DIGITAL VIDEO LIBRARY INFORMATION SYSTEM

CASE STUDY: MOVIE LAND ENTERTAINMENT LIMITED, UGANDA

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A Research Project Submitted to the School of Computer Studies in Partial Fulfillment of the Requirement for the Award of the Bachelors of Computer Science & Bachelors of Information Technology Of Kampala International University

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DECLARATION

We **Ahmed Mbarak Ahmed & Geofrey Isaac Mwakiluma** declare that the content of this project entitled Digital Video Library Information System, submitted to the School of Computer Studies of Kampala International University for the reward of Bachelors of Computer Science & Bachelors of Information Technology respectively, is our own original work and has never been presented to any other institution of learning for any academic award.

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APPROVAL

I certify that this project report entitled **Digital Video Library Information System** is the original work of **Ahmed Mbarak Ahmed & Geofrey Isaac Mwakiluma** submitted in partial fulfillment of Bachelors of Computer Science & Bachelors of Information Technology Respectively of Kampala International University.

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DEDICATION

I Ahmed Mbarak Ahmed, Dedicate this Project to My Lovely Parents Mr. Mbarak Ahmed and Ms. Nuru Hajj for their love, support and moral they showed towards me during my academic struggle. MAY THE ALMIGHTY ALLAH REWARD THEM ABUNDANTLY.

I dedicate this research in full gratitude for what you have done for me both materially and spiritually and for believing in me despite all odds. In all humility, this dedication is my humble recognition of your importance to me and my destiny. I still recall that sometimes back my parents thought that my brain was so dense to hold anything actually to an extent of being a dwaff, but I thank God that Ben carson in his book gifted hands proved them otherwise that a dwarf can turn to be a genius and that's what I take to be today and in the future to come.

I Geofrey Isaac Mwakiluma, Dedicate this project to my Beloved Parents Mr. Isaac Mwakiluma & Mrs. Olivia Mwakiluma for their encouragement, love, support, moral and the sacrifices they have done for me throughout my entire academic struggle. MAY GOD BLESS THEM ALL.

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ACRONYMS

VISION	Video Indexing for Searching Over Networks
QBIC	Query by image and video content
SMIL	Synchronized Multimedia Integration Language
W3C	World Wide Web Consortium
VCD	Video Compact Disc
DVD	Digital Video Disc
MYSQL	Structured Query Language
DVLIS	Digital Video Library Information System
PHP	Hypertext Preprocessors
WAMP	Windows/Apache/MySQL/PHP, Python, (and/or) PERL
DBMS	Database Management system

ABSTRACT

The advances in the data capturing, storage, and communication technologies have made vast amounts of video data available to consumer and enterprise applications. However, interacting with multimedia data, and video in particular, requires more than connecting with data banks and delivering data via networks to customers' homes or offices. Still there are limited tools and applications to describe, organize, and manage video data. The fundamental approach is to index video data and make it a structured media. Manually generating video content description is time consuming and thus more costly to the point that it's almost impossible. Moreover, when available, it's subjective, inaccurate, and incomplete.

This research sought out to design a system for Movie Land Entertainment Limited to computerize the manual based system currently in place. The system would be able to offer automatic content-based indexing of videos in the company and will act as data repository for easing the renting process.

The research used Object Oriented methodology to conduct the research. Data collection was done through interview, observation and questionnaire, the data was analyzed to come up with the required information to develop the system. The research used PHP and Dreamweaver to design the interface and MySQL to design the database.

The research came up with a full operational rental system which can be implemented to Movie land Entertainment Limited for a computerized system.

The researcher recommends that the system be implemented and the users of the system be trained so that they can operate efficiently and further upgrade of the system so that it can interact with clients and able to contain digital movies online.

CHAPTER ONE
INTRODUCTION

1.0 Background to the Study

Movie land entertainment Limited has a main branch in Kampala District, located in Kampala Road, 1 Kilometer from the city Center. The company has 20 branches in Uganda, the company deals with the rental of movies in form of VCDs and DVDs to the clients, it has more than 1000 clients in Uganda and need to increase its marketplace, currently the company operates in manual generating video content description which is time consuming and it's very costly to maintain.

According Hoffman and O'Gorman, (1993); Lesk, (1991) the advances in the data capturing, storage, and communication technologies have made vast amounts of video data available to consumer and enterprise applications. However, interacting with multimedia data, and video in particular, requires more than connecting with data banks and delivering data via networks to customers' homes or offices. We still have limited tools and applications to describe, organize, and manage video data. The fundamental approach is to index video data and make it a structured media. Manually generating video content description is time consuming and thus more costly—to the point that it's almost impossible. Moreover, when available, it's subjective, inaccurate, and incomplete.

Currently, Movie land Entertainment limited operates the rental store in such a way a client goes to the store pay a membership fee and after that a client can borrow a movie by paying a rental fee and given one week to return it back. If the customer exceed the period given, he should either come to the company and renew the period or he will pay late fee charge. The company records all the details in a book of records containing the name of client, date borrowed, return date and movie title borrowed. When the client return the movie they crosscheck their names and the movie borrowed and remark as returned.

This conundrum has attracted researchers from various disciplines, each with their own algorithms and systems. In addition, the MPEG group recently issued MPEG-7 as a standard to

provide normative framework for multimedia content description. However, in contrast, there are few convincing stories we can tell about successful applications of the research results. It seems that the excitement enjoyed by many researchers from both academia and industries has yet to generate significant impact in the marketplace.

1.1 Problem Statement

Owing to the large volumes of movie VCDs and DVDs on the manual managed company, it has been a burden for the Movie Land Entertainment Limited running Video rental services using the manual system currently in place. The system does not provide data security and movies cannot be easily accessed and this results into time wastage in searching, and retrieving video information. The system therefore aimed at solving the above problem.

1.2 Objectives

1.2.1 General Objective

To investigate the current system, design and implement the Digital Video Library Information system for the Movie Land Entertainment Limited.

1.2.2 Specific Objectives

a) To investigate current system which is in place at the case study.

b) To design a database that will act as video data repository, or record keeping containing details of videos in the company.

c) To develop automatic content-based indexing of videos that will significantly improve the users' ability to access specific video information of interest

d) To design, implement and test the digital video library system suitable for storing, indexing, searching, and retrieving video and audio information and providing that information across to its client.

1.3 Scope of the Study

The scope of the study was subdivided into two

1.3.1 Geographical Scope

The scope covered the Movie Land Entertainment Limited Kampala Branch which is located in Kampala road in Kampala District, Uganda.

1.3.2 System Scope

The system its only limited to keep track of all the rentals, keep a history of clients information, generate reports of movies in store, current rentals and inventory on the movies rented. When rentals are returned, they can easily be entered into the system and any late charges will automatically be recorded. The system is not including operation of tracking clients who do not return the movies, and also does not tackle the supplier transaction of purchasing the movies, its basically a rental system which only deals with registered members for renting movies available in the system. The system is a web based application design using PHP/Dreamweaver and MYSQL.

1.4 Significance of the Study

Due to the fact that managing videos in a manual generated file system which cumbersome, the new system will ease the storage, indexing and retrieving of video data.

The designed system will be important to the company through reducing the problem of data redundancy. This is to be done by eliminating the duplication of files, records hence saving time and space.

The customers will benefit as will quickly search indices for multiple video information to movie of their choice hence more efficient and time saving.

The system will be benefit the business as it will reduce on the number of workforce in the company hence reduces on the expenditure.

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This study is very important to the university in that its future researcher will use it for academic purpose and make their study a bit easier.

1.5 Limitations of the study

The study was faced with a lot of limitations which retarded the smooth running of the study to be finished in time. The followings are some of the limitations.

- Some of the staff members were absent and other not willing to respond and to give the right information thus the researcher used other techniques of data collection between like observation to overcome the problem.

- The time period to conduct the research was short this is due to the fact that was given 3 month by the School of Postgraduate studies to accomplish the research meanwhile have to do personal business.

- There was lack of materials such as software to design the system which was not install on the labs, that made a researcher to went ahead to buy a software which was expensive.

However, as the researcher overcome all the shortcoming by using different data collection methodology to collect the data and to come up with a operational system for the Movie land Entertainment Limited.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

Literature review is an important chapter in a thesis where its purpose is to provide the background to and justification for the research undertaken by primary Scholarship.

Literature Review uses database reports of primary or original scholarship, and does not report new primary scholarship itself. The primary reports used in the literature may be verbal, but in the vast majority of cases reports are written documents. The types of scholarship may be empirical, theoretical, critical/analytic, or methodological in nature. Second a literature review seeks to describe, summarize, evaluate, clarify and/or integrate the content of primary reports". Its with this view that the researcher reviewed literature about related system as posted by previous research.

2.1 Information System

According to Date, (2001) defines information system as a collection of people, procedures and equipment designed, constructed, operated and maintained to collect, record, process, store, retrieve and display information.

According Flickner, Myron et al (1995), defines information system as a set of interrelated components working together to collect, retrieve, process, and store and distribute information.

According to the Researcher information system is a set of interrelated components, information resource that retrieve and display information

2.1.1 Components of an information system

1) Input: this is the startup component in which a system operates. It largely determines the nature of output in the system. Unless the input is accurate, the output cannot be expected to be accurate. In most cases, output for one system becomes input for another system. (Henry C, 2000)

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2) Process: it is defined as an activity that makes possible the transformation of input to output. Machines, functions, operations may act as a processor transformed data into output. (Henry C, 2000)

3) Output: is defined as a result of an operation. It's the main objective for which an information system is designed. Though output largely depends upon the input, its nature may be vastly different from those of input.(Henry C, 2000)

4) An information systems input data may be numerical in nature but the output may be pictorial diagrams, pie diagrams, bar diagrams e.t.c. in other words, input, process, output are the common elements of a system. They are elements by which all systems are described. (Henry C, 2000)

5) People: these are the users of the system. Includes system analysts, programmers, data base administrators, end users. (Henry C, 2000)

6) Procedures: are the rules that govern the working of the information system, e.g. how backups are done, levels of security etc. (Henry C, 2000)

2.1.2 Role of information systems in an organization

1. Helps managers with planning, controlling and decision making
2. Enables organization to utilize resources optimally
3. Enables employees to utilize time effectively
4. Acts as a communication tool within the organization and outside environment
5. Helps an organization to produce products and services of high quality through avoiding errors/mistakes.
6. Organizations can keep up with competition or crate and conduct business globally, that is, through the internet
7. Technology allows workers to work from anywhere at any time using functions like video conferencing.

2.1.3 Categories of information systems

1. Transaction Processing Systems (TPS): - are computer based systems that keep truck of the transactions needed to conduct business. Each department of an organization has to have it own transaction processing system.

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2. Management Information System (MIS): _-_ is a computer based information systems that use data recorded by TPS as input into programs that produces routine reports as output.

3. Decision Support System (DSS): - is a computer based information system that provides a flexible tool for analysis and helps managers focus on the future.

4. Executive Information System (EIS): - is an Easy-to-Use DSS, made especially for top managers. It specifically supports strategic decisions making.

5. Expert System (ES): - is a set of interactive computer programs that helps users solve problems that would otherwise require the assistance of a human expert.

2.2 Database and all its aspects

For any information system to function to the satisfaction of its need it must have a database to enable the storage of data. Therefore basing on this background, it was seen right and fitting to address a brief view of Databases as the information below depicts. Data base systems are designed to manage large bodies of information. Management and data involving both defining structures for storage of information. In addition databases ensures safety of information stored , despite system crashes or attempts at an authorized access since this data is to be shared therefore the system must avoid possible anomalous results.

According to Martin etal (1999), a database is a shared collection of logically related data, organized to meet the needs of an organization .A database management system is a support software that is used to create, manage and protect organization data .A DBMS works with the operating system to modify data and make data accessible in variety of meaningful and authorized ways.

James (1995), defines a database as an integrated collection of logically related records or objects .DBMS is asset of computer programs that controls the creation, maintenance and use of databases of an organization and its end-users.

According to Date (2001), states that the database is a collection of persistent data that is used by the application systems of some given enterprise. Enterprise is a convenient generic term for any reasonably self contained commercial, scientific, technical or other organization. An enterprise

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can be a single individual (with a small data base) or a complete corporation or a supermarket or bank. Any organization must necessarily maintain data about its operations .Such data is referred to as "persistent data" as referred above Therefore among the persistent data we could have sales made, account data among others.

2.2.1 Advantages of Databases

i.   Data can be shared; It might not be possible to satisfy the data requirements of the new applications without having to add new data to the data base (Date, 2001)

ii.   Redundancy can be reduced; In file based system redundancy is unavoidable, but with the data base files are integrated and this problem is eliminated as long as the data administrator is aware of the data requirements for both applications (Date, 2001)

iii.   Inconsistence can be avoided in file based. Suppose there is a change in one file means changes have to be made in all other files otherwise data becomes inconsistent but for the data base a change in one record is done automatically to all others as well through a process called Probating dates (Date, 2001)

iv.   Transaction support is provided. Having a logical unit of work typically involving several database operations in particular, several update operations. Example transferring cash amount from account A to account B clearly two updates are required one to withdraw cash from A and the other to deposit to account B, if the user has stated that the two updates are part of the same transaction then the system can effectively guarantee that either both of them or neither is even (say because of power outage) half way the process (Date, 2001)

v.   Integrity can be maintained; To ensure that the data in the data base is correct ,data is controlled centrally by permitting the data administrator define and the data base administrator implement integrity constraints known as business rules (Date, 2001)

vi.   Security can be enforced. Data access is restricted to those with passwords and proper permissions (Date, 2001)

vii.   Conflicting requirements can be balanced. Here the data base administrator under the instruction of the data administrator's direction can so structure the system so as to provide an overall service that is "best for the enterprise" to avoid the conflicting requirements issue (Date, 2001)

viii.   Standards can be enforced. Date (2001), states that the data base administrator under the data administrator's instruction ensures that all applicable standards are enforced in the presentation of data. The applicable standards may include any or all of the following departmental installation, international standards. Standardizing data representation is particularly desirable as an instrument to aid interchange or movement between systems.

2.3 Digital Libraries in General

Technological advances of several kinds are converging to transform the ways in we generate, store, and use information. Digital libraries are being built which store a wide variety of information and information types: page images of technical journal articles [Lesk, (1991); Hoffman and O'Gorman, (1993)], nucleic acid sequence data [Burks, (1991)], geographic information [Pissinou, (1993)], computer science technical literature (Bruneiand Cross, 1993) to name a few.

With regular libraries, the user goes to the information. In the digital realm, the information is delivered to the user; requiring easy to use, easy to learn user interfaces [Fox, 1993], and information servers which can interface with a wide range of client technologies (Kahle and Morris, 1993). The ability of users to manipulate retrieved information has fundamentally changed the relationship between the information producer and consumer [Rawlins, (1993)], prompting attention to both the legal and social aspects of this process (Garrett & Lyon, 1993).

A recent development is the emerging ability to digitize and manipulate video and audio information. In addition to teleconferencing, this has a wide range of commercial applications. For example, the AP wire service is beginning to transmit digitized video clips as well as text over its existing network (Broadcasting and Cable, 1993). Twentieth Century Fox and Sony are digitizing news reels from the thirties and forties (Business Week, 1993), which will be a unique educational resource. Digital video is also been utilized in marketing research firm reports (CD-ROM Professional, 1993) and in marketing products over the ECnet which links manufacturers and suppliers [Computer World, (1993)]. Finally, digital post production is becoming standard in the film industry, which is continuing to push the state of the art for manipulating video images (Zorpette, (1993).

Large scale collections of video data are also getting attention. For example, AT&T envisions a huge digital library storing a wide range of data, including movies for viewing on demand, interactive presentations, educational materials, marketing presentations, and news (Business Week, (1993). To make this dream a reality requires research in the basic technologies necessary to implement digital video libraries. Recent efforts have been made in developing the individual components necessary for handling multimedia data [(Nicolaou, 1990); (Rangan 1993)], and building software systems and operating systems designed to handle multimedia data [(Fox,1991); (Jeffay 1992)].

What is needed is the technology to treat collections of digital video segments as a library which can be automatically indexed and searched based on the contents of the video. Given the limited descriptive ability of current computer vision systems (Haralick and Shapiro, 1992), and the improving accuracy of connected speech recognition systems (Takebayashi, 1991), the most sensible approach for automatically indexing video is to extract textual descriptions of the video directly from the audio track. The Video Mail Retrieval Using Voice project at The University of Cambridge represents one effort in this direction (James, 1994). This group is attempting to extract video indexing terms from the sound track and written contents of video mail.

2.4 Digital Video Library System

The sixth NSF initiative, The Info media Digital Video Library Project at Carnegie-Mellon University is the most relevant to this project. They are developing new technologies for creating full-content search and retrieval digital video libraries. (Takebayashi, 1991).

2.4.1 Automatic / content-based indexing

The following items are representative of current thinking in content-based video indexing. The underlying premise holds that it is possible to not only segment but also to effectively index and classify audio and video material through automated analysis of embedded content. This is an approach taken by commercial video application system vendors such as Virage (http://www.virage.com) and Snap.com (http://realguide.real.com) (accessed on 5th April 2008) whereby keyword searching offers the precision of traditional Internet search engines. Research is focussed on pattern recognition, speech feature extraction, and other content-based

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characteristics that allow for highly specialized querying. An example of such a search might involve finding shots that contain trawlers at sea from a long-form documentary on the Canadian ship building industry.

One interesting research direction involves extracting and presenting high-level abstractions of content so users get an overview of the underlying story and message without having to download entire movies or clips. Certain facets of the automated approach to video indexing are therefore worth monitoring. It is unlikely, however, that a "perfected" automated indexing solution could fully supplant conventional metadata since the former is unlikely to allow for flexible, targeted categorization of resources. Rights management requirements are also unlikely to be fully met by automated means, given the complexity of related issues. The most effective approach will likely involve, as John R. Smith proposes in "Digital video libraries and the Internet" (1999), automated techniques for the extraction of certain content-based features complimented by traditional bibliographic data.

According Irani, Michal and P. Anandan (1998), Presents an approach for efficient access, use, and manipulation of video data. In order to support rapid access to information of interest within a video item, video data can be transformed from its sequential, frame-based representation to a scene-based representation to which each frame is directly related. The indexing methods employed are based on geometric and dynamic information contained in the video itself.

According Flickner, Myron et al (1995), An overview of QBIC, a content-based retrieval system that allows queries of large image and video databases based on example images, user-constructed sketches and drawings, and selected colour and texture patterns.

According Gauch, Susan, Wei Li, and John Gauch. (1997), VISION (Video Indexing for Searching Over Networks) project demonstrates the technology necessary for a comprehensive, online digital video library. VISION's approach combines the integrated application of mature image or video processing, information retrieval, speech feature extraction and word-spotting technologies for efficient creation and exploration of library materials.

According to Hall, Wendy. (1995), To realize the full potential of hypermedia, links need to be separated from information nodes and then processed as separate entities. Hall suggests a flexible database model that integrates hypermedia, structured databases, and information retrieval.

According Kobla, Vikrant and David Doermann (1998), Argues that while compression provides tremendous space savings, it can often introduce inefficiencies when decompression is required to perform indexing and retrieval. A first consideration in developing automatic processing techniques should be to attempt to enhance access capabilities within existing compression representations.

According to Smith, John R. (1999, In addition to automated techniques for the extraction of metadata from constituent audio, textual, and video features, additional metadata derived from bibliographic information allows for more structured querying. The assignment of subject categories using a classification system also improves retrieval capabilities, and projects such as Visual Seek automatically filter images and video from the Web into a visual content-specific taxonomy of subject classes.

According to Stone, Harold S. (1999), An overview of the state of the art of automated image retrieval. Image search is viewed as a blend of image understanding, descriptor-based searching, and pixel-based searching. Future research directions include designing interfaces that are more effective in matching what humans seek to the visual characteristics of the database and developing enhanced ways to derive image descriptors automatically.

According to Turner, James. (1994), In discussing appropriate access points for storage and retrieval of individual shots, Turner argues that the presently developing environment of networked resources will require ever-increasing standardization of practices in order to function efficiently. This also encourages greater cooperation among producers of content and managers of information. Much of the labour involved in indexing should also be shared among those responsible for providing access to information.

According Yeo, Boon-Lock and Minerva M. Yeung. (1997): Argues that information retrieval is not just search and indexing techniques but part of the general process of information use. The authors advocate a combination of keyword-based query and visual and audio-based query. Video visualization and browsing involve both extracting and presenting high-level abstraction of the content so users get an overview of the underlying story and message in minimal time. Through these abstractions, a user can quickly browse the content of individual video clips, navigate from one document to another in seconds, select segments of interest, and compose video documents from various sources, all without downloading the full clips, thus saving bandwidth and time.

2.4.2 Metadata schemes

The inherent properties of digital media resources allow creators to embed processing instructions in the form of metadata. In this way a description of the item is embedded within it. This may have interesting consequences for how metadata is harvested and used in the future. While Dublin Core is widely regarded as the front runner in resource description of networked objects, other descriptive schemes are worth considering on account of their potential as containers for various types of metadata. MPEG-7, an emerging standard for describing multimedia content is still in the developmental stage but video indexing experts such as Jane Hunter describe its potential to become a prominent standard. SMIL, a World Wide Web Consortium (W3C) recommendation for the description of multimedia presentations, is also described. Complex digital object architectures, such as those proposed by Lagoze and Payette (1998), suggest that a combination of metadata standards may eventually come to represent digital objects in a networked environment.

According to Hunter, Jane and Frank Nack. An Overview of the MPEG-7 DDL Proposals 1999. [Article online]; accessed 29 March 2008; available from http://archive.dstc.edu.au/RDU/staff/jane-hunter.html; Internet. Describes the Description Definition Language (DDL) proposals submitted in response to the MPEG-7 Call for Proposals and the results of their evaluation at the MPEG-7 AHG Test and Evaluation Meeting in Lancaster in February 1999. MPEG-7, often referred to as the multimedia content description interface, is an emerging metadata standard for describing audio, still images, and video. The

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design of the DDL forms a core part of the work within MPEG-7. It is designed to provide a solid foundation enabling users to create their own description schemes and descriptors. This is an excellent overview of MPEG-7 functional requirements and a informed discussion of the emergence of XML as the standard DDL syntax.

2.4.3 Data Models / Metadata interoperability

The relationship between a digital object's structure and the description of its content is important to the development of metadata standards. The requirements for storing and accessing various types of media are largely guided by the framework under which a given object falls. Data models contribute to a such a framework by providing a container in which resources of various types can be treated in a relatively uniform fashion. Metadata interoperability is thus facilitated. While metadata schemes are concerned primarily with the semantics of resource description, the containment architecture of a digital object describes the dynamics between its constituent elements. Although metadata element sets may differ depending on purpose, common data models facilitate mapping from one standard to another.

According Lagoze, Carl and Sandra Payette. Flexible and extensible digital object repository architecture (FEDORA) 1998. [Online]; accessed 22 March, 2008; available from http://www.cs.cornell.edu/payette/papers.html; Internet.
FEDORA addresses the requirements for digital objects and the repository service that provides access to them. FEDORA provides an object-oriented data model for the logical expression of the Warwick Framework, that is, the ability to package multiple distributed metadata sets with any form of digital content. Digital objects in the FEDORA context are conceptualized as having: a structural kernel, which encapsulates content as discreet and opaque byte stream packages; and an interface or behaviour layer that gives contextual meaning to the data in the digital object.

By segregating structure from interfaces, FEDORA makes it possible for digital objects of extreme structural variation to present themselves to clients in a normalized manner.
The FEDORA architecture makes a number of contributions in the areas of extensibility and interoperability for digital objects and repositories:

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the architecture separates the structure and raw data stored in a digital object from the semantically meaningful content types that are manipulated by clients; and it permits creation and storage of any computable rights management mechanism and the association of these mechanisms with the disseminations defined for a digital object.
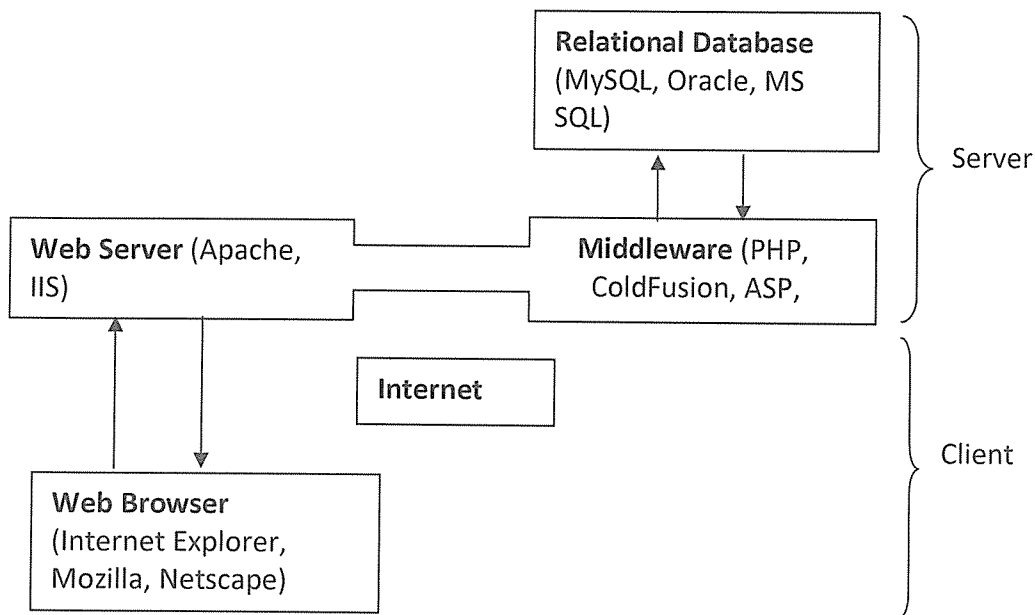
2.5 Web based application

Web Based Application is an application that is accessed via web browser over a network such as the Internet or an intranet. It is also a computer software application that is coded in a browser-supported language (such as HTML, JavaScript, Java, etc.) and reliant on a common web browser to render the application executable.

Web applications are popular due to the ubiquity of a client, sometimes called a thin client. The ability to update and maintain web applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity. Common web applications include webmail, online retail sales, online auctions, wikis, discussion boards, weblogs, massively multiplayer online role-playing games and many other functions. Retrieved from "http://en.wikipedia.org/wiki/web\-application" on 31st august 2008

To design a system that can be accessed from different locations, it calls for putting several issues into consideration. There is a point of control (Server) and the access point by users (Client). The server and the client need to smoothly and efficiently communicate so that to provide the needed information. The server can reside in one location and the multiple clients can be positioned wherever. The architecture of final products look as shown in figure below:

Figure 1: Architecture of web based application

Though many variations are possible, a web application is commonly structured as a three-tiered application. In its most common form, a web browser is the first tier (presentation), an engine using some dynamic Web content technology (such as ASP, ASP.NET, CGI, ColdFusion, JSP/Java, PHP, embPerl, Python, or Ruby on Rails) is the middle tier (application logic), and a database is the third tier (storage). The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface.

2.5.1 Benefits of Web based application

Browser applications typically require little or no disk space on the client, upgrade automatically with new features, integrate easily into other web procedures, such as email and searching. They also provide cross-platform compatibility (i.e., Mac or Windows) because they operate within a web browser window.

Standards compliance is an issue with any non-typical office document creator, which causes problems when file sharing and collaboration becomes critical. Also, browser applications rely on application files accessed on remote servers through the Internet. Therefore, when connection

is interrupted, the application is no longer usable. Google Gears is a platform to ameliorate this issue and improve the usability of browser applications

2.6 Rental system

Rental shop is a business that allows a consumer to temporarily obtain a reusable good or product for a specified period of time in exchange for payment, a process known as renting. Typically, a rental shop will conduct business with customers under conditions and terms agreed upon in a rental agreement or contract, which may be implied, explicit, or written.

Typically, a customer must sign up for an account with the shop and give billing information like a credit card number. If items are returned late, the shop usually charges late fees, which typically accumulate day by day. Some shops now have policies where instead of late fees, they will treat overdue items as a sale after a certain date, and charge a price equivalent to a standard sale of that object (with appropriate deductions for the rental fee already paid and for its pre-opened condition).

The most common type of rental shop are video rental outlets, offering primarily movies. Many such rental shops also offer music or computer games as well. Some video rental outlets use a kiosk or vending machine to dispense and collect rentals. Other types of rental shops include car and truck rentals, construction and heavy equipment rentals, sporting goods and recreational rentals, television and domestic appliance rentals, and costume rentals.

Many motion pictures that do not perform well in movie theatres depend on the rental market for success, and some movies are released direct-to-video. Until 1998, movies were released in three phases: theater, rental, retail. There would typically be a two to three month delay between the time a movie was available for rental, and when the movie could be purchased by the consumer. (In reality, the video was available, but priced between $75 and $125). This started changing with the advent of movie release on DVD. Blockbuster video refused to use the VHS strategy for DVD, so the studios began releasing DVDs at an initially lower price. During 1998, retailers would have the DVD version of a film available for sale the same day the VHS version was

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available for rent. This later changed, with release dates for VHS and DVD coinciding. Retrieved from "http://en.wikipedia.org/wiki/Rental_shop" on 31st august 2008

2.7 Types of digital Video Library projects
Carnegie-Mellon.

The info media digital video library. "The Info media (tm) Digital Video Library project will establish a large, on-line digital video library by developing intelligent, automatic mechanisms to populate the library and allow for full-content and knowledge-based search and retrieval via desktop computer and metropolitan area networks. Initially, the library will be populated with 1000 hours of raw and edited video drawn from video assets of WQED/Pittsburgh, Fairfax County (VA) Public Schools, and the Open University (U.K.).

Columbia University.

Oversized Color Images Digitization Project. "this project, under contract to the Commission on Preservation and Access, to identify the most acceptable preservation and access techniques available for oversize, color images associated with text. Five maps from brittle volumes have been scanned, as have single-frame color microfiche of the maps (produced during an earlier Commission-sponsored project) and 4 x 5 color transparencies. Paper printouts have been made from each digital version."

CHAPTER THREE
METHODOLOGY

3.0 Introduction

In this chapter, the researchers discussed the various methods and methodology that were used to collect data for the research. Object-Oriented methodology was used to come up with operational web-based system.

This involved collection of data about the existing system and analyzed it with an intention of understanding how to meet the current need for a new system to be implemented. Analysis is a problem solving technique that decomposes a system into its component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose (Bentley Kevin C. Dittman, 2000)

3. 1 Area of Study and Population

The investigation was carried out at Movie Land Entertainment Limited Kampala branch located in Kampala District. In accordance with (S.Gupta 2003) a sample should be in a position to wholly represent a population in every aspect. Thus our research was based on the branch in Kampala District which mainly constitutes large number of Movies, Clients and workforce. Currently the company has 5 branches in Uganda, Kampala branch be the main branch which constitute 20 employees and over 1000 movies in store.

3.2 Samples

The researchers used random sampling method to obtain relevant data. A total of 20 employees of the population in Movie Land Entertainment Limited of Kampala Branch were selected using the stratified sampling method to enable the research to select a sample and purposeful sampling techniques were used, through this method the researchers selected employees who work with clients and the current system and the from the manager and some of clients of the company to collect data of currently system in place.

3.3 Data Collection Tools

Fact-finding techniques, also referred to as Data-collection techniques, were used to gather information. These techniques allowed the systems analyst to systematically collect information about the objects of study (people, objects, phenomena) and about the settings in which they occur. The researchers had to be systematic in the collection of data since, if data are collected haphazardly, it would be difficult to come up with required operational software. The following data collection methods were used to help in the problem investigation.

3.3.1 Interview Method

The researchers carried out a direct conversation with manager of Video Rental of Movie land Entertainment Limited and answers were recorded. Also the researchers interviewed the workers of the company and the members of the company to get information of the existing system.

The interview was carried out to get the respondent's view on how the existing system is working and its problems. It was the most significant and productive fact finding method, it was used to obtain information from the manager of Movie Land Entertainment Limited

In the case of Digital Video Library Information System, the structured interview method was used. Structured interview is a method where the interviewer had a specific set of questions to ask the interviewee. Depending on the interviewee's responses, the interviewer directed additional questions to obtain clarification or amplification.

Structured interview was used because of the following reasons:
1. The interviewer obtain supplementary information.
2. It allowed the interviewer to ask questions that may reveal additional information useful for making a selection decision
3. With this approach, the interview could be modified as needed to gather important information.
4. Enable the interviewer to rephrase question to each individual who will be interviewed
5. It allowed observation of non-verbal communication and study attitudes.

3.3.2 Observation

In this technique, the researchers was involved in systematically selecting, watching and recording behavior and characteristics of people and objects at Movie land Premises. This technique was used in cases where the validity of data collected through other methods was in question or when the complexity of certain aspects of the system prevented a clear explanation by the end-users. The type of observation used was the Non-participant observation: in this method, the observer watches the situation, openly or concealed, but does not participate.

Observation was used for the following reasons:

1. It helped in checking the validity of data obtained through other methods. This increase reliability of the data/information gathered.
2. The researcher was able to see exactly what is being done. Complex tasks were sometimes difficult to clearly explain in words. Through observation, the researcher identified tasks that had been missed or inaccurately described by other fact-finding techniques.
3. Observation is relatively inexpensive compared with other fact-finding techniques.
4. Observation allowed the researcher to do work measurements.
5. It is a very useful fact-finding method when qualitative data is sought.
6. It is also useful where the data users didn't give correct information.

3.3.3 Questionnaire Method

This method was used by distributing the questionnaire to the 10 workers of Movie Land entertainment limited in Kampala Branch. The questions was asked and distributed in form of paper sheets and recorded after being filled by the respondents. Out of 10 workers who were given questionnaire, 8 workers filled the questionnaire and the information was analyzed to come up with requirement for the new system.

3.4 Requirement Analysis

This defines the requirement of the new system. For the case of Movie Land Entertainment Limited Digital library information system, the following requirement were identified:

3.4.1 Functional Requirement

The system should react to a particular inputs and how the system should behave in a particular situation. The system should allow users to input information of the movie and the clients. The system will maintain, validate, insert, delete and modifies records stored in database. The functional requirement of the system have five tables, of Movie detail, clients details, rentals details renew movies and the revenue of the company.

3.4.2 Non-Functional Requirement

A non-functional requirement is a description of features, characteristics and constraints that define a satisfactory system.

There are constraints on the services/functions offered by the system such as timing constraints, reliability, response time, constraint on the development process, usability, look and feel, security standards etc.

3.4.3 System Requirement

Microsoft windows XP was chosen because it is compatible with most software and better for networked environment therefore, fewer problems are encountered during the running of the system. The antivirus is also needed to detect virus in the system that would affect the running of the software or slow down the system. Because it's a web based application, Internet Explorer or any other browser can work effectively.

Hardware (H/W) requirements. This describes the minimum hardware requirements for the development of the new system. The following are the minimum hardware requirements.

Hardware	Requirements
Computer	Compatible Pentium IV
Memory (RAM)	128 MB recommended. Additional memory may be required depending on operating system requirements.
Hard disk	40 GB recommended.
Monitor	VGA with the resolution of 800X600.
Input device	PS/2 mouse and keyboard.
CD-ROM	256X
Processor speed	1000 recommended
Generator	Any compatible
Ups power stabilizer	600w capacity

Table 1: Hardware Requirement for the Movie Land Entertainment Limited

3.5 Software Architecture

System architecture defines the specification for the new system, which describes the input requirement, output requirement, storage requirements and the processing of the new system.

3.5.1 User Interface design

Interface models were used to depict the external inputs and outputs to and from the system and their sources and destination. The researchers used PHP and Dreamweaver to design the user interface. They served for designing user and system interface. Example of login interface which to authenticate the user by username and password to login to the system.

3.5.2 Database

The researchers used the Unified Modeling Language (UML) to come with conceptual framework of the database. This is through the use of UML diagram like Use case diagram, class diagram and sequence diagram.

3.6 Physical Design

System design is the process or art of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. One could see it as the application of systems theory to product development. The researchers used MySQL to design the database which acts as data repository and used PHP/Dreamweaver 8.0 to design the interfaces which will be able to act as input and output of the data to the user.

3.7 testing

Testing was carried out to check whether the system and its components behaved in the desired manner. After acquiring the system hardware and software, system testing was the next step in order to see if the acquired hardware and software work properly

System testing was done in two stages as explained below:

3.7.1 Unit testing

This is the first stage of testing that was done by using written test plan as shown in Table 4.8 and prepared test data. All the forms that are on the system were tested against the test plan and the conditions. The database was also tested and all the validation rules were checked to see their effectiveness and efficiency. Testing individual components separately to remove errors. This was done by the researchers.

3.7.2 System Testing

This testing was conducted on the complete, integrated system to evaluate the system's compliance with its specified requirements.

3.7.3 Acceptance Testing

The system was tested by users to provide final certification that it is ready to be used. This was done at Movie land Entertainment Limited by the workers of the company. After being tested, the system was reviewed by management, when all were satisfied; the system was installed at Movie Land Entertainment Limited.

CHAPTER FOUR
SYSTEM ANALYSIS AND DESIGN

4.0 Introduction

Systems analysis is a problem-solving technique that decomposes a system into its component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose. It is driven by the business concerns of system owners and system users. Hence, it addresses the Data, Process and interface building blocks from system owners' and system users' perspectives.

System analysis was part of preliminary investigation of the previous system. A detailed study of the previous system was done in order to find out the difficulties and problems of that system, the user requirements, the inputs to the system, the outputs generated.

System analysis and design was done because it helped in pinpointing the problem, helped in setting system goals and helped to determine the boundary of the project by taking into consideration the limitations of the available resources.

4.1 Requirement Analysis

An investigation was carried out to establish how the existing system functions and what its problems were. This led to a definition of a set of options from which the users could choose their required system. In carrying out an investigation, information about the current system was collected and by recording the problems and requirements described by the users of the current system, a picture of the required system was build. Functional requirement, non functional and system requirement were all identified and used to come up with the operation system.

4.1.1 Requirements of the Proposed System

After data collection and analyzing, the researcher came up with the requirements of the new system. The system, after completion was expected to:

1. Process and provide management with information about the Movies in store and the ones with clients hence providing them with meaningful reports for decision making.

2. To identify and display any outstanding video rental with amount due on each video and total amount due.

3. To provide Information System access to all necessary personnel (data entry, update and deletion).

4. To provide a full range of reports that will satisfy informational requirements which include viewing customer rental history, video rental history, titles by category, items by status, overdue videos by customers and outstanding balances by customers.

5. To document the Video Library information System within the Standards and Procedures Manual.

6. To provide training to personnel responsible for supporting the Digital Video Library information System.

7. Keep track of client's information about the movies they possess and currently in the stock.

8. Provides central information sources, which can be used to attend to problem requests, provide detailed information that can be used for decision making quickly and accurately.

9. Produce timely professional looking and summarized reports that can intern be used for decision making by the organization.

10. Improve Employee service and satisfaction levels through faster response times and multi-channel communication.

11. Provide a good interface not only for the expert user but also for the novice user who knows little about the retrieval mechanism.

4.1.2 Benefits of the Proposed System

The proposed system led to the following benefits to the Movie Land Entertainment Limited:
1. Proper maintenance of records for future reference.
2. Improved employee productivity and resource allocation.
3. Easy report generation
4. Easy backups incase records are damaged
5. Retrieval of the exact information required to assist a user as quickly and as easily as possible.

6. Reduces costs by reducing the time taken to find content through integrated search.

7. Prevented loss of important data.

4.2 Software Architecture

4.2.1 User Interface Design

Interface models were used to depict the external inputs and outputs to and from the system and their sources and destination. Example of interface which was designed by PHP and Dreamweaver 8.0, the login interface authenticates the user by username and password to login to the system as in the figure 4.1.

MOVIE LAND ENTERTAINMENT

Digital Video Library
Information System

Log In

Please type in your user name and password to login.

User:
Password:

Submit   Reset

This software is Registered to
Movie Land Entertainment Ltd.

©2011

Figure 2: Login Interface

This is a form for login to the system, which has two levels, one is administrator who has full privileges of the system and another one is Clerk who is limited to data entry but can't delete. Thus the system provides security of the data.

4.2.2 Database

The researcher used the Unified Modeling Language (UML) to come with conceptual framework of the database. This is through the use of UML diagram like Use case diagram, class diagram and sequence diagram. The following diagrams were used to come up with database

Use case diagram for Digital Video Library Information System (DVLIS)
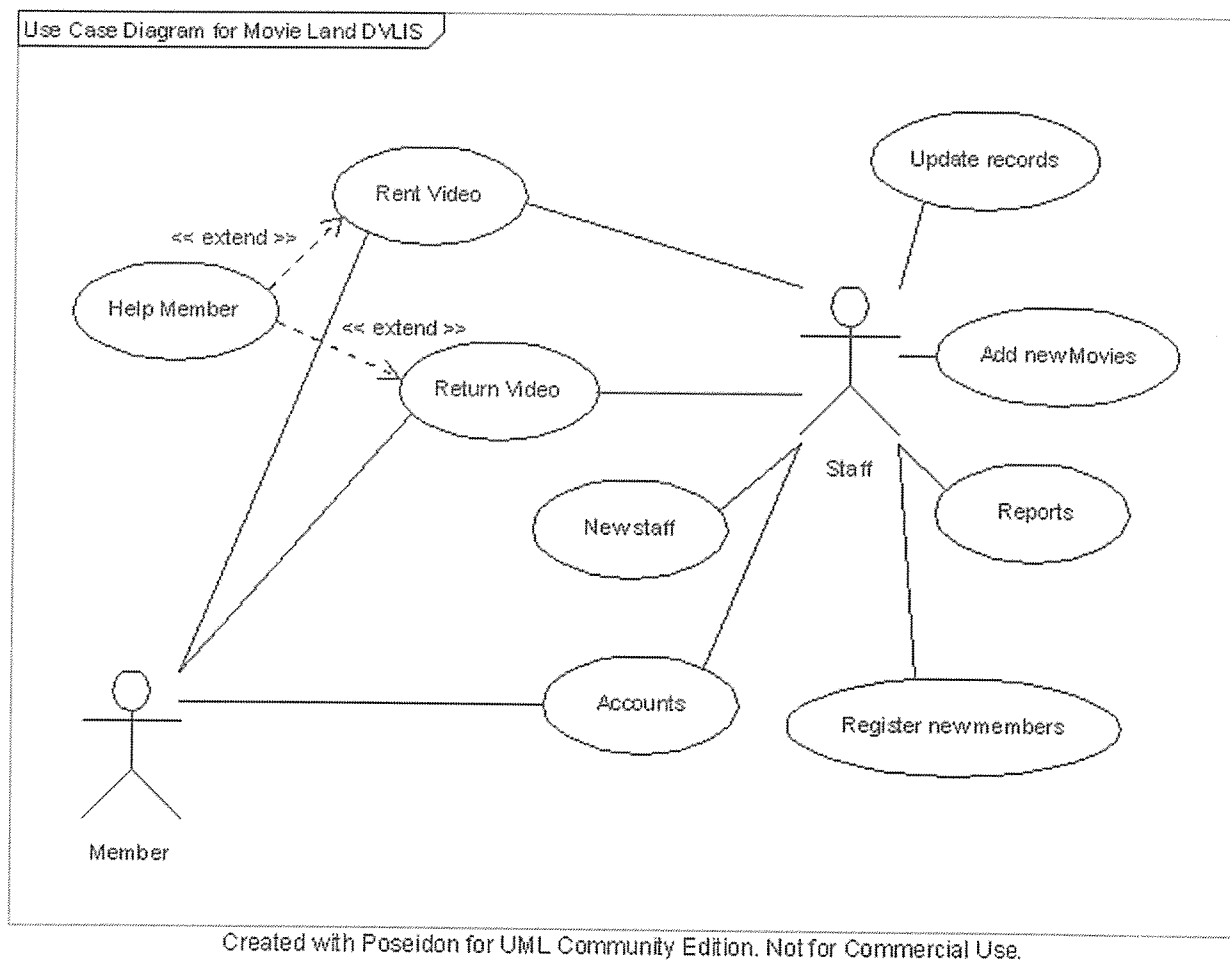
Figure 3: Use Case diagram for Digital Video Library Information System(DVLIS)

Actors	Use Case
Member	Rent Video
	Return Video
Staff	Reports
	Add new movies
	Accounts
	Register new members
	Add new staff
	Update records

Class diagram of a Digital Video Library System
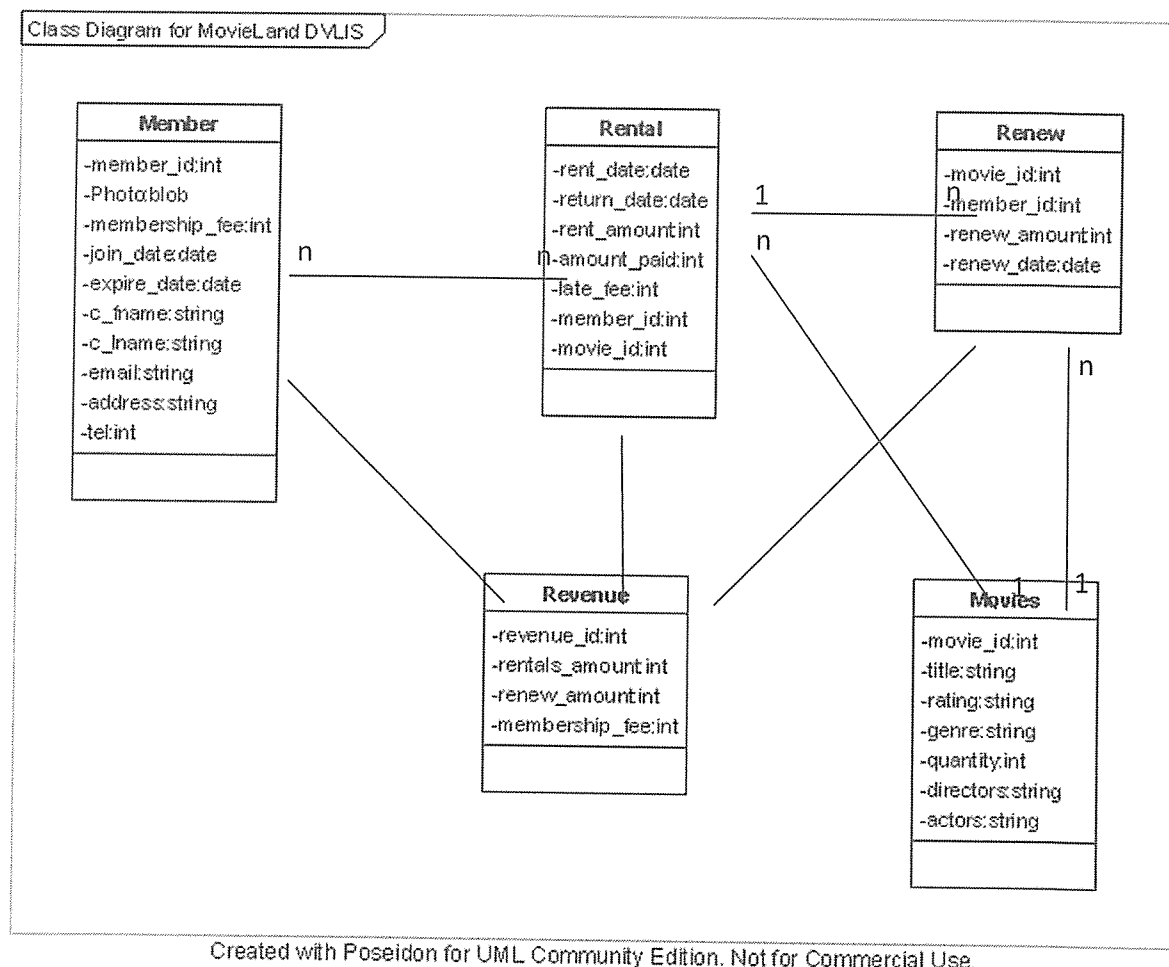
Figure 4: Class diagram of a Digital Video Library Information System

The class diagram above shows the different entity with the attributes and the relationship between the classes. Member class is used to capture the details of the members in the system. The Movie class stores details of the current movies in the company. Rental class act as a middle class between the member and the Movie class. The rental items can be renewed and its details will be stored in the Renew class which contains the details of the item renewed. Revenue class stores details concerning financial records obtained from rentals and membership fees.

Sequence diagram showing new member registration in Digital Library Information System:

Created with Poseidon for UML Community Edition. Not for Commercial Use.
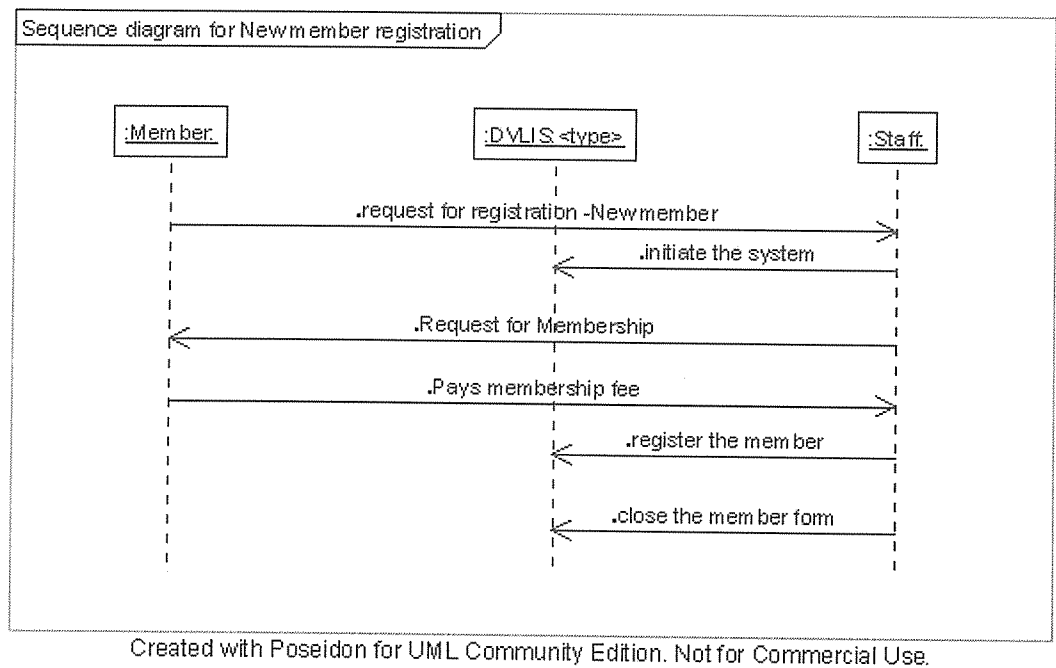
Figure 5: sequence diagram for registering new members

The sequence diagram above shows the flow of process for registration. When new members come to the company they will request for registration, whereby the will pay membership fee and they can be able to rent a movie in the company.

Sequence diagram showing renting process

Sequence diagram for Renting

| :Member | :DVLIS: | :Staff |

- .requst for movie - Registered Member
- .allow to search Movie on shelves
- .take movie of interest
- .Open rental form
- .request to pay rental fee
- .Pay rental fee
- .record rented movie
- .hand out movie
- .close the rental form
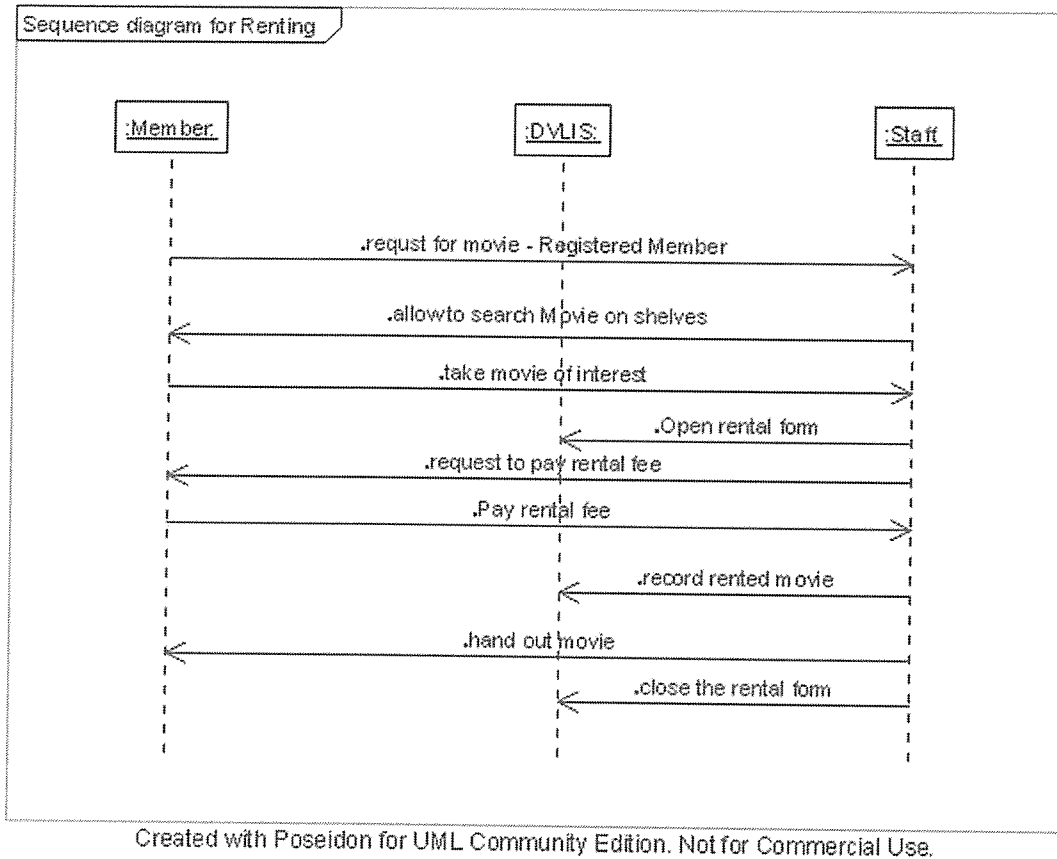
Figure 6: Sequence diagram for renting Movies

The above diagrams shows the interaction between the member, System and the staff for a registered member to rent a movie. The diagram illustrates the processes till the member got the movie.

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Sequence diagram for returning a movie
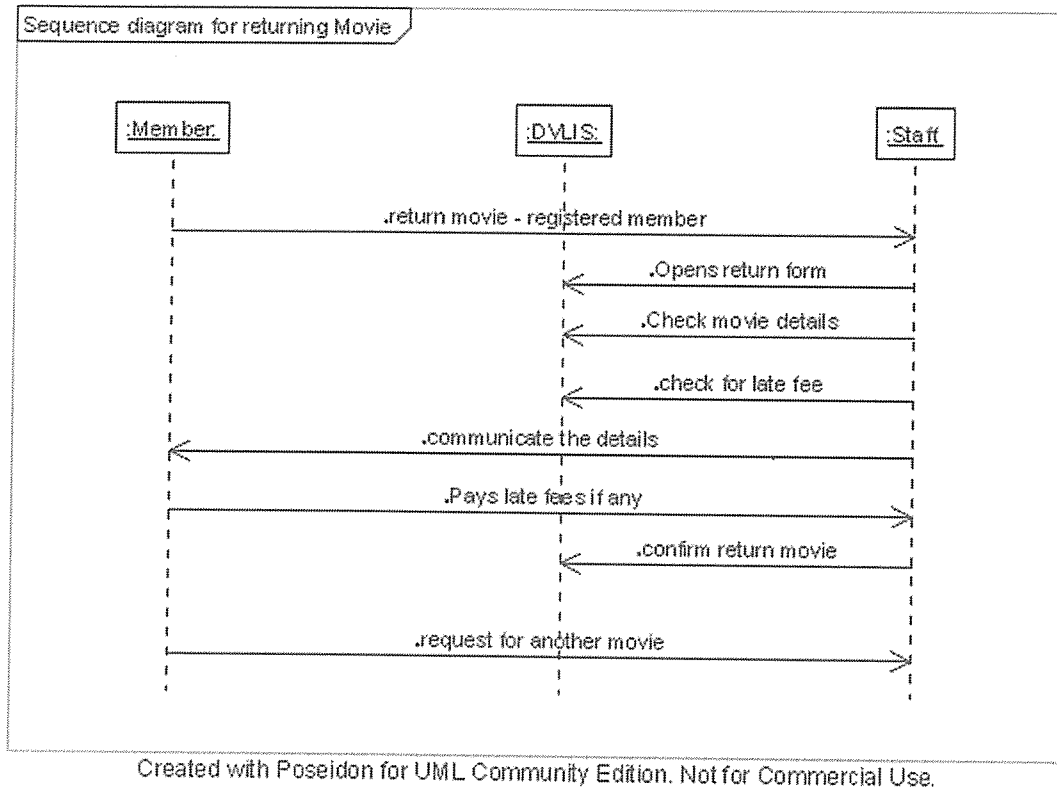
Figure 7: Sequence diagram for returning a movie

The sequence diagram above shows the process for a registered member to return the rented movie. It illustrate the interaction between the staff and the system and between the member and the staff.

4.3 System Design

System design involved the specification or construction of a technical, computer based solution for the business requirements identified in a system analysis. Whereas system analysis emphasized on the business problem, system design focused on the technical or implementation concerns of the system. It was driven by the technical concerns of the system designer. System design was looked at from three perspectives:

1. Logical Design
2. Physical Design

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3. Database Design

4.3.1 Logical Design

Logical design (logical models) depicts what a system is or what a system must do but not how the system will be implemented. They are implementation independent, that is, they depict the system independent of any technical implementation.

- System flow chart (SFC). These are modeling tools that use many symbols to represent the computerized processes, manual operations, inputs and output of the system as well as the interaction of all the parts of the system as shown in figure 4.5 and figure 4.6.

Flow diagram showing authentication to login to the Digital Video Library Information System:
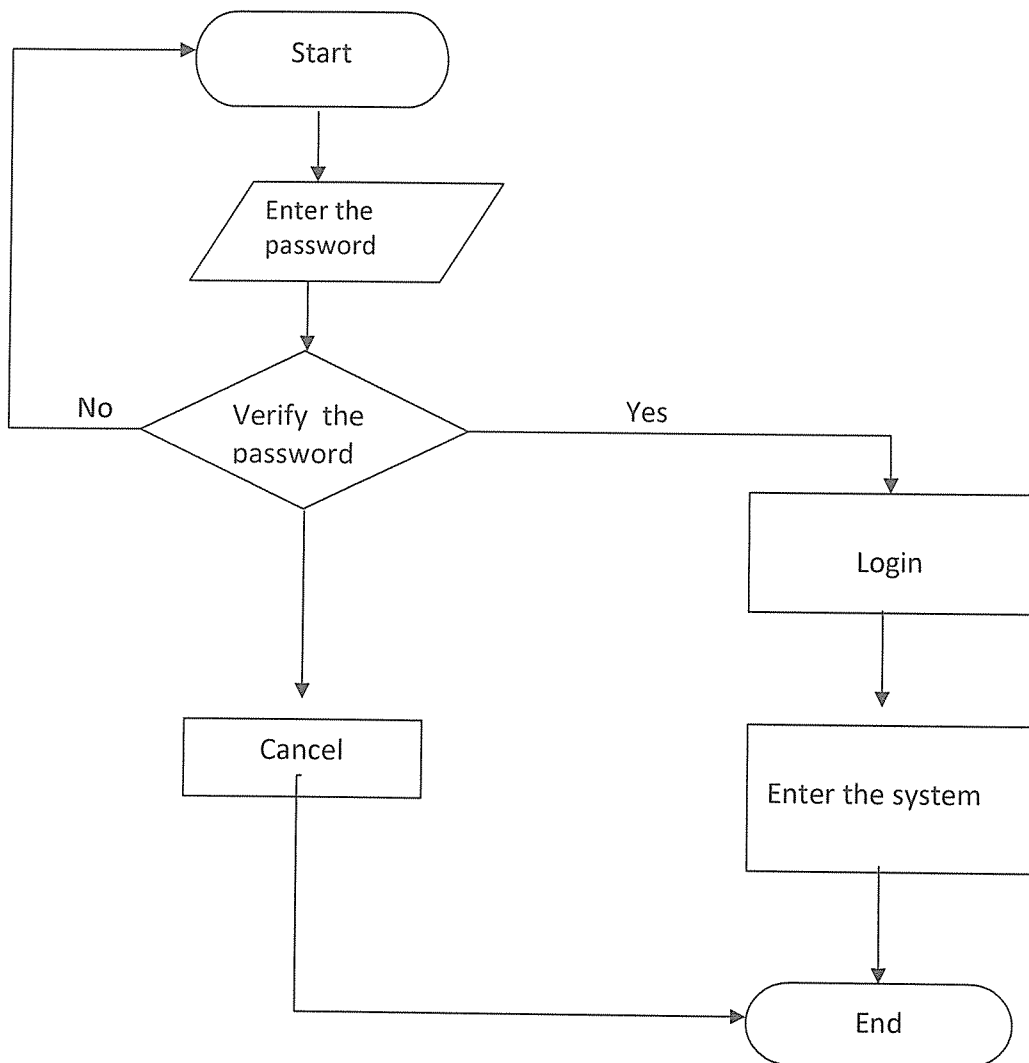
Figure 8: shows the system flow chart of the new system

Key:

Terminator   Process

Data   Decision

Data flow symbol
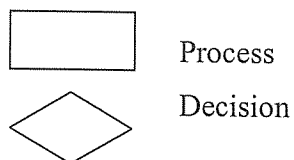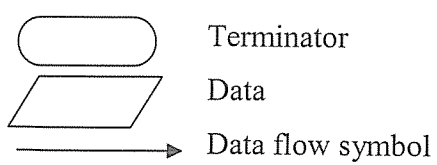
Flow Chart for Digital Video Library Information System (DVLIS)
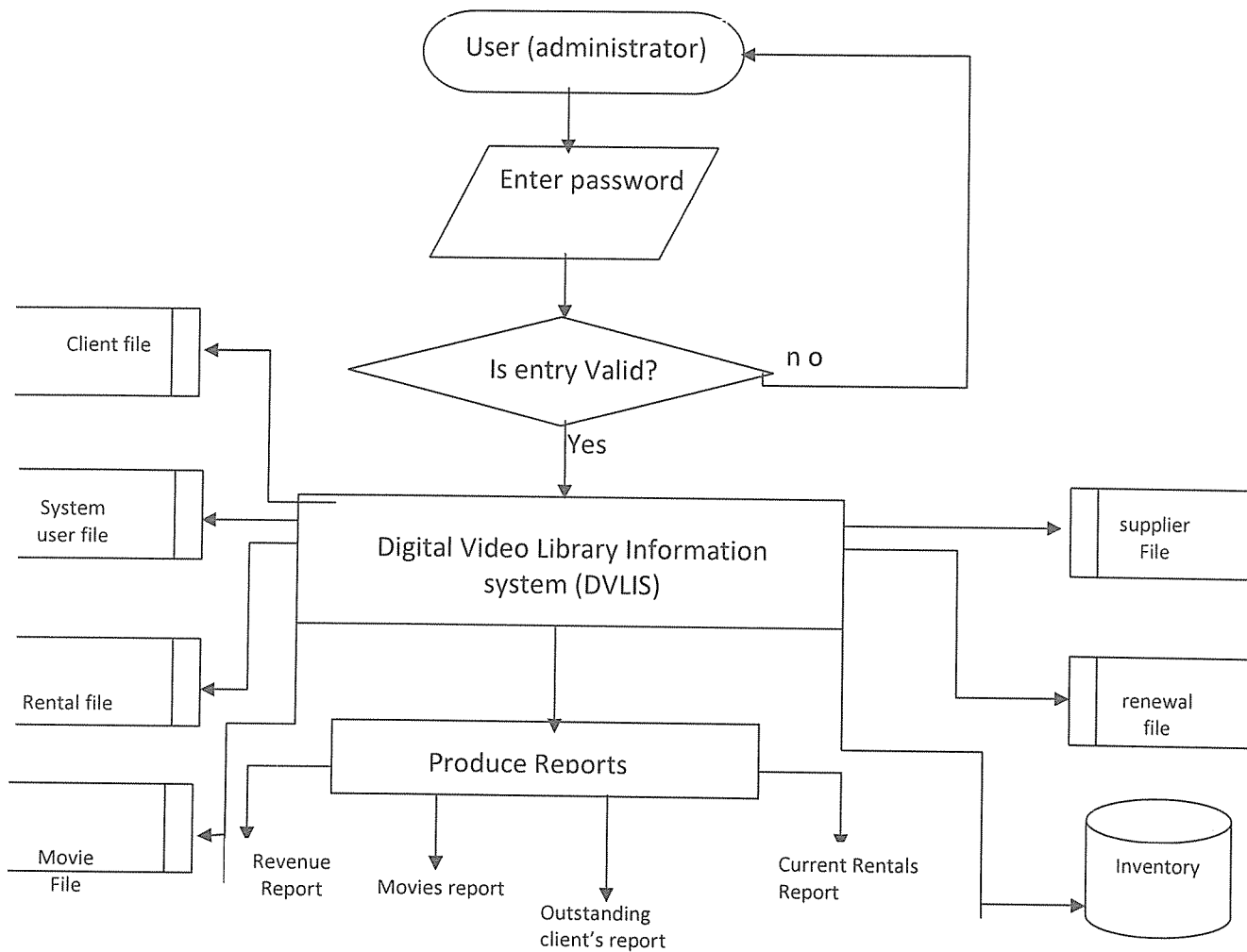
Figure 9: System Flow Chart for Digital Video Library Information System (DVLIS)

The administrator can login to the system and manipulate the data stored in files or can input new data to file. There are different files in the system include client file, movie file, rental file, renewal file, system user file and inventory file. The administrator can produce the reports like client reports, movies report and current rentals report.

4.3.2.1 Verbalization

The system contains seven major tables with other supporting tables as shown in figure 4.3. The entities and attributes of the system are shown below;

1. Member table which will be able to store the details of the clients in the system. The table has following attributes; member_id, photo, membership_fee, join_date, c_fname, c_lastname, email, address and telephone for the client. The information of client stored into the system can later be altered and edited and new member can be added into the system and can be deleted by the administrator only.

2. Movies table which have all the details of the movies currently in the system. It includes the attributes movie_id, title, rating, genre, quantity, directors of the movie and actors in the movie. This table will store all the movies in the company and they can be altered by editing, deleting and new movie can be entered into the system.

3. Rental table, this table is capable of holding all the details of the movies and members who rented the movies, the attributes include; member_id, Movie_id, rent_date, return_date, renew_date, rent_amount, amount_paid and late_fee.

4. Revenue table which will deal on the amount the company will have earn on the rental business. The table have the following properties; rentals_amount, renew_amount and the membership_fee. This table will be used to get the report on the financial benefit of the business.

5. Supplier table which acts as a contact address to the client of the business. It will be able to store all the details of the supplier and can be contacted when the company needs to restock. It has the attributes, supplier_id, name and address.

6. User table which contains information on all the users of the system, in this case the user are of two levels, one with administrative privilege and other with no full privilege of the system. This table have the following attributes; user_id, name, password, level, email and sex.

Relationships

There is relationship between tables as illustrated in figure 4.3,

First a customer table is to the rental table in that when a customer borrow a movie, the details will be kept in the rental table with the member_id.

The rental also relate with movie table in that movie_id is the item which is rented and will contain in the rental table.

There is a relationship between rental and revenue in that when a movie is rented the amount is recorded into the revenue table and will be kept for decision making and financial analysis.

4.3.2 Database Design

Digital Video Library Information system is based on Relational Database management systems whereby the researcher used MySQL to design the database. This kind of database implements data in a series of two-dimensional tables that are related to one another via foreign keys. Each table consists of named columns and rows.

The name of the database that will contain the files for the Video information system is **Digital Video Library Information System (DVLIS)**

Examples of database tables containing in DVLIS:

System user table:

Figure 10: system user table

This stores the details of the users of the system, which currently is design to have two levels, one of Administrator who has full privilege of the system and other of clerk who does not have full privilege of the system and is restricted on some other features of the system.

Table structure for table `users` using the MySQL code.

```
CREATE TABLE `users` (
  `user_id` tinyint(11) NOT NULL auto_increment,
  `name` varchar(30) NOT NULL,
  `password` varchar(30) NOT NULL,
  `level` varchar(30) NOT NULL,
  `email` varchar(50) NOT NULL,
  `sex` varchar(2) NOT NULL,
```

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PRIMARY KEY (`user_id`)

) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=1 ;

This table will act as the first page to appear so that can authenticate the user of the system. This will ensure data security and integrity of the data.

Members table

Figure 11: Members table

This is a table of members which shows all details of members, it will be able to store the members in the system with all their details. The system only allow rental to the members who have registered in the system and paid the membership fee, this is because to act like security when the member do not return back the movie rented.

Table structure for table `members`

CREATE TABLE `members` (

  `member_id` tinyint(11) NOT NULL auto_increment,

```
`photo` blob,
`membership_fee` int(11) default NULL,
`join_date` date default NULL,
`expire_date` date default NULL,
`c_fname` varchar(30) default NULL,
`c_lname` varchar(30) default NULL,
`email` varchar(50) default NULL,
`address` varchar(100) default NULL,
`tel` int(15) default NULL,
PRIMARY KEY (`member_id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=1 ;
```

Movies table

Figure 12: Movie table

This is a table which stores all details of movies currently in the company. When the movies are rented out, the quantity of the movies in this list will reduce and therefore showing list of available movies in the system.

Table structure for table `movies`

```
CREATE TABLE `movies` (
  `movie_id` tinyint(11) NOT NULL auto_increment,
  `title` varchar(100) NOT NULL,
  `rating` varchar(30) NOT NULL,
  `genre` varchar(30) NOT NULL,
  `quantity` tinyint(4) NOT NULL,
  `directors` varchar(100) NOT NULL,
  `star_actors` varchar(100) NOT NULL,
  PRIMARY KEY  (`movie_id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=1
```

Rental table

Figure 13: Rental table

This is a table design to store the rentals, it contain the movie rented, return date amount and client details, when a client borrows movies it will be recorded in this table and its due date. This table will be also used to query the revenue earned from renting.

Table structure for table `rental`

```
CREATE TABLE `rental` (
  `rentals_id` tinyint(11) NOT NULL auto_increment,
  `member_id` tinyint(11) NOT NULL,
  `movie_id` tinyint(11) NOT NULL,
  `quantity_rented` varchar(10) NOT NULL,
  `title` varchar(100) NOT NULL,
  `c_fname` varchar(50) NOT NULL,
```

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`c_lname` varchar(50) NOT NULL,

`rent_date` date NOT NULL,

`return_date` date NOT NULL,

`renew_date` date NOT NULL,

`rent_amount` int(11) NOT NULL,

`amount_paid` int(11) NOT NULL,

`late_fee` int(11) NOT NULL,

PRIMARY KEY (`member_id, movie_id`)

)

Revenue table

Figure 14: Revenue table

This table store the revenue of the company. The revenue will be the amount earned for rental, renewal and the membership fee. This information will be kept for the future auditing of the system.

Table structure for table `revenue`

```
CREATE TABLE `revenue` (
  `membership_fee` int(11) default NULL,
  `rentals_amount` int(11) default NULL,
  `late_fee` int(11) default NULL,
  `renew_amount` int(11) default NULL,
)
```

Supplier table

Figure 15: Suppliers table

This is a table which store details of the suppliers of the movies in the company. This table acts as address contact of the supplier.

Table structure for table `supplier`

```
CREATE TABLE `supplier` (
  `supplier_id` tinyint(11) NOT NULL auto_increment,
  `name` varchar(50) NOT NULL,
  `address` varchar(50) NOT NULL,
  PRIMARY KEY (`supplier_id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=1 ;
```

Other supporting tables for the system are

List of days of the month

Field	Type	Null	Default
id	tinyint(11)	No	
days	int(11)	No	

Table 2: List of days of the month

This table stores the days of the month. Ie. From 1st to 31.

List of the month of the year

Field	Type	Null	Default
id	tinyint(11)	No	
month	int(15)	No	

Table 3: month of the year

This table is used to store all the month of the year that is from January to December so that the user of the system does not type manually.

List of years

Field	Type	Null	Default
id	tinyint(11)	No	
years	int(4)	No	

Table 4: List of years

List of fees

Field	Type	Null	Default
id	tinyint(11)	No	
fees	int(5)	No	

Table 5: List of fees

This table is used to store the fees chargeable to members of the company

List of fines

Field	Type	Null	Default
id	tinyint(11)	No	
fines	int(11)	No	

Table 6: List of fines

This table stores list of amount should be charged to clients.

List of genre

Field	Type	Null	Default
genre	varchar(15)	No	
id	tinyint(11)	Yes	*NULL*

Table 7: List of genre

This table stores the genre of the movies so that to have a drop down menu for all genre.

List of rating

Field	Type	Null	Default
id	tinyint(11)	No	
rating	varchar(5)	No	

Table 8: List of rating

This table stores the list of rating of the movies.

Presentation of the software

Log in page

MOVIE LAND ENTERTAINMENT

Digital Video Library
Information System

Figure 16: Login page

This is the first page to display when the system starts, this page authenticate the user of the system. There are two levels in which someone can login into the system, one is by the by Administrator privilege and the other is of clerk who doesn't have full privilege. Administrator have the full privilege e.g to view the revenue of the company, deleting records and edit data already existing in the system.

Rent page

Figure 17: rent movie to clients form

This is a form for renting movies to clients. The clerk or administrator need to fill the form in order to rent the movie, a client select the movies which are available in the system, the clerk or administrator fill the form which will include the member_id and movie_id. This form will update the rental table and the movie table which will reduce its quantity by the number of quantity rented.

Return page

Figure 18: Showing a return page of movie.

The page for a client returning movie to the company. The clerk or administrator will open the rental page which contain all the movies rented out. He will check the member_id and open the link to return the movie page, clicks on the confirm button of return movie which will update the movie table and clear the customer rentals.

Search detail page

Figure 19: Search page for movies in company

The page shows example of a search wizards which make it possible for quickly filter the details you need. This is a technique which quickly takes user to the record of interest. This is done by writing the field which you want to search. The fields include either by all fields in the table, by movie title, rating, genre or by ID. This feature will enable save time and quickly get the required information from the system.

Renew page

Figure 20: Renew page

This is a renew form which is used by user to extend the period of movie rented. This is an added feature to clients so that to avoid late charges.

Administrator page
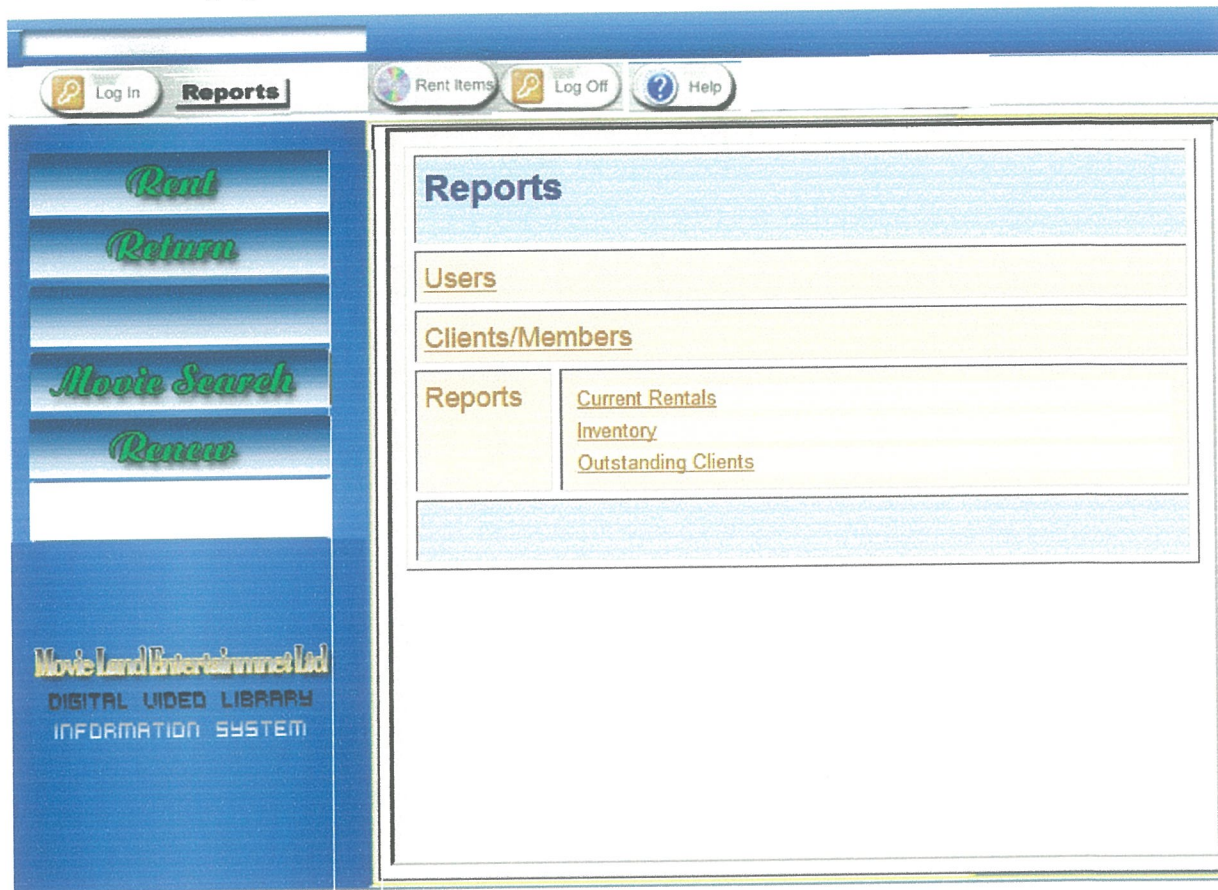
Figure 21: Administrator page

This is a page for a user who has administrative right, which means full privileges of the system. The Administrator will be able to view reports, users, clients and suppliers details in the system. This page is only available to the administrator thus the clerk does not have the right to this services.

Selected output

System outputs are used to present data to the users. The Digital Video Library Information System contain the following Reports.

- Current Rental history
- Title of movies by category
- List of client
- Outstanding balances by customers
- Revenue of the company

Report interface page

Figure 22: Report interface page

This page shows the reports which can be query from the system, it include current rentals, inventory of the company revenue gotten from the rental charges, membership fee and late charges. The administrator has full privileges to view the clients, delete print out reports and add or delete users of the system

Rentals report
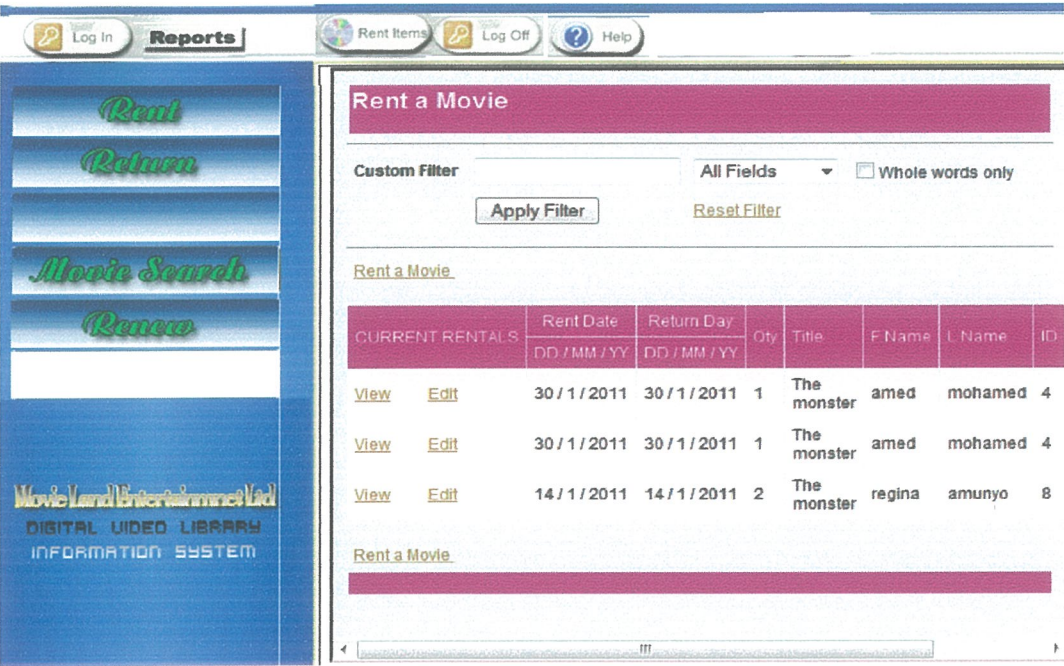
Figure 23: Rentals report

This report shows the list of movies rented out to the client. The report shows the details of the members, rented date, return date and the details of movie borrowed.

4.3.3.2 Validation

Data validation is an attempt to build into the computer program the power to detect whether entries made are correct. The incorrect data items are detected and reported. The validation checks used in this project include:

Range Check

The fields are checked to ensure that they contain the correct number of characters.

Format check

This check ensures that fields are entered using the correct data types, that is, a non numeric field should not have numeric data and vice versa.

4.4 System Testing

Testing was done to determine whether the system produces the desired results and whether it satisfies the user's requirements.

System testing, also known as integrating testing, tests the functioning of the information system as a whole to determine if discrete modules will function together as planned

4.4.1 Test Plan

Test No	Module	Purpose	Test Data	Expected Results
1	Password	To check if password gives access to the system	"Video"	Access to the system is granted.
2	Password	The check if password gives access to the system	Any other character other than "video"	A message box us displayed stating "invalid password"
3	Page Menus	To check if page menus displays sub-menus of all the page in the system	Click on the page menu	All the submenus will be displayed.
4	Customer page Menu	To check if the customer page menu displays the customer page on the screen	Click on the customer page sub-menu.	front page appears.
5	Rental page Menu	To check if the rental page menu displays the rental form on the screen	Click rental form sub-menu	rental page appears.
9	Report menu	To check if the report menu displays the sub-menus of all the reports in the system	Click on the report menu	The reports submenus appear.
10	Help menu	To check if help contents are displayed	Click on the contents submenu	The electronic help manual appears.

Table 9: Systems Test Plan

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4.5 Implementation

Before the implementation of the new system, hardware and software requirement must be installed so that they would be compatible with the new system since we were converting from both manual system and computerized to fully computerized the system, the conversion of hardware, software and the manual files into the new system was done using the parallel approach method of implementation. That is to say old system and new system were operated side by side until the new system showed reliability then the old system will be abandoned.
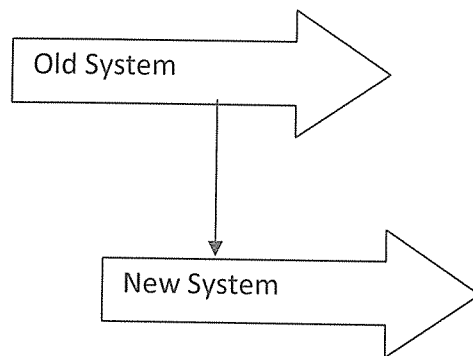
Figure 24: The implementation approach

4.5.1 Systems Security

A. Software

- Use of passwords to allow only authorized users to gain access to the systems documents.
- Install anti-virus software that will help detect and clear viruses.
- Take regular backups in case of data loss.
- Diskettes should be checked for viruses before being used.

B) Hardware

- Lock all computer room doors to restrict any physical access.
- Employ watch guards if need be to restrict any physical access.
- Keep all hardware away from fire and water.

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CHAPTER FIVE
DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Discussion

Literature concerning digital video information systems was reviewed, but the researcher found out that different types of digital video information systems were not satisfying the organization to which he was carrying out his research. This was because they were very complex and expensive for the Movie land Entertainment Limited.

The methodology used in this study specifies the areas in the study was carried and the techniques and tools that were used in data collection and analysis. The Researcher used System development life cycle because it involves a number of essential technical activities that specifies and combines both project design specification in the initial stages and working programs in the later stages of development.

An investigation was carried out to establish how the existing system functions and what its problems were. This led to a definition of a set of options from which the users could choose their required system. In carrying out an investigation, information about the current system was collected and by recording the problems and requirements described by the users of the current system, a picture of the required system was build. To help in investigation, the following fact finding techniques were used:

Structured interview was used because used because of the following reasons:

1. It allowed the interviewer to ask questions that may reveal additional information useful for making a selection decision

2. With this approach, the interview could be modified as needed to gather important information.

Observation was used for the following reasons:

1. It helped in checking the validity of data obtained through other methods. This increased reliability of the data/information gathered.

2. The system analyst was able to see exactly what was being done. Complex tasks were sometimes difficult to clearly explain in words. Through observation, the analyst could

identify tasks that had been missed or inaccurately described by other fact-finding techniques.

Systems design is the process or art of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. One could see it as the application of systems theory to product development. The system design was done in three phases. Database design is the process of producing a detailed data model of a database. This logical data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a Data Definition Language, which can then be used to create a database.

Logical Design the designers are focused with the operations of the system basing on how the system will work, without taking too much notice of the choice of technical architecture.
In physical design, all the design decisions were made that are dependent on the physical system architecture. The designer specified the technologies to be used to implement the system in terms of Data, Process, Interface and how these components interact and communicate across a network.

5.1 Conclusion
The design and implementation of the new system at Movie Land Entertainment Limited was a very interesting venture although there was unavailability of enough resources but, it was successful as it allows users to store large amount of data and manipulate their data with a minimum of ease compared to the old system. Thus the project objectives were achieved through whereby the new system is to keep all the records of Movies in the company, clients details, rentals and revenue of the company very effectively.

The application will save the Movie land entertainment Limited a lot of manpower and high operational costs, stationery and time.

5.2 Recommendations

The researcher recommends that the application be developed further to include more help files this is because the researcher didn't tackle more of help files which can assist the new users of the system.

The researcher also recommends for user training, with the introduction of the new system, staