rules, emotions, immediate action, initiatives and integrity. These drivers have been presented in the diagram below. The following is a brief description of the drivers as inferred by Sabourin (2009)

(i)Rules: This deals with the clarification and alignment of the manager's objectives. The driver gathers variables that refer to factual and rational analysis of given situations. This perspective leads to concept forming and formulation of generalizations that integrate the observations and the reflections. The economic planning and the analysis are prevailing in this dimension. Obstacles deal with figures, figures and protocols. Decision-making is based on facts and abstract principles.

(ii)Emotions: The driver of emotions deals with getting a commitment to the manager's objectives by its employees. This driver gathers variable dealing with topic such as fetching a commitment, clarifying problems, reconciling the divergent points of view and establishing consensus. In this second situation, we make a thoughtful observation that consists of making observations on the experience lived by the persons and of thinking about their meaning.

(iii)Immediate Action: The driver of immediate action gathers variables that reflect creating value-added action or immediate actions in response to urgent matters in the execution of objectives. It addresses concrete action and those that allows rapid actions on small scale to obtain quick results. Thus, the variables deal with quick decision taking without respect to an established plan.

(iv)Initiatives: The driver of initiatives deals with translating managerial objectives into concrete projects for employees. It gathers variables dealing with introduction of new projects and ideas that results in more willing and more capable employees. This third driver relies on the active experiment of initiatives; realize projects and continuous improvements to the existing activities.

(v)Integrity: The driver of integrity deals with executing objectives in the context of integrity of values and principles. It gathers variables associated with executing objectives in respecting organizational values and principles. These variables refer to obstacles faced concerning organizational values. This is the capacity to realize the organization objectives in the respect of the integrity under pressure.

3. 0 Research Methodology and Design

3.1.1 Study design
The research involved qualitative and quantitative studies to explore the research objectives and findings. The use of a "mixed-methodology" approach, both qualitative and quantitative methods, benefited the researcher by giving a wider view and more evidence to analyze the issues. A focus group and a survey were involved in the respective stages (qualitative and quantitative) of this research in Canadian province. Firstly, focus group (IT technicians) findings served the purpose of providing information for the next stage. The data gathered from the focus groups was analyzed to identify how IT specific themes match the variables in the identified in the literature. Secondly, an online survey was used to explore in depth some of the impending issues which IT managers face while executing their objectives.

3.1.2 Participants Sample

The eligible study participants were degree prepared and qualified IT technicians and administrators from various IT systems and institutions operating within the Canadian province selected for study. For the specific purpose of this study, a survey of 149 information technology managers was completed and analyzed using the descriptive statistics analysis for which 5 categories of obstacles faced by information technology managers were identified.
Before undertaking this study, we developed a specific instrument capable of measuring management practices adopted by information technology managers in their organizations. To do so we completed a set of 15 focus groups with information technology managers to survey from a qualitative perspective, the set obstacles that they faced. They were gathered under the 5 categories of the previous research carried out by Sabourin (2009).

3.1.3 Focus groups with managers to identify managerial obstacles
Before undertaking this specific study, we completed focus groups with information technology managers to list the various obstacles they face from each of the drivers previously identified. Fifteen focus groups were conducted with an average of 10 information managers per group to identify obstacles faced by managers. We identified 5 obstacles from each of the 5 drivers totaling to 25 obstacles. The obstacles were selected based on the frequency among the participants for each of the focus groups. The obstacles identified were used as input to elaborate the measurement instrument related to obstacles.

3.1.4 Development of a measurement instrument
We further developed an instrument tool to measure the role of the 25 obstacles that were identified with managers in focus groups. We used the verbatim of the focus group to elaborate a survey to validate these obstacles. A pre-test of questionnaire was administered and the questions were sequentially adjusted with fifteen groups of approximately 10 managers per group before being rolled out to a larger sample of managers. Several adjustments were made in these 5 pre-test to insure the statistical behavior of each questions. The table below presents each of the 25 questions that were completed by the participants. This has been presented in table 2.

3.1.5 Surveys of information technology managers
The step 4 consisted of surveying a group of 149 managers in a governmental Department of a Canadian province. The participants were all managers and project managers with an information technology background and were in charge of supervising information technology projects. The group was selected to insure the homogeneity of the respondents in terms of origins, task and functions.
In the specific context of this research, we surveyed this specific group of managers in public services going through the context of information management to better understand obstacles facing information technology managers. These managers were undertaking transformation of their administrative systems with information technology activities in government institutions.

3.1.6 Data Analysis

For the purpose of this research, data analysis was descriptive in nature. To simplify the interpretation, degree of agreement with statements was aggregated into two categories of yes and no. Responses were analyzed as single cohort for the respective obstacles and variables that constituted the drivers. Online survey data were downloaded to an excel spreadsheet and then imported into standard statistical package for social sciences software for descriptive analysis. Responses were categorized into two general categories of “Yes’’, and “No” to simplify data interpretation. Incomplete surveys were included in the analysis, provided that the basic demographic information and a response to a particular question were provided.

4.0 Findings and Results

4.1.1 Results
One hundred and forty nine (149) online survey accesses were recorded during the designated survey collection period. This represents 45% of all IT managers practicing in Canada. None of the surveys were

found to contain no responses or respondent duplicated survey attempts and thus none was neglected. We noted that not all participants provided responses to all the survey questions.

4.1.2 Frequency demographics based on research variables with regard to managerial practices adopted by IT managers

The frequency demographic and respondents characteristics are summarized in table 2. This was based in the years of practice in administrative and management positions since commencing the employment. The analysis of the data involved a purely descriptive analysis, which had frequency, percentage, valid percentage and the means of central tendencies which included mean, median and standard deviation (Table 3).

4.1.2.1The driver of rules
Below is a description of what the data gathered from the survey regarding each of the variables of this driver. The driver had variables labeled V_{29} to $V_{33.}$ With regards to V_{29} .it was noted to have mean score 2.28, median of 2.00 and standard deviation 0.844. V_{30}: noted a mean score 2.02 median of 2.00, and standard deviation 0.933. V_{31}: the variable came out with a mean score 2.54, median 2.00 and standard deviation 0.668. V_{32}: had noted mean score 3.08, median of 3.00 and standard deviation 1.373. V_{33}: emerged with a mean score 2.99, median of 3.00, and standard deviation 1.190.

4.1.2.2. The driver of emotions
The driver had its variables labeled as V_{34} to V_{38}. V_{34}: had a mean score: 2.61 and, median of 2.50 and, standard deviation: 0.862. V_{35}: noted to have a mean score 2.50, median of 2.00 and standard deviation 0.906. V_{36}: was observed to have a mean score 2.86, median of 3.00 and standard deviation 0.906. V_{37}: only reported a mean score of 2.24, median of 2.00 and standard deviation 0.901. V_{38}: after analysis, we noted a mean score of 2.36, median of 2.00, and a standard deviation of 0.934.

4.1.2.3 The driver of initiatives
The driver had important variables labeled V_{39} to V_{43}. V_{39}: For this variable the median score is 2.55, median of 2.00 and the standard deviation is 1.014. $V_{40;}$ noticed a mean score 2.92, median of 3.00 and standard deviation 1.064. V_{41} had a mean score 2.77, median of 3.00 and standard deviation 1.020. $V_{42;}$ had a mean score is 3.26, median of 3.00 and the standard deviation is 1.118. V_{43}: From the data analysis, the mean score 2.99, median of 3.00, standard deviation 1.079.
4.1.2.4 The driver of immediate action
The driver had variable labeled V_{44} to $V_{48.}$ V_{44}: From the analysis, this variable had a mean score of 2.92, median of 3.000 and standard deviation of 1.123. V_{45}: scooped a mean score was of 3.34, median of 3.00 and standard deviation 1.152. V_{46}: The analysis of the data gave rise to a mean score 2.93, median of 3.00 and standard deviation1.210. V_{47}: This variable screened a mean of 3.80, median of 4.00 and a standard deviation of 1.137. V_{48}: managed to hold a mean score of 2.94, median of 3.00 and a standard deviation1.334.

4.1.2.5 The driver of Integrity
Under this driver there were variables labeled V_{49} to V_{53}. $V_{49;}$ after analysis had a mean score of 2.61, median of 3.00 and standard deviation 0.984, V_{50}; screened a mean score of 2.89, median of 3.00 and a standard deviation 0.954. V_{51}: Overall, this had a mean average score of 2.72, median of 3.00 and standard deviation 0.901. V_{52}; was noted to have a mean average score of 2.31, median of 2.00 and standard deviation of 1.010. V_{53} was observed to have a mean score is of 2.94, median of 3.00 and standard deviation 0.954.
4.1.3 Perception of IT managers towards the drivers of managerial practices and leadership
With regards to the drivers of management practices, it was established that the driver of immediate action holds the highest consideration towards managerial practices by IT managers. This driver had, a frequency recorded 131, mean of 3.1897, median of 3.200 and standard deviation of 0.75874. The driver of rules was after analysis found to have a frequency of 132, a mean of 2.5773, median of 2.500 and standard deviation

of 0.72983. The driver of emotions had a frequency of 131, mean of 2.5530, median of 2.400 and standard deviation of 0.71773. The driver of integrity had a frequency of 130, mean of 2.6969, median of 2.600 and standard deviation of 0.70603. The driver of initiatives had a frequency of 130; mean score of 2.8923, median of 2.800 and standard deviation of 0.80602. The summary is presented in table 4.

Our analysis therefore brings to light, the modern perspective of five drivers of management for IT managers. The analysis of the data highlights how IT management gathers multidimensional practices with varying complementary facets. The following is a brief discussion of the drivers.

The driver of immediate action is considered as the foremost management driver due to its high score in mean of 3.1897 and median of 3.200. In other words, emergencies and last minute rush would always arise and if puzzled well, they contribute to successful execution of management and objective achievement. The findings related to the driver of initiatives can be applied in the area of identification of training and developmental needs of IT managers and employees, to fulfill the competency gap. Conversion of goals into concrete projects, techniques used for team based management, techniques used as self resolution for solving managerial dilemmas all need a set of unique competency.

The findings related to the driver of rules also have managerial and leadership implications for IT managers. This driver focuses on the clarity of communicating the expectations, systems to evaluate the results and supportive parameters and the process used for regular reviews and it calls for precise identification, design and implementation of communication systems, evaluation systems and monitoring systems respectively. Hence the management should design perfect systems to ensure that the drivers of rules are followed by IT managers and technicians.
Though not all management skills will be needed, the study shows that the driver of emotions has a crucial impact when IT managers are achieving their organizational objectives, especially with well motivated employees. Though the driver of integrity was not widely commented, with regards to this study on IT management and leadership exercising, there is need that managers ensure that their actions are clean and focused on the overall attainment of the organization's objectives and goals. The summary of the report has been presents in table 3.

4.1.4 Hypotheses confirmation and the research drivers
This section examines and discusses all our hypotheses formulated earlier. With respect to the findings on the subject of exploring the obstacles faced by IT managers in their managerial practices, we intend to examine to what extent each of our hypotheses were supported. The results of the empirical analyses have provided answers to our research questions. Apart from examining the hypotheses formulated we also wish to elucidate other potential observations of our research to existing literature on IT management practices. Our conceptual model shows that the obstacle drivers in relation to the implementation of organizational strategies are different in terms of importance.

Drivers of rules: The rules remain a significant dimension in the implementation of the objectives of an organization. As such, the ability of managers to master the rules of procedure in conjunction with the development needs of the company is sometimes associated with the work experience and entrepreneurial culture, which have been implemented.
Q_1 confirms the hypothesis H_1: Good and well structured policies and quality management approach by IT managers will have a positive impact on the performance of their employees in relation to driver of rules.
Drivers of Initiatives: Risk-taking is a critical factor in the development of a business and in the cohesion of the working groups. This risk-taking is often very carefully calculated so that the company and its employees are given some leeway to act in the direct interests of the organization.
Q_2 confirms the hypothesis H_2: Given the nature of managerial impediments, IT managers and professionals would face challenges when initiating new changes in relation to driver of initiatives.
Drivers of Emotions: Indeed, the study shows that the driver of emotions has a crucial impact when IT managers are achieving their organizational objectives. In response to the question Q3, we confirm through

the hypothesis H_3: Stimulating the emotions of employees can help create better results and spur performance of an organization in relation to drivers of emotions.
These results also confirm the studies of many other authors who emphasized the organization's ability to define problems and classify them (Drucker, 2007); to tackle resistances to change and to improve the co-ordination. All these abilities must be seen as one of the key factors, which can impact on an employee's level of perception.

Drivers of immediate action: Under the drivers of immediate action, our hypothesis states that IT managers would anticipate many emergencies and last minutes requests and changes as a key obstacle since there is volatility in the IT environment, especially with software security and information management. The descriptive analysis supported this hypothesis.
Q_4 confirms the hypothesis H_4: Given the ever rising needs and decision to be made by managers, when faced with challenges managers will rely on the driver of immediate action.
5.0 Discussion

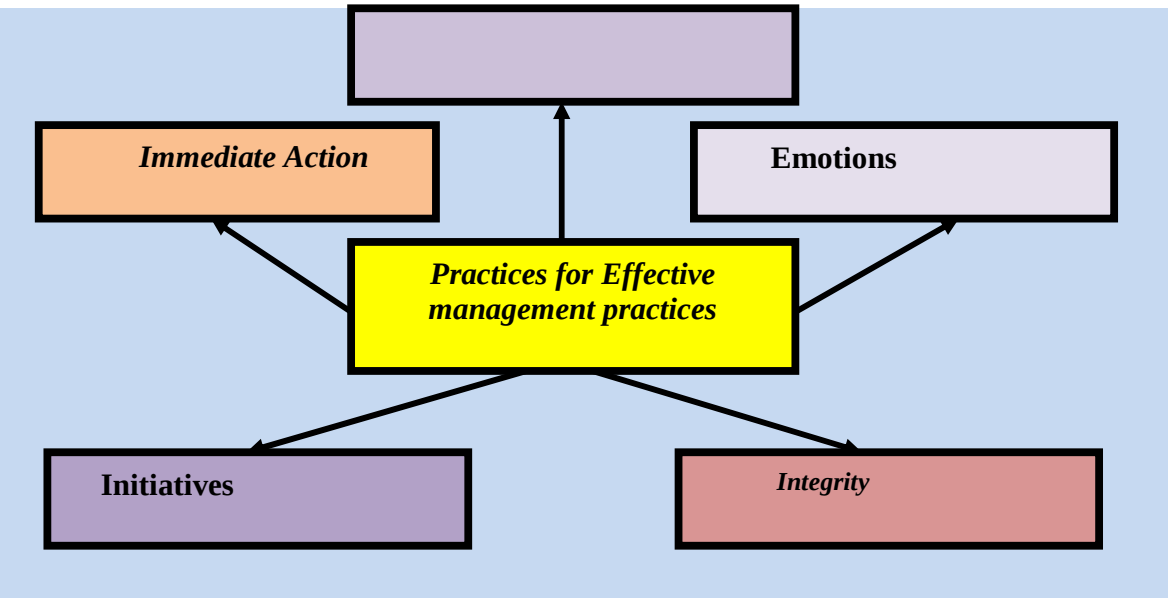
Based on the responses of the focus groups, the findings and literature review arguments, it remains relative that information technology managers face a multiple of challenges in their managerial practices. These challenges range from information management, human resource controls and managerial practices. As reported in the research drivers and confirmed in the previous research, the driver of rules according to Sabourin (2009) focuses on the clarity of communicating the expectations, systems to evaluate the results and supportive parameters and the process used for regular reviews and it calls for precise identification, design and implementation of communication systems, evaluation systems and monitoring systems respectively. This driver would present some management barriers especially when employees try to oppose new rules. The ranks and chains of command remain to be necessary tools in effective management practices. With regards to the driver of emotions, it is relative that managers try to establish some of the amicable ways of stimulating the emotions of their employees so as to avoid any form of managerial problems. Managers have to fetch the commitment of their co-workers notably by creating positive emotions as a reliable climate, common perspectives which see to it that people have the necessary motivation to carry out the objectives.
Informational managers have always to ensure that their approaches do not turn out to be slow. They have to be able to take immediate action when faced with an urgent need in their information management. This is in line with the holding of the driver of immediate action. This driver of immediate action allows managers to act in a concrete way, on a small scale to obtain results quickly. With this driver, managers have the privilege of a fast decision-taking, in an established plan or in consensus. So, they can make consultations only as far as it gives results quickly. Successful information management is about organizational and cultural change, and this can only be achieved through strong leadership (Kendall et al 1987). The starting point is to create a clear vision of the desired outcomes of the information management strategy. This will describe how the organization will operate, more than just describing how the information systems themselves will work. Effort must then be put into generating a sufficient sense of urgency to drive the deployment and adoption of new systems and processes (Libicki 1995).
Any initiative taken by information technology managers will have an impact on their managerial practices as noted from the driver of initiative. This driver aims at translating the objectives of the organization into concrete projects by giving responsibilities to each of the teams and ideally to each of the members in the organization. Such initiatives have the effect of increasing considerably the sense of the responsibilities and the initiative of the employees. This driver turns the more capable and voluntary employees towards the realization of a given objective. This driver rests on the implementation of new ideas and improvements of information and communication approaches.
When dealing with co-workers it is essential that managers be able to observe some sense of integrity in their management practices. When managers and co-workers have pressure, they have to make sure to work on the realization of their objectives in an integral way that is in harmony and in a coherent way with the values and principles of their organization. The members of the organization have to find in themselves their motivation to realize the objectives of the organization. The driver of integrity rests on the emotion to work for the overall good. This situation prevails in spite of the tendency of many organizations to set up an incentive payment.

5.1.1 Practical and Theoretical Implications for effective managerial practices by IT Managers
Our research has implication for the information management practices by IT managers. It shows that a specific focus should be regarding on the impediments IT managers have had to deal with. Even if this study emphasized many managerial impediments, it did not found the reason why IT managers encountered more obstacles related to immediate action. Consequently, the case of IT managers, a specific focus should be put for the impediments that are related to immediate action and rules. Our research has implications for social action in relation to the thorny subject matter of information quality. For instance an organizational context where IT managers and technicians are segregated could hinder their effort to perform and to access to top management position. Our research also has implications for IT managerial action in the sense that it will be always beneficial for our organization to let express different sensibilities and approach to problem-solving within the framework to promote participative management among IT managers and their technicians.
5.1.2 Limitations and Future Research
In the context of IT management practices, additional research with large samples will be necessary to support the current findings and its validity. Additional research is required to generalize these findings to the IT managers employed specifically in the government institutions and the private sector. Also global level categories have to be included in the additional research to generalize the current research findings.
5.1.3 Conclusion
This study is focused on the challenges experienced by IT managers and co-workers as they execute their management practices. Taken as a whole, our findings suggest that, there are some impediments associated with drivers of Emotions, immediate action, Rules and initiatives as well as integrity. Even if these obstacles are in multiple levels to develop and promote IT management practices, it is imperative to study with more depth obstacles faced by IT managers in order to better understand how the obstacles they face represent an impediment to the development of their competencies and effective performance in IT.
References
Dima, J., Yusuf, S., Charbel, Z., (2009).”The learning organization: tracking progress in a developing country; A comparative analysis using the DLOQ”. The Learning Organization. Bradford: Vol. 16, Iss. 2; pg. 103.
Muhammad, A., Erik, J., de B., Olaf, A., M., F., Cory, S., & Harm-Jan, S., (2009). “Process embedded design of integrated management system”. The International Journal of Quality & Reliability Management. Bradford: Vol. 26, Iss. 3; pg. 261.
Young-Mi, K., Judy, A., Kara, S., L, E., K., Dan, B., Ron, M., & Lynn, J., (2007). “Enterprise Digital Asset Management System Pilot: Lessons Learned”. Information Technology and Libraries. Chicago: Vol. 26, Iss. 4; pg. 4, 13 pgs.
Robert, P., Lesile, W., (2007). “Critical Success Factors in International ERP Implementations: A Case Research Approach”. The Journal of Computer Information Systems. Stillwater: Vol. 47, Iss. 3; pg. 60, 11 pgs.
Cecil, B., (2006). “ERP implementation efforts at three firms; Integrating lessons from the SISP and IT-enabled change literature”. International Journal of Operations & Production Management. Bradford: Vol. 26, Iss. 11; pg. 1223.
Gee-Woo, B., Robert, W., Z., Young-Gul, K., Jae-Nam, L., (2005). “Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social-Psychological Forces, and Organizational Climate 1”. MIS Quarterly. Minneapolis: Vol. 29, Iss. 1; pg. 87, 25 pgs.
Barbara, H., W., & Hughe, J., W., (2001).”An empirical investigation of the factors affecting data warehousing success”**.** MIS Quarterly. Minneapolis: Vol. 25, Iss. 1; pg. 17, 25 pgs.
Yongesh, M., & Dennis, G., (2005). A Multidimensional Commitment Model of Volitional Systems Adoption and Usage Behavior**.** Journal of Management Information Systems. Armonk: Vol. 22, Iss. 1; pg. 117.
Robert, R., R, A., Thomas, W., F., (2009). “Aligning the IT human resource with business vision: The leadership initiative”. MIS Quarterly. Minneapolis: Vol. 24, Iss. 2; pg. 327, 27 pgs
Rajeev, S., & Philip, Y., (2003). “The Contingent Effects of Management Support and Task Interdependence on Successful Information Systems Implementation1”. MIS Quarterly: Minneapolis: Vol. 27, Iss. 4; pg. 533

Tanya, V., B., & Huub, J., M., R., (2008). "HRM systems for successful information technology implementation: evidence from three case studies". European Management Journal: London:Vol. 26, Iss. 3; pg. 153.
Kwok, H., L., & Jianmei, Z., (2006). "Drivers and obstacles of outsourcing practices in China". International Journal of Physical Distribution & Logistics Management. Bradford: Vol. 36, Iss. 10; pg. 776.
Graeme, M., & Martin, R., (2009). "Reconceptualising absorptive capacity to explain the e-enablement of the HR function (e-HR) in organizations". Employee Relations. Bradford: Vol. 31, Iss. 5; pg. 515.
Bartol, K.M. & Martin, D.C. (1991). Management. New York: McGraw-Hill.Bateman, T.S.& Zeithaml, C. P. (1993). Management: function and strategy (2nd Edition). Burr Ridge, Illinois: Irwin.
Butterworth-Heinemann. Fayol, H. (1949). General and industrial management. Translated, C. Stones.
Drucker, P. F. (2007). Management: tasks, responsibilities, practices. Oxford:
Isaac, Stephen, and Michael, William B. (1981). Handbook in Research and Evaluation. 2nd ed. San Diego, CA: Edits Publishers.
Keen, Peter G.W. (1980) "Information Systems and Organizational Change". Report CISR-46, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.
Keen, Peter G.W. "Introducing Change". Computerworld, September, 29, 1982. p. 10.
Kendall, K.E., Buffington, J.R., and Kendall, J.E., (1987) "The Relationship of Organizational Subcultures to DSS User Satisfaction", Human Systems Management, Vol. 7. pp. 31-39.
Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc.
Kling, R. (1980) "Social Analyses of Computing: Theoretical Perspectives in Recent Empirical Research". Computing Survey, Vol. 12, No. 1, pp.61-110.
Kraemer, Kenneth L., Dutton, William H., and Northrop, A., (1981). The Management of Information Systems. New York, NY: Columbia University Press.
Laudon, K. (1996), Management Information Systems. Upper Saddle River: Prentice Hall, Inc.
Lederer, A. L., & Mendelow, A. L. (1988) "Convincing Top Management of the Strategic Potential of Information Systems", MIS Quarterly December.
Lewin, K., (1947) "The Coming of the New Organization", Human Frontiers, Vol. 1.
Libicki, Martin C. (1995) Information Technology Standards: Quest for the Common Byte. Newton, MA: Butterworth-Heinemann.
Lucas, H. (1975). Why Information Systems Fail. New York, NY: Columbia University Press.
Marchand, D., A., (1985) "Information Management: Strategies and Tools in Transition", Information Management Review 1 summer, pp. 27-34. Marshfield, Mass: Pitman Publishing Wren, D., A., (1994). The evolution of management thought, ed.), New York:
Newcomer, K., E., & Caudle, S., L., (1991) "Evaluating Public Sector Information Systems: More than Meets the Eye." Public Administration Review. Vol. 51, September/October: pp. 377-384.
Norton, B., (1994) "Organizational Cultures and their Relevance to the Information Organization." Aslib Proceedings. Vol. 46, No. 6, June: pp. 173-176.
Rainey, H., G., (1991) Understanding and Managing Public Organizations. San Francisco, CA: Jossey-Bass Publishers.
Rainey, H., G., and Perry, James L., (1992) Building Public Management Research and Practice. In Ingraham, Patricia W., and Kettle, Donald F. ed. Agenda for Excellence, Chatham, NJ: Chatham House.
Rapport, R., N., (1970) "Three Dilemmas in Action Research", Human Relations, vol. 23, pp. 499-513.
Wamsley, G., L., (1992) Management Processes A working document, Virginia Polytechnic and State University.
Yoo, J., W., Lemak, D., J., & Choi, Y., (2006) Principles of management and competitive strategies: using Fayol to implement Porter. Journal of Management History, 12 (4), 352-368.

Sabourin, V., (2009). Experiential leadership: five strategies to improve the efficiency of services and transform organizations. Colloquium proceedings of (AIMS) l'Association Internationale de management stratégique.

Fig 1: summary of the conceptual drivers



Source: Sabourin (2009). A model for Drivers of effective performance in strategy execution

Table 1: Description of measurement variables in the drivers

Drivers & Variables	**Measurement-Questions**
Driver of Rules	
V_{29}	I have developed work techniques to clarify the expectations of our bosses.
V_{30}	We have identified goals that focus on customer service.
V_{31}	We have developed work techniques to help individuals stay focused on the results to be achieved
V_{32}	We systematically conduct annual reviews of our activities with the other units within our organization.
V_{33}	We are able to estimate the economic value of improvements we wish to make throughout the organization
Drivers of Emotions	
V_{34}	We are able to encourage our workers to adhere to our goals so that they are fully aware of their importance.
V_{35}	We are able to communicate a sense of urgency to our workers so that they are able to make rapid decisions..

V_{36}	We are able to significantly increase the motivation and levels of engagement of our workers.
V_{37}	We work closely with colleagues who are able to support us during the decision-making process.
V_{38}	We are able to treat our employees fairly.
Drivers of Initiatives	
V_{39}	We have developed a culture that fosters initiative and accountability.
V_{40}	We translate our goals into concrete projects for all our employees.
V_{41}	We know how to set team goals.
V_{42}	We have developed techniques to increase self-resolution of problems for team members.
V_{43}	In my organization, we use various techniques according to the level of importance of decisions and team-based management.
Drivers of Immediate action	
V_{44}	We systematically provide improvements and contingency plans to effectively respond to emergencies.
V_{45}	Over the past years, the number of emergencies we responded to has decreased.
V_{46}	We systematically perform reviews to find durable solutions for repeat situations.
V_{47}	I dedicate at least 2 to 3 ninety-minute sessions each week to work directly on their annual goals.
V_{48}	We dedicate a maximum of one day each week to respond to urgent requests.
Drivers of Integrity	
V_{49}	We clearly define the values of our organization.
V_{50}	When under pressure, we are able to reinforce the values of our organization.
V_{51}	I am able to recognize differences between the values of my employees and those of my organization.
V_{52}	We have ways of contributing to the organization's reputation through the services we provide.
V_{53}	We have work methods to systematically reinforce our employees' sense of obligation.

Table 2: Summary of descriptive analysis of the research variables

Driver	Variable		Percentage	Valid Percentage	Measures of Central Tendency		
		Frequency			Mean	Median	STD Deviation

Rules	V_{29} V_{30} V_{31} V_{32} V_{33}	131 132 132 131 131	87.9 88.6 88.6 87.9 87.9	100 100 100 100 100	2.28 2.02 2.54 3.08 2.99	2.00 2.00 2.00 3.00 3.00	0.844 0.933 0.668 1.373 1.190
Emotions	V_{34} V_{35} V_{36} V_{37} V_{38}	132 131 132 132 129	88.6 87.9 88.6 88.6 86.6	100 100 100 100 100	2.61 2.50 2.86 2.24 2.36	2.50 2.00 3.00 2.00 2.00	0.862 0.906 0.906 0.901 0.934
Initiatives	V_{39} V_{40} V_{41} V_{42} V_{43}	132 131 131 130 129	88.6 87.9 87.9 87.2 86.6	100 100 100 100 100	2.55 2.92 2.77 3.26 2.99	2.00 3.00 3.00 3.00 3.00	1.014 1.064 1.020 1.118 1.079
Immediate action	V_{44} V_{45} V_{46} V_{47} V_{48}	132 130 131 130 130	88.6 87.2 87.9 87.2 87.2	100 100 100 100 100	2.92 3.34 2.93 3.80 2.94	3.00 3.00 3.00 4.00 3.00	1.123 1.152 1.210 1.137 1.334
Integrity	V_{49} V_{50} V_{51} V_{52} V_{53}	130 129 129 130 130	87.2 86.6 86.6 87.2 87.2	100 100 100 100 100	2.61 2.89 2.72 2.31 2.94	3.00 3.00 3.00 2.00 3.00	0.9840 0.9540 0.9010 1.010 0.954

Table 3: Summary of descriptive analysis of the managerial drivers

Driver	Frequency	Percentage	Valid Percentage	Measures of Central Tendency		
				Mean	Median	STD Deviation
Rules	132	88.6	100	2.5773	2.500	0.72983
Emotions	131	87.9	100	2.5530	2.400	0.71773
Initiatives	130	87.2	100	2.8923	2.800	0.80602
Immediate action	131	87.9	100	3.1897	3.200	0.75874
Integrity	130	87.2	100	2.6969	2.600	0.70603

Information and Knowledge Management
ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
Vol 2, No.2, 2012

The Novel Lossless Text Compression Technique Using Ambigram Logic and Huffman Coding

Suresh Kumar*, Madhu Rawat, Vishal Gupta, Satendra Kumar

Department of Computer Science, G. B. Pant Engineering College, Pauri, Uttarakhand, INDIA

* E-mail of the corresponding author: vishalgupta87@gmail.com

Abstract

The new era of networking is looking forward to improved and effective methods in channel utilization. There are many texts where lossless data recovery is vitally essential because of the importance of information it holds. Therefore, a lossless decomposition algorithm which is independent of the nature and pattern of text is today's top concern. Efficiency of algorithms used today varies greatly depending on the nature of text. This paper mainly brings in the idea of using an art form called ambigram to compress text which is again compressed by Huffman coding with consistency in the efficiency of the compression.

Keywords: Ambigrams, Huffman coding, Lossless compression, Steganography, Embedded algorithms, Encryption.

1. Introduction

There are many algorithms exist in this world for compressing the data, some of them carries lossy techniques which sometimes destroy some important data also. Our technique is carries lossless compression using ambigram and Huffman coding which compress the data more than 60%. The ambigram technique is known to this world from decades earlier but not to be used for compressing the data. Our main concern is in this technique which can be further used with the much known compression technique Huffman coding without the loss of any data.

A. Ambigram - Definition

The word ambigram was firstly describe by Douglas R. Hofstadter, a computer scientist who is best known as the Pulitzer Prize winning author of the book Godel, Escher, Bach. In Hofstadter defines what he means by an ambigram.

"An ambigram is a visual pun of a special kind: a calligraphic design having two or more (clear) interpretations as written words. One can voluntarily jump back and forth between the rival readings usually by shifting one's physical point of view (moving the design in some way) but sometimes by simply altering one's perceptual bias towards a design (clicking an internal mental switch, so to speak). Sometimes the readings will say identical things; sometimes they will say different things."

B. Huffman Coding:

In computer science and information theory, Huffman coding is an entropy encoding algorithm used for lossless data compression. The term refers to the use of a variable-length code table for encoding a source symbol (such as a character in a file) where the variable-length code table has been derived in a particular way based on the estimated probability of occurrence for each possible value of the source symbol.

2. Types of Ambigrams

A. Half Turn Ambigrams

Half-tum ambigrams have two different readings and to switch from one to the other we simply have to rotate the ambigram 180 degrees in the plane it is living in as shown in Fig. 1.

B. Quarter Turn Ambigrams

Quarter Tum Ambigrams have three different readings and to switch from one to another we simply have to rotate 90 degrees in the clockwise or anti-clockwise direction as shown in Fig. 2.

C. Wall Reflection Ambigrams

Wall Reflection Ambigrams have two different readings and to switch from one to another you simply have to reflect through a vertical line in the plane as shown in Fig. 3.

D. Lake Reflection Ambigrams

Lake reflection ambigrams have two different readings and to switch from one to the other you simply have to reflect through a horizontal line in the plane.

E. Dissection Ambigrams

Another type ambigram that does not fall into either of the categories is the dissection ambigram. The example below illustrates that the circle can be squared after all as shown in Fig. 4.

3. Types of Huffman coding

Many variations of Huffman coding exist, some of which use a Huffman-like algorithm, and others of which find optimal prefix codes (while, for example, putting different restrictions on the output). Note that, in the latter case, the method need not be Huffman-like, and, indeed, need not even be polynomial time. An exhaustive list of papers on Huffman coding and its variations is given by "Code and Parse Trees for Lossless Source Encoding".

A. *n*-ary Huffman coding

The *n*-ary Huffman algorithm uses the {0, 1, ... , *n* − 1} alphabet to encode message and build an *n*-ary tree. This approach was considered by Huffman in his original paper. The same algorithm applies as for binary (*n* equals 2) codes, except that the *n* least probable symbols are taken together, instead of just the 2 least probable. Note that for *n* greater than 2, not all sets of source words can properly form an *n*-ary tree for Huffman coding. In this case, additional 0-probability place holders must be added. This is because the tree must form an *n* to 1 contractor; for binary coding, this is a 2 to 1 contractor, and any sized set can form such a contractor. If the number of source words is congruent to 1 modulo *n*-1, then the set of source words will form a proper Huffman tree.

B. Adaptive Huffman coding

A variation called adaptive Huffman coding involves calculating the probabilities dynamically based on recent actual frequencies in the sequence of source symbols, and changing the coding tree structure to match the updated probability estimates.

C. Huffman template algorithm

Most often, the weights used in implementations of Huffman coding represent numeric probabilities, but the algorithm given above does not require this; it requires only that the weights form a totally ordered commutative monoid, meaning a way to order weights and to add them. The Huffman template algorithm enables one to use any kind of weights (costs, frequencies, pairs of weights, non-numerical weights) and one of many combining methods (not just addition). Such algorithms can solve other minimization problems, such as minimizing $\max[w_i + \text{length}(c_i)]$, a problem first applied to circuit design.

D. Length-limited Huffman coding

Length-limited Huffman coding is a variant where the goal is still to achieve a minimum weighted path length, but there is an additional restriction that the length of each code word must be less than a given constant. The package-merge algorithm solves this problem with a simple greedy approach very similar to that used by Huffman's algorithm. Its time complexity is $O(nL)$, where L is the maximum length of a code

word. No algorithm is known to solve this problem in linear or linearithmic time, unlike the presorted and unsorted conventional Huffman problems, respectively.

4. Working model

In this model, the text to be compressed is got from the user which is stored in a temporary memory. First step is to calculate the position of white spaces in the entered text and store the same in a file. Similarly, the positions of special characters are stored in a separate file, after which the white spaces and special characters are removed from the original text. Then the number of alphabets in the text is calculated and the text is divided into two equal parts. The first part is taken and for each letter present, a symbol from the font file is chosen in such a way that when the text is rotated by 180 degrees, the second part of the text can be read. In this way the text can be compressed to about 50%. After this we compressed this text with Huffman coding which further compressed the data and the final data is compressed more than 60%. [Refer Fig. 5].

5. Implementation

A. Creating font file

Creating a font file for ambigram would require 26 symbols for each character. For example, 'a' alone requires 26 symbols for it has look like all possible letters of alphabet when rotated. An example for this is given below:

A true type font file containing about 676 ambigram symbols is created and each symbol is given a code as follows:

• Each of the letters in the English alphabet set is given an index from 0 to 25. For example, letter 'a' is given an index o. Under each alphabet index, a set of 26 symbols is created. For example, under 'a', i.e. under 0, 26 ambigram symbols are created by combining 'a' with all the 26 alphabets in such a way that when rotated 180 degrees, every other letter from a to z can be formed following which the code for each symbol is assigned to be

$$\text{code} = (\text{first alphabet's index} * 26) + \text{second alphabet's index} \quad (1)$$

For example, the code of the symbol which represents 'db' is calculated as (3*26) + 1 = 79. Thus the font file with 676 ambigram symbols with each one mapped to a user defined code is created.

B. Text Compression

During first phase of the compression, the first letter of the first part on rotating should be the last letter of the second part and the second letter of the first part of the first part must be the last but one letter of the last part. Thus the first letter of the first part and the last letter of the second part are taken and their corresponding indices are found out and assigned to i and j respectively. Then the code of the symbol for representing these two letters is found out using (1). The corresponding symbol is fetched from the font file and stored in a file and the two letters are removed from the original file. The process is repeated till there are no more letters left. If the total count of letters in the original file is odd, then a single letter will be left out, which will be copied as it is without any replacement in the compressed file containing symbols [8].

After that Huffman compression starts working which is the second phase of the compression and as follows:

The technique works by creating a binary tree of nodes. These can be stored in a regular array, the size of which depends on the number of symbols, *n*. A node can be either a leaf node or an internal node. Initially, all nodes are leaf nodes, which contain the symbol itself, the weight (frequency of appearance) of the symbol and optionally, a link to a parent node which makes it easy to read the code (in reverse) starting from a leaf node. Internal nodes contain symbol weight, links to two child nodes and the optional link to a

parent node. As a common convention, bit '0' represents following the left child and bit '1' represents following the right child. A finished tree has up to n leaf nodes and $n - 1$ internal nodes. A Huffman tree that omits unused symbols produces the most optimal code lengths.

The process essentially begins with the leaf nodes containing the probabilities of the symbol they represent, and then a new node whose children are the 2 nodes with smallest probability is created, such that the new node's probability is equal to the sum of the children's probability. With the previous 2 nodes merged into one node (thus not considering them anymore), and with the new node being now considered, the procedure is repeated until only one node remains, the Huffman tree.

The simplest construction algorithm uses a priority queue where the node with lowest probability is given highest priority:

1. Create a leaf node for each symbol and add it to the priority queue.
2. While there is more than one node in the queue:
    1. Remove the two nodes of highest priority (lowest probability) from the queue
    2. Create a new internal node with these two nodes as children and with probability equal to the sum of the two nodes' probabilities.
    3. Add the new node to the queue.
3. The remaining node is the root node and the tree is complete.

Since efficient priority queue data structures require O(log n) time per insertion, and a tree with n leaves has $2n-1$ nodes, this algorithm operates in O(n log n) time, where n is the number of symbols.

If the symbols are sorted by probability, there is a linear-time (O(n)) method to create a Huffman tree using two queues, the first one containing the initial weights (along with pointers to the associated leaves), and combined weights (along with pointers to the trees) being put in the back of the second queue. This assures that the lowest weight is always kept at the front of one of the two queues:

1. Start with as many leaves as there are symbols.
2. Enqueue all leaf nodes into the first queue (by probability in increasing order so that the least likely item is in the head of the queue).
3. While there is more than one node in the queues:
    1. Dequeue the two nodes with the lowest weight by examining the fronts of both queues.
    2. Create a new internal node, with the two just-removed nodes as children (either node can be either child) and the sum of their weights as the new weight.
    3. Enqueue the new node into the rear of the second queue.
4. The remaining node is the root node; the tree has now been generated.

Although this algorithm may appear "faster" complexity-wise than the previous algorithm using a priority queue, this is not actually the case because the symbols need to be sorted by probability before-hand, a process that takes O(n log n) time in itself.

In many cases, time complexity is not very important in the choice of algorithm here, since n here is the number of symbols in the alphabet, which is typically a very small number (compared to the length of the message to be encoded); whereas complexity analysis concerns the behavior when n grows to be very large.

It is generally beneficial to minimize the variance of code word length. For example, a communication buffer receiving Huffman-encoded data may need to be larger to deal with especially long symbols if the tree is especially unbalanced. To minimize variance, simply break ties between queues by choosing the item in the first queue. This modification will retain the mathematical optimality of the Huffman coding while both minimizing variance and minimizing the length of the longest character code.

C. Decompressing Text

While decompressing, the process of decompression is simply a matter of translating the stream of prefix codes to individual byte values, usually by traversing the Huffman tree node by node as each bit is read from the input stream (reaching a leaf node necessarily terminates the search for that particular byte value). Before this can take place, however, the Huffman tree must be somehow reconstructed. In the simplest case, where character frequencies are fairly predictable, the tree can be pre-constructed (and even statistically adjusted on each compression cycle) and thus reused every time, at the expense of at least some measure of compression efficiency. Otherwise, the information to reconstruct the tree must be sent a priori. A naive approach might be to prepend the frequency count of each character to the compression stream.

This initial decompressed text with Huffman coding is read from the end of the file. If the end contains any letter it is copied as it is to a file. As and when a symbol is encountered, the code of the symbol is obtained on comparison with the font file. The indices of the two letters are calculated from the code as follows:

• Perform the operation (code / 26).

• The quotient gives the index of the first character (i)

And the remainder gives the index of the second character 0). Once the indices are calculated, the ambigram symbol is replaced by the corresponding pair of alphabets in the new file, by appending the alphabet corresponding to index 'i' to the beginning of the file and the alphabet corresponding to index 'j' to the end of the new file. After decompressing all the symbols with respective characters, the files with the position of white spaces and special characters are read and the white spaces and special characters are inserted accordingly in the new file thereby getting back the original text.

6. Applications in the field of steganography

The purpose of steganography is to hide the very presence of communication by embedding messages into innocuous-looking cover objects, such as digital images [9]. To accommodate a secret message, the original cover image is slightly modified by the embedding algorithm to obtain the stego image. Our compression method (which is the combination of Huffman coding and ambigrams) is applicable over a variety of data. For example-confidential data of Indian Army, navy and Air Force, confidential letters of the CEO of the companies, etc. where privacy is the most key issue. This method enhances the security and decreases detectability manifold as the original font set is made available to only the receiver. Therefore the secret message cannot be tracked by any external agent. The output of this technique is embedded by an image and then suitably encrypted and sent to the receiver with the corresponding stego key.

7. Conclusion and future work

We concluded here by saying that this technique presented here compressed text by around 60% which is comparable to other methods in existence. Moreover, unlike many other algorithms, this method does not restrict the user to give only specific types of inputs. Also, this is a lossless compression technique which involves no data loss while decompressing.

In future work, this proposed idea can be implemented and further be extended by embedding this technique in any other compression technique. Thereby the overall efficiency of compression can be further increased.

References

Douglas R. Hofstadter, Ambigrammi (in Italian), Hopeful-monster Editor, Firenze, 1987.

D.A. Huffman, "A Method for the Construction of Minimum-Redundancy Codes", Proceedings of the I.R.E., September 1952, pp 1098–1102. Huffman's original article.

Burkard Polster, Les Ambigrammes-I'art de symetriser les mots, Editions Ecritextes, 2004.

John Langdon, "Wordplay Ambigrams and Reflections on the art of Ambigrams, Harcout" Brace Jovanovich, 1992.

Scott Kim, Inversions: A Catalog of Calligraphic CartweeIs, Byte Books, McGraw-Hili, 1981.

Ken Huffman. Profile: David A. Huffman, Scientific American, September 1991, pp. 54–58

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. *Introduction to Algorithms*, Second Edition. MIT Press and McGraw-Hill, 2001. ISBN 0-262-03293-7. Section 16.3, pp. 385–392.

Gowtham S., Iyshwarya G., Kaushik Veluru, Tamarai Selvi A., Vasudha J., Text Compression Using Ambigrams, IEEE Conf. ICETE 2010,V4 page 509-511

Faisal AIturki, and Russell Mertsereau, "A Novel Approach for Increasing Security and Data Embedding Capacity in Images for Data Hiding Applications", *International Conference on Information Technology: Coding and Computing*, 2011. Page(s):228-233

Figure 1: Half Tum Ambigram of the word "ambigram"

Figure 2: Quarter Turn Ambigram of the word ”OHIO”

Figure 3: Wall Reflection Ambigram of the word “GEOMETRY”

Figure 4: Dissection Ambigram of the word “CIRCLE”

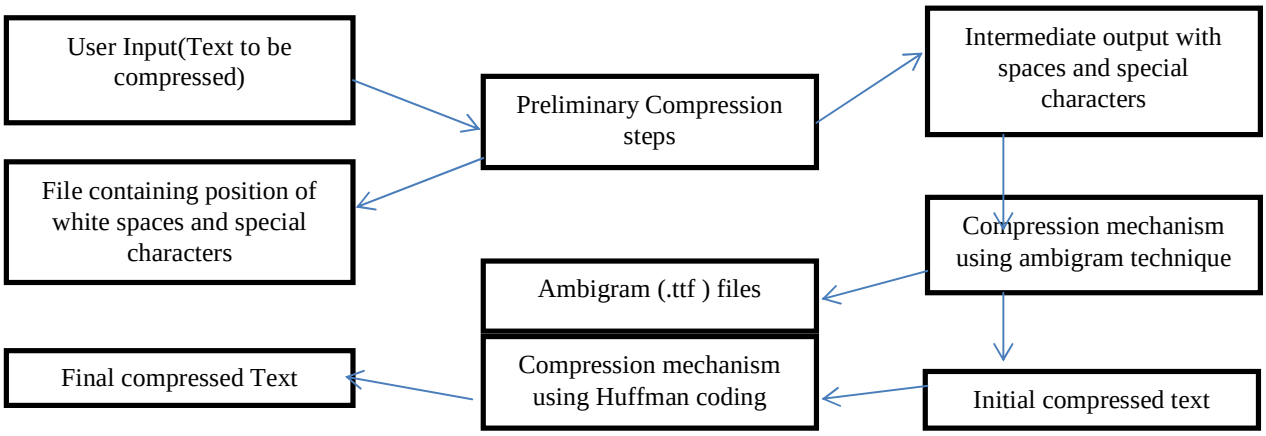


Figure 5: Text Compression Mechanism

Information and Knowledge Management
ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
Vol 2, No.2, 2012

Biometric Data Security using Recursive Visual Cryptography

LakshmiMadhuri.K.* Viraj Thakur Rajesh Jaiswal Sandesh Sonawane Rohit Nalavade
.Department of Computer Engineering,Pune University MAE Alandi
Pune ,Maharashtra 412105,INDIA.
*E-mail:team.rvcb.1@gmail.com

Abstract
Recursive Visual cryptography takes the idea from the basic scheme of Visual cryptography to hide multiple secrets recursively in the single image. This paper proposes a scheme of recursive creation of shares using the basic scheme and embedding secrets into the shares. This results levels of share creation *i.e. n- secrets* equals *n/2 levels*. This paper also provides secured authentication for the user, using the Biometric authentication Thus the proposed paper is implemented in any of the real time applications.
Keywords: Recursive Visual Cryptography, Embedding secrets, Biometric authentication, Levels of shares

1. Introduction

Internet is one of the most popular communication channels but is insecure. Since it is an open and insecure medium, malicious users can intercept data. The fast growth of online applications results in the data security problem. In order to achieve data security, users need secure communication methods for transmitting secret messages over the Internet. Encryption is well-known method for achieving data security. It transforms secret information into an encrypted form, which looks like a random message. Transformation procedure is called encryption process and the result is called cipher text. A computational device is required to perform decryption of the cipher text. Therefore, the cost or efficiency of the hardware, complex algorithms and mathematical computations increase to encrypt and decrypt the data.Therefore, the cost increases and efficiency reduces. and mathematical computations increase to encrypt and decrypt the data.

2. Data security

Security of data has been a major issue from many years. Using the age old technique of encryption and decryption has been easy to track for people around. Providing security to data using new technique is the need of the hour.This project uses the technique of Visual cryptography and providing biometric authentication. Thus using the above technique Recursive Visual cryptography would be implemented.

2.1Objectives

- To provide security in any real time application.
- To store more than one secret at a time.
- To provide much more security by adding biometric authentication.

3. Visual cryptography

One of the best known techniques to protect data such as image is Visual cryptography. Naor and Shamir introduced the visual cryptography scheme as a simple and secure way to allow the secret sharing of images without any cryptographic computations.VCS is a cryptographic technique that allows for the encryption of visual information such that decryption can be performed using the human visual system.

The basic scheme is referred to as the -out-of- VCS which is denoted as VCS. Given an original binary image, it is encrypted in images, such that where a Boolean operation is is an image which appears as white noise, and is the number of noisy images.It is difficult to decipher the secret image using individual's. The encryption is undertaken in such a way that one or more out of the generated images are necessary for reconstructing the original image. In the case of (2, 2) VCS, each pixel in the original image is encrypted into two sub pixels called shares.The paper proposes the scheme of share creation taken from NxN share creation,we hereby propose the scheme of 2X2 Share creation proposed in this paper.

Fig.1 denotes the shares of a white pixel and a black pixel. Neither share provides any clue about the original pixel since different pixels in the secret image will be encrypted using independent random choices. When the two shares are superimposed, the value of the original pixel can be determined. If is a black pixel, we get two black sub pixels; if it is a white pixel, we get one black sub pixel and one white sub pixel. Therefore, the reconstructed image will be twice the width of the original secret image. (Note1)

4. Related work

The topic of recursively hiding secrets within a share has been extensively researched.The scheme proposed in this paper applies to images and attempts to increase the efficiency of traditional VC to make it possible to hide extra secret information that serves as a steganographic channel. The scheme involves recursive hiding of smaller secrets within a larger secret. It is obvious from the previous work that many thoughts have been given to the idea of recursive information hiding within visual cryptography. However, the idea of embedding these types of recursive shares within the share and providing biometric security at the last level so that no previous shares would be recovered, to our knowledge, has never been considered.

4.1 Our contribution

There are two main contributions that are discussed within this paper. The first deals with recursive creation of shares. This involves a recursive multiple resolution VC scheme which allows smaller secret to be hidden within one large share.

The second contribution is providing biometric security to the last level of share, such that when the last share is authenticated the upper level of embedded secrets would be revealed. The Iris recognition algorithm would be used to provide biometric security to last level of client share.The well known algorithm for Iris security the median metric algorithm would be implemented.

5. Proposed modules:

Data storage and retrieval: For the purpose of authentication there would a server database which stores all the biometric images of the User, and the other information related to the user. The other database would store all the shares created at the runtime.

5.1 Module 1: Image processing: Converting images to grey scale:

Naor and Shamir mentioned the extension of their scheme to grayscale images.That is, to represent the grey levels of the hidden image by controlling the way how the opaque sub pixels of the sheets are stacked together. If the number of colors is increased the contrast of the images would be reduced and therefore would not be useful in recursive visual cryptography.[4] For the deployment of recursive visual cryptography scheme we need to convert color images grey scale images.

5.2Module 2: Recursive Visual Cryptography

This method put forth has a secret image. Each secret is identified, two shares are created of that secret, as in the above figure.Share1 is stored at client side and share 2 is stored at server side. In the next level the secret image 2 is taken and this secret is embedded in the application side share. The share that is stored at the application side has a secret embedded in it. Now this secret and share is converted into 2 shares and one stored at the client side and one store the server side.This method is followed recursively, such that at each level a secret would be embedded in the corresponding shareThus this is the method of recursive visual cryptography

5.2.1 Visual cryptography Algorithm:

Input:A W x H secret image P,p(i,j) of P
Output:2 shares S^m ,m=1to n;
Process:
1.Generate sharing matrices C0 and C1.
2.For each pixel p(i,j),1<i<W and 1<j<H;
3.For l as the expanded pixel 1to n;
4.For m=1 to n
4.1: If pixelp(i,j)=0(White),the pixel value
S^m (i,j)=C0(l,m)
4.2: If pixelp(i,j)=1(Black),the pixel value
S^m (i,j)=C1(l,m)

5.2.2 Recursive storing of secrets Algorithm

1.For each S^m, S^{m+1}=next secret,m=1to n.
2.E^m=Embedded secret in share C^m ,m=Odd share;
3.Expand E^m using the 2X2 secret sharing scheme
4.Go to step 1 of RVC for each new secret

5.Store S^m, m=Even share stored at client side,
S^m=Odd share stored at application side

Our policy is to provide biometric authentication at the client end such that when biometric authentication is provided by the client the secret would be stacked on the application side hare and the secret would be revealed (Note 2)

5.3Module 3: Biometric Authentication

There are various techniques provided for authentication in general scheme. Biometric authentication is the scheme provided by recognizing the human visual identity recognition. We here would be implementing the iris recognition system. (Note3)

An efficient method for personal identification based on the pattern of human iris is proposed. It is composed of image acquisition, image pre-processing to make a flat iris then it is converted into Eigen iris and decision is carried out using only reduction of iris in one dimension. By comparing the Eigen irises it is determined whether two irises are similar. The results show that proposed method is quite effective.

A general iris recognition system is composed of four steps. Firstly an image containing the eye is captured then image is pre processed to extract the iris. Thirdly Eigen irises are used to train the system and finally decision is made by means of matching.

5.3.1 Methodology: Image acquisition

In iris recognition image acquisition is an important step. Since iris is small in size and dark in colour, it is difficult to acquire good image. The colour image is captured .The image is then changed from RGB to gray level for further processing.

First of all to separate the iris from the image the boundaries of the iris and pupil are detected. Since pupil is the darkest area in the image as shown in Figure 2; so a rough estimate of its center (Cx, *C*y) is performed using the following

Formula

$$Cx=\arg\min(x)(I\sum(x,y))$$
$$Cy=\arg\min(y)(I(\sum(x,y))$$

Where *I(x, y)* is the iris image intensity at point (x, y). To find the exact centre of the pupil, a part of image is binarized.Then using the median matrix method the image pixel intensity would be calculated and median would be calculated and stored in the array. The algorithm used here is the median matrix method; here the edges of the biometric images would be detected by using edge detection algorithm. (Note 4)

During the authentication process the array would be attached and then customer would be authenticated.

5.4 Decryption

After the biometric authentication is done the customer will give his part of the share. The two shares from the application side and the client side would be superimposed and if they match the secret would be revealed.This would be done for each level and the embedded secrets at each level will also be revealed.

6. Advantages

The advantages of such type of Recursive Visual cryptographic scheme are: Original image security is provided. Secure Authentication is provided. Chance of fake share creation is not possible. More than one image be kept as secret .Recursive cryptography is first of the concepts to be implemented for security.

7. Experiments and results

Two shares are generated Share1 and Share2 as output of visual cryptography algorithm. One share along with username is kept by system and other is given on the user card. For authentication user provides share which is on the card. The share extracted from this card is superimposed with corresponding share that is stored in the database, generates the original image. From this Iris template image feature template is generated. Now this feature template is matched with Iris feature of newly provided eye image using hamming distance.

The most popular and commercial iris recognition system was developed by Daugman.Following this many iris recognition systems are proposed by researchers. As main intent of this paper is providing

security to the iris template in the database, image processing algorithm for iris feature extraction are derived from. The working of proposed system is shown in figures. For enrollment a single eye image is taken from CASIA database. After performing segmentation, normalization and feature extraction feature template is generated. Iris template image (generated from feature template) and another binary image which is chosen by system
Administrator is given as input to the visual cryptography algorithm.

8. Conclusion

We would be trying to build a secure intense project in which security would a major issue, thus making security with the intense algorithm of Recursive visual cryptography, and adding biometric authentication to it. Various approaches adopted by researchers to secure the raw biometric data and template in database are discussed here. In this paper a method is proposed to store iris template securely in the database using visual cryptography. Experimental results indicate that by applying visual cryptography techniques on iris template for more security, matching performance of iris recognition is unaffected with extra layer of authentication.

References

Moni Naor and Adi Shamir," Visual Cryptography" *EUROCRYPT -1994* Vol. 950, pp. 1 – 12, 1994.
WeirWeiQi and YanQueen's." Resolution Variant Visual Cryptography for Street View of Google Maps" in IEEE International Symposium on Circuits and Systems, 2009.ISCAS 2009, 2010, pp. 1695-1698.
Arun Ross and Asem Othem ,"Visual Cryptography for Biometric Policy",IEEE Transactions On Information Forensics And Security, Vol. 6, No. 1, March 2011 .pp70-81.
Tzung Chen and Kai Hsiang Tsao," User friendly random grid based Visual Secret Sharing" *National Chiayi University, Taiwan ,ROC.*
Manimurugan.K.Porukumara "Fast and Efficient Visual cryptography for Medical Images"-*Sn, Anna University Coimbatore,India.* Proceedings Of ICETECT 2011,pp 594-599.
J. Daugman. "Biometric personal identification system based on iris analysis." United States Patent, Patent Number: 5,291,560, 1994.
Masood, K., D.M.Y. Javed and A. Basit, "Iris recognition using wavelet". In Proceedings of the International Conference on Emerging Technologies- ICET, IEEE Xplore Press.

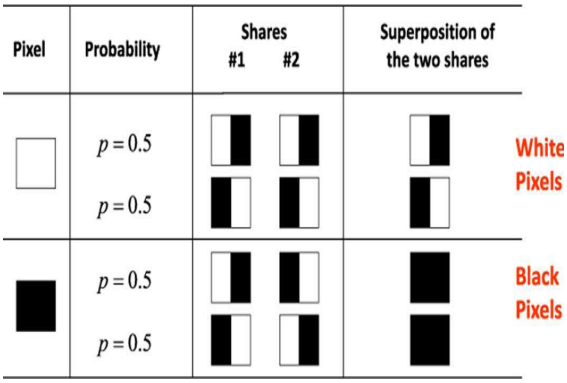


Fig1:Pixel expansion scheme

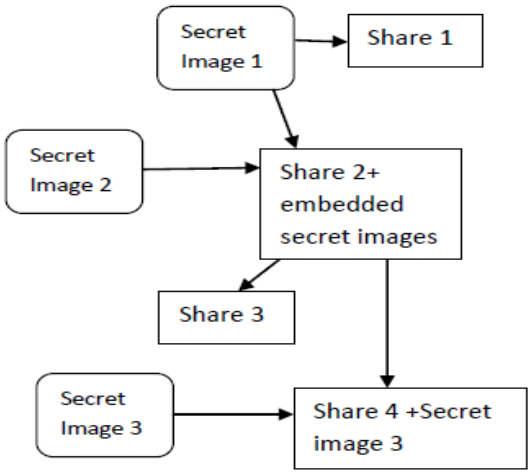


Fig 2:Recursive Visual Cryptography

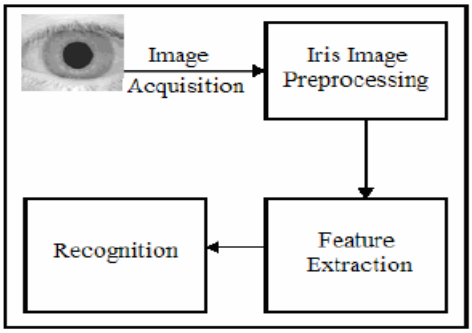


Fig. 3:Iris Recognition methodology

Information and Knowledge Management
ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
Vol 2, No.2, 2012

Ahmed Ali Abdel Sater
Department of English, Assiut University, Egypt
Tel:0020882354089 E-mail: abuwagdy_2005@yahoo.com

Safe El-Nasr Saleh Zanquor
Department of English, Assiut University, Egypt
Tel:00201220598376 E-mail: dr_safe42@yahoo.com

Abstract

There is no doubt that practice has determined theory, but theory has typically taken over the leading role and at times has been disconnected from practice. In this respect education and linguistics reflect the priorities of society.

The results of this paper's data show a strongly prevailing difference in the responses of our informants towards the eight items of the suggested questionnaire. Hence, this difference supports the fact that the theoretician and the practitioner can claim to represent a language community or its knowledge of the language.

Keywords: The theoretician , the practitioner, integrated teamwork.

Objective of this Paper:

The objective of this paper is to clarify that there is a close relationship between theory and practice in the Language Community or its Knowledge of the Language.

1. Introduction

At the beginning, the researcher will clarify the meaning of theory and practice, "A theory is an idea and hypothesis which explains some things. Practice is an exercise and application of any task or theory or in other words translation of an idea into action, On the lighter side: Theory is where you know everything but nothing works. Practice is where everything works but nobody knows why" .(Maiwandwall, 2011).

The serious problems of connecting theory with practice in applied linguistics and language teaching are surveyed in view of the symptomatic disconnections of theory from practice in theoretical linguistics. The relationship between theory and practice can form a difficult problem in almost all fields of human activity. In most fields, human practices were well constructed long before theories started to be produced and have also played an important role in the history of communities.

"Theory and Practice in the Teaching of Writing is designed to foster reflection on how theory impacts practice, enabling prospective teachers to develop their own comprehensive and coherent conception of what writing is or should be and to consider how people learn to write" (Clark 2002) .

2.The Relationship Between Theory and Practice

The researcher expects that practice would play an effective role also in determining what kinds of theories should be produced. In fact, theory has typically overcame the basic role and at times has been isolated from practice altogether. This strategy allows a community or its institutions, especially education, to maintain an official theory of humanity, equality, and efficiency.

"We examine three related ways in which the gap between theory and practice has been framed. One approach views it as a knowledge transfer problem, a second argues that theory and practice represent distinct kinds of knowledge, and a third incorporates a strategy of arbitrage leading to the view that the gap is a knowledge production problem". (Andrew H Van De Ven, Paul E Johnson 2006).

It is evident that "the relationship between theory and practice also seems difficult within linguistics, a branch of humanities science. In real life, we see a rich mosaic of practices relating to language, ranging from the general operations of language learning and ordinary conversation over to highly specialized strategies of communication such as translating poetry" (Beaugrande, R. de. 1997).

This similarity suggests a principle which, according to Widdowson H.G. has hardly been raised in the central work on applied linguistics: how far a theory is applicable to practice is a good measure of how far the theory is valid as a theory (Widdowson H.G. 1990).

In this connection, we can start by differentiating between the two main ways of going about constructing theories of language.

"Fieldwork linguist is the backbone of an empirically-based science of linguistics. Firsthand information on barely known minority languages is essential for our understanding of human languages, their structural properties and their genetic relationships. 'Immersion' fieldwork as major 'must' is contrasted to 'interview' fieldwork as a less desirable option. We aim at an open-ended documentation of each language, intended for various audiences, being both accessible and user-friendly. This introductory essay introduces a number of issues concerning linguistic fieldwork, discussed in some detail by the contributors to this issue, each a highly experienced fieldworker and a recognized authority in their fields. This is what makes the issue special" (Alexandra, 2007).

On the contrary, homework linguists 'work' at 'home' or in the office with data that may have come from different sources, such as samples from language textbooks, and finally to data invented by the linguist during the homework process itself. (Beaugrande, R. de. 1997).

3. Review of Related Literature

3.1 Harste, J.C., Leland, C., Schmidt, K., Vasquez, V., & Ociepka (2004):

This article describes a study that examined the role that theory and practice play in the preparation of new teachers. It presents multilayered observational, anecdotal, and performance data relating to a group of undergraduate "interns" in an elementary teacher education program in an urban location in the United States. These data lend support to the hypothesis that a new teacher's understanding of the relationship between theory and practice influences the way she positions herself as a professional, the stance she takes in developing curriculum, and whether she comes to see herself as a change agent who can make a difference in the lives of children. Observational data obtained for four interns during their student teaching experience and two years later when they were teaching on their own are presented. The authors conclude that education is theory all the way down, and that teacher educators have a particular obligation to address theoretical issues in their work with future teachers.

3.2 Bongarets

This paper reports on two studies that addressed the issue of ultimate attainment by late second language learners. The aim of the studies, which included a carefully screened group of highly successful Dutch learners of English in their designs, was to determine whether or not late second language learners who had achieved a native like performance in the pronunciation of a second language could be identified. Speech samples provided by two groups of learners, one of which consisted of highly successful learners only, and a native speaker control group were rated for accent by native speakers of English. The ratings obtained by some learners were within the range of the ratings assigned to the native speaker controls. Such results suggest that it is not impossible to achieve an authentic, native like pronunciation of a second language after a specified biological period of time. Examination of the learning histories of the highly successful learners lead the authors to argue that certain learner characteristics and learning contexts may work together to override the disadvantages of a late start.

3.3 Ioup

This study concerns the ability of adults to achieve native like competence in second language when the acquisition context lacks formal instruction and, therefore, more closely resembles the environment for first language acquisition. The study presents the results of extensive testing of an adult who has apparently acquired native proficiency in Egyptian Arabic (EA) in an untutored setting. The goal is to determine to what extent her linguistic competence matches that of native speakers. Measures employed to assess her level of achievement are a speech production task, a grammatically judgment task, a translation task, an anaphoric interpretation task, and an accent recognition task. Results are compared to those of native speakers as well as to those of a proficient learner of EA with extensive formal instruction. The results lead the authors to reexamine the critical period hypothesis while addressing the role of talent in adult language learning. The study concludes with an evaluation of our subject's language learning history to discover what factors differentiate her from less successful naturalistic adult acquirers.

3.4 Munro

Untrained native English listeners assigned foreign accent scores to sentence and narrative utterances that had been rendered unintelligible through low-pass filtering. Utterances produced by native English talkers were assigned consistently higher ratings than those produced by Mandarin-speaking learners of English, even when the listeners were unfamiliar with the content. Because these filtered speech stimuli contained very little of what could be considered segmental information, the results suggest that untrained listeners can identify foreign-accented speech on the basis of no segmental information alone, whether they are presented with material of known or of unknown content. Acoustical analyses of the stimuli suggested that differences in speaking rates, intonation patterns, and timing may have played a role in the listeners' assessments, although the cues to foreign-accentedness may have varied from talker to talker and from utterance from utterance. Surprisingly, no relationship was observed between the ratings of the filtered and unfiltered versions of the nonnative stimuli.

3. 5 Slavoff

The present study evaluates the role of age on the rate of acquiring English as a second language in an immersion setting. Subjects were children with native languages. typologically very different from English. The children arrived in the US between the ages of 7 and 12 years and were tested on their knowledge of English grammatical morphology and syntax at different lengths of stay in the US, ranging from 6 months to 3 years. Subjects' performance was predicted by the length of their stay in the US and by gender, with females outperforming males. Age of arrival played no role in predicting

subjects' rate of acquisition. Performance was very similar between two age groups examined (7-9- and 10-12-year-old arrivals) throughout the 3 years measured. The present results suggest that, on certain aspects of grammar, different-aged children acquire a second language during the first 3 years of acquisition at similar rates when their native language is very different in typology from the target language.

3.6 Discussion

From the previous studies, it is evident that there is a close relationship between theory and practice in the Language Community or its Knowledge of the Language. By reviewing the above studies, the researcher can deduce the following:

- Both of theory and practice play an integrated role in the central work on applied linguistics.

- The role of the theoretician and the practitioner would be explicitly accounted for within the theories, stipulating under what conditions a theory or practice is related to a given language or to language as general conception, and how the theoretician and the practitioner can claim to represent a language community or its knowledge of the language. (**Beaugrande, R. de**. **1997**).

4. Fieldwork Linguistics and Language Learning

Anyone who studies this research, it comes to his mind an important question, it is : what is the difference between fieldwork linguistics and language learning?

The case of the fieldworker linguist differs from that of the language learner in the following points:

(1) The fieldworker tries to learn from the society’s language from multiple viewpoints. On the contrary, many of the language learners have one source, i.e. their tutors..

(2) "Fieldworkers are asked to gather their own systematic data corpus, but language learners are given textbooks compiled by other people may be in some ways non-specialist persons" (Beaugrande, R. de. 1997).

(3) The fieldworker is a well educated scholar who has the ability to commit to the task as compared to those language learners who are children and teenagers.

These three points assure the success of the fieldworker as an ideal language learner, but the expectation of failure causes apprehensions and painful worry for ordinary classroom learners.

Consequently, there is no doubt that a practice-driven theory needs to explain how cultural communications happen and how they might be guided to meet the specific needs of second language learning.

In this sphere, we can deduce that a practice-driven theory also needs to explain how both the training of teachers and the role of learners in conventional classrooms might effectively compensate the lack of opportunity for cultural immersion.

5. To What Extent can the Application of Homework Linguistics be expected?

Chomsky's followers believe to have achieved this high-minded goal. Newmeyer's (1980: 249) Linguistic Theory in America presented Chomsky's as 'the world's principal linguistic theory', for which 'no viable alternative exists'; 'the vast majority' of 'linguists' 'who take theory seriously acknowledge their adoption of Chomsky's view of language'.

A leading argument in Chomsky's campaign was that fieldwork would never attain 'the deeper and more important notions of linguistic theory', due to its 'limitation-in-principle to classification and organization of data' (Chomsky 1965: 18).

Frankly and without exaggeration, we should not expect that reliable operational criteria for the deeper and more important ideas of linguistic theory will ever be forthcoming because knowledge of the language, like most facts of interest and importance, is neither presented for direct observation nor extractable from data by inductive procedures of any known sort.

The gap between what real native speakers say or what real children learning the language do versus what the theory said or implied about them was continually blurred by rhetorical double-tracking to connect each theoretical construct with a conveniently commonsense misinterpretation.

in this case 'theory of language' rather than 'theory of a particular language' — with a systematic ambiguity to refer both to the child's innate predisposition to learn a language of a certain type and to the linguist's account of this (Chomsky 1965: 25).

Of course, there is no clear notion of how a child could learn a language as a set of formal rules, witness his audaciously evasive 'instantaneous model' wherein 'successful language acquisition

(SLA)' happens in a single 'moment' (Chomsky 65: 36). Otherwise, he would have had to specify how the LAD proceeds by building up rule after rule.

6. The attitude towards the relationship between theory and practice among a group of students in Assiut university, Egypt

In addition to the differences of opinion about the relation between theory and practice, an attempt will be made in this paper to investigate the attitude of a group of undergraduate students in Assuit university , Egypt, towards this relation. A hundred informants of those students (50 males and 50 females) studying at three colleges in Assiut university were selected (colleges of medicine , engineering and education.) all of whom are native speakers of Arabic but due to their educational background all of them have learned English as a foreign language and use it as a medium of instruction in their colleges a mixed methods approach to data collection was employed using a self report questionnaire and key informants interview . the questionnaire includes eight items used earlier by Chomsky 1985 (number 1), Ferguson 1983 (number 2-3) and by Dives 2003(number 4-8). The informants were interviewed individually to answer some questions (appendix1) , then were asked to fill in the eight items of the questionnaire by choosing one of the four variables (strongly agree, agree, uncertain, and disagree). (appendix 2).

7. Results and Discussion

The results of our data show a systematic difference in the responses of the one hundred subjects towards almost every item of the suggested questionnaire.

Examining table 1 closely, we see that the informants of our study have chosen the ''strongly agree'' variable with a percentage 65% in their response to item number 1 , while they have chosen the same

variable (i.e. strongly agree) with a percentage 60% related to item number 2; 90% related to item number 3 and they have chosen the same variable (i.e. strongly agree) with a percentage 51% related to item number 4.

Also they have chosen the variable (agree) with a percentage 90,85,80 and 70 % for items 5,6,7 and 8 .

These results show a strongly prevailing difference in the responses of our informants towards the eight items of the suggested questionnaire. Hence, this difference supports the fact that the theoretician and the practitioner can claim to represent a language community or its knowledge of the language and indeed there is a close relation between theory and practice.

8. Conclusion

At last, we can say that the expectations of application were determined before the theories were constructed, accordingly, the results of this paper's data show that the role of the theoretician and the practitioner would be integrated within the theories, and how the theoretician and the practitioner can claim to represent a language community or its knowledge of the language.

References

Alexandra, Y. Aikhenvald (2007),' ***Linguistic fieldwork: setting the scene. Language Typology and Universals***': Vol. 60, No. 1, pp. 3-11.
Andrew H Van De Ven, Paul E Johnson (2006), ***'Knowledge for theory and practice. Academy of Management'***, Volume: 31, Issue: 4, Pages: 802-821
Beaugrande, R. de. (1980), **'Text, Discourse, and Process'**, Norwood, N.J.: Ablex.
Beaugrande, R. de. (1992),**'The heritage of functional sentence perspective from the standpoint of text linguistics'**, Linguistica Pragiensa 34/1-2: 2-26 and 55-86.
Beaugrande, R. de. (1996), '**New Foundations for a Science of Text and Discours**e', Norwood, N.J.: Ablex.
Beaugrande, R. de.(1997),***'Theory and Practice in Applied Linguistics: Disconnection, Conflict, or Dialectic***?', Applied Linguistics 18/3, 1997, 279-313.
Chomsky, N. (1965), **'Aspects of the Theory of Syntax'**,Cambridge: M.I.T. Press.
Chomsky, N. (1975), ' **Reflections on Language**', New York: Pantheon Books.
Clark L. Irene, Irene L. Clark, (2002), "***Concepts in Composition: Theory and Practice in the Teaching of Writing***". (online) Available:
http://www.langacademy.net/vb/showthread.php?10093-Concepts-in-Composition-Theory
Harste, J.C., Leland, C., Schmidt, K., Vasquez, V., & Ociepka (January/February 2004). **Practice makes practice, or does it? The relationship between theory and practice in teacher education.**
Ioup, Georgette, Boustagui, E., El Tigi, M. and Moselle, M. (1994), ***'Reexamining the critical period hypothesis: A case study of successful adult SLA in a naturalistic environment.'*** Studies in Second Language Acquisition 16.1: 73-98.
Maiwandwall, Barai Mobarez (2011). **What_is_the_difference_between_theory_and_practice**.
(online)Available: http://wiki.answers.com/ #ixzz1f7eR1ta2
Munro, M. J. (1995),**''Nonsegmental factors in foreign accent.' Studies in Second Language Acquisition'**, 17.1: 17-34.
Newmeyer, F. (1980), **'Linguistic Theory in America'**, New York: Academic.
Slavoff, G. R. and Johnson, J. S. (1995), ***'The effects of age on the rate of learning a second language***', Studies in Second Language Acquisition 17.1: 1-16
Widdowson, H.G. (1990),' **Aspects of Language Teaching**,' Oxford: Oxford University Press.

Appendices

Appendix One

The Questionnaire

Table(1)

The attitude towards the relation between theory and practice among some students in Assuit university.

Items	Strongly Agree	Agree	Uncertain	Disagree
1-The relation between theory and practice in learning the English language	65%	10%	10%	15%
2-The theoretician and the practitioner represent a language community	60%	20%	10%	10%
3-The fieldwork linguist should be well-educated and well-qualified person	90%	3%	2%	5%
4-The language learners are given books compiled by other people	51%	20%	20%	9%
5-The field worker is doing under the conditions of cultural immersion	90%	2%	3%	5%
6-The learners of foreign languages may have scant contact with the culture	85%	5%	5%	5%
7-"The theory should provide a framework for a permanent interaction among the individuals concerned with teaching and learning of both native and all foreign languages"	80%	5%	5%	10%
8-"It is necessary to share all the learners as a whole in contact"	70%	15%	10%	5%

Appendix Two

The Interview Questions

What is your name?

In which university do you study?

What is your major?

Language Background

What language do you know? How well?

Have you lived abroad? If yes which country?

What is the percentage of your study material given in Arabic vs. English? (%)

How would you compare your speaking/reading/listening and writing abilities in Arabic and English? (%)

Table (2): Summary of Results

Attitude	**Standard**	**Mean**	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	

	Deviation		Number	Number	Number	Number	Item
			%	%	%	%	
Strongly Agree	**0,869**	**3,45**	**65**	**10**	**10**	**15**	**1**
Agree	**1,090**	**3,22**	**60**	**20**	**10**	**10**	**2**
Uncertain	**2,040**	**5.40**	**90**	**3**	**2**	**5**	**3**
Strongly Agree	**0,600**	**2, 90**	**51**	**20**	**20**	**9**	**4**
Disagree	**2,040**	**5, 40**	**90**	**2**	**3**	**5**	**5**
Disagree	**1,090**	**4,80**	**85**	**5**	**5**	**5**	**6**
Disagree	**1,010**	**4,00**	**80**	**5**	**5**	**10**	**7**
Disagree	**0,900**	**3,00**	**70**	**15**	**10**	**5**	**8**

Information and Knowledge Management
ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
Vol 2, No.2, 2012

Achieving Success Through Effective Business Communication

Farmeena Khan [1*] Mohd. Ehmer Khan [2]

1. Department of Management, Janardan Rai Nagar Rajasthan Vidyapeeth University, Rajasthan, India
2. Department of Computer Science, Singhania University, Jhunjhunu, Rajasthan, India

* E-mail of the corresponding author: ehmerkhan@gmail.com

Abstract

In business, communication is used to promote a product or services, relay information within the business or deal with legal or similar issues. We can also define business communication as a process of transmitting information and thoughts between various parts of an organization and also to people outside organization. Effective communication is essential and indispensable for the success of any business. Technology has opened the door to new ways of interacting, but the process is still challenged by barriers that hinder its effectiveness. In our paper we have defined communication process, barriers to effective business communication and various tips to overcome these communication barriers.

Keywords: Barriers to Business Communication, Communication Process, Effective Communication

1. Introduction

In an organization communication plays a crucial role in employer-employee relationship. Although effective communication does not guarantee success of an organization but in effective communication assure problem and very soon these problems will become a crisis. Communication in any organization is of vital importance to be able to express objectives, necessities, emotions etc. an effective communication must have certain qualities which are described below:

i. Completeness
ii. Conciseness
iii. Consideration
iv. Correctness
v. Courtesy
vi. Clarity
vii. Concreteness

Some of the interesting facts about communication are described below:

i. 7% words of the information communicated.
ii. 38% vocal tone.
iii. 55% of body language

Some of the methods for business communication are described below:

i. Web based communication
ii. E-mails
iii. Writing letters, reports, memos etc.
iv. Video conferencing
v. Audio video presentation (e.g. PowerPoint)

vi. Using telephone

vii. Face to face meetings

2. The Benefits of Effective Communication in an Organization

There are various benefits of an effective business communication in an organization such as;

1. Employee commitment to his/her job is improved.
2. Training and recruitment cost are reduced.
3. Better employee performance.
4. Helps in avoiding misunderstanding.
5. Improved employer-employee relationship.
6. Improved exchange of ideas.
7. Company's goals are reached much quicker.
8. Less confusion.
9. It will help with innovation and creativity.
10. Communicated in an effective way can prevent uncertainty.
11. Proper method of communication can save time and money of an organization.
12. Effective communication enhances client relation.
13. It will originate an environment of ample participation.
14. Organizing human resource in an effective manner.

3. Business Communication Process

To carry out effective business communication there are certain elements of business communication process which are described below and explained in Figure 1.

- Sender/Transmitter: Sender is the initiator of the business communication process. It is the duty of sender to choose the type of message and effective medium. A sender can make use of symbols to convey the message.
- Message: It is codified information, which the sender sends to the receiver. It must be ensured that the main objective of message is clear.
- Medium: It is the channel of communication between sender and receiver. The sender must choose an appropriate medium which makes it effective and correctly interpreted by receiver.
- Receiver/Decoder: Receiver is a person for whom the message is aimed. Successful communication takes place only when a receiver understand the meaning intended by the sender and it depends upon various factors such as knowledge of recipient and his responsiveness to the message.

Feedback: It permits the sender to analyze the efficacy of the message. It is the best way to prove that the message was received and understood. Feedback may be verbal or non verbal. It may also in the written form like reports, memos etc.

4. Barriers to Effective Business Communication

Below are some of the exclusive barriers to effective business communication which are shown in Figure 2. and are listed below:

- Physical Barrier: some of the physical barriers in an organization are listed below:

i. Marked out area portraying a particular territory.
ii. Large working area.
iii. Separate areas for the people of different status.

- Perceptual Barrier: Each individual is different and that is why they think different. A same message may be taken differently by different individual and that will create a barrier.
- Emotional Barrier: Emotional barrier is one of the chief barriers to open and free communications. This arises when people become very mindful of what they are going to speak next. They feel vulnerable and hence this stunts their thinking power and communications.
- Cultural Barrier: When people belonging to different culture work together, can be one of the business communication barriers in an organization. So, to avoid this kind of problem there must be a cultural diversity in the work place.
- Linguistic Barrier: When the people of different nationalities and different mother tongue work together there must be biggest communication barrier in the workplace. When they couch their communication in their language, it is a way of excluding others.
- Technological Barrier: Some time due to the technical failure the message is not delivered completely or not delivered at all and this will create a barrier in business communication.
- Improper way of explaining: Some speakers get frustrated when the other person fails to understand things quickly, this will create a business communication barrier.
- Red Tape: Message gets delivered to many different people before reaching the actual recipient. This can alter the message and makes the process too long.

5. Overcoming Communication Barriers

Below are some points which help us know, how to overcome business communication barriers in an organization:

1. We have to eliminate difference in perception.
2. Taking the receiver more seriously.
3. Modify the message according to the audience.
4. Reduction of noise levels.
5. Effective use of informal channel of communication
6. Effective use of body language.
7. Avoid information to be overloaded.
8. Using multiple channels and encoding.
9. The speaker should step into the shoes of listener.
10. The message should be concise and complete.
11. Message should state the purpose clearly.
12. Organizational structure must be simple.
13. Listening attentively and carefully.
14. Clear and simple words should be used.

6. Effect of Ineffective Business Communication on Business Growth Graph

An effective communication can improve the growth of any business firm whereas an ineffective communication can create problems and declines the growth graph of that particular business firm, which is shown in Figure 3.

7. Conclusion

For the successful running of an organization, it is important that the transparency is maintained among the employers and employees. There are lots of communication barriers in an organization, but to ensure the free flow of information between the sender and the receiver, these communication barriers must be overcome and for this it is important to understand the underlying causes of business communication barriers which may include a wide range of factors.

In a nut shell every employee must try their level best to avoid business communication barrier in an organization for effective business communication.

References

Borkar, Rujata. (9/2/2010), "Importance of Communication in Business", Available online at <http://www.buzzle.com/articles/importance-of-communication-in-business.html> [accessed 25 Nov 2011].

Communication, Available online at <http://www.easycoursesportal.com/bussinesadministration/Lecc-27.htm> [accessed 6 Jan 2012].

Communication Barriers – Reasons for Communication Breakdown, Available online at <http://www.managementstudyguide.com/communication_barriers.htm> [accessed 25 Nov 2011].

Guidelines for Effective Communication, Available online at <http://www.managementstudyguide.com/guidelines-effective-communication.htm> [accessed 25 Nov 2011].

Overcoming Communication Barriers, Available at <http://www.managementstudyguide.com/overcoming-communication-barriers.htm> [accessed 25 Nov 2011].

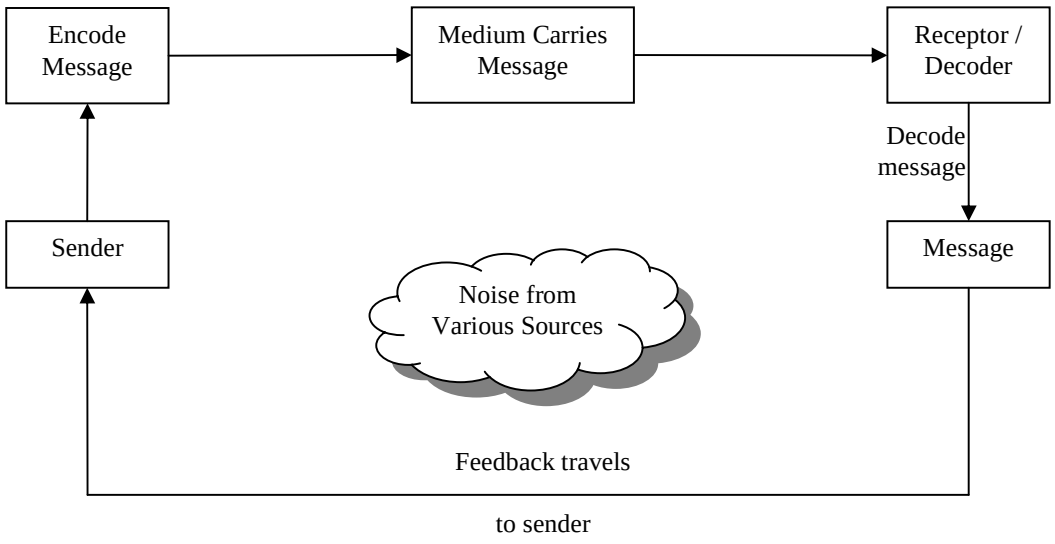


Figure 1. Represent Business Communication Process

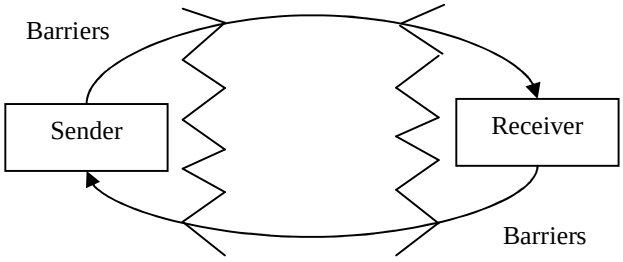


Figure 2. Represent Barriers to Communication

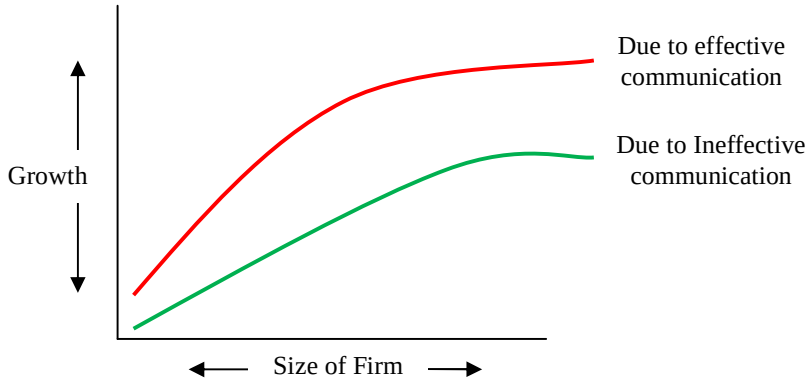


Figure 3. Represent Business Growth Graph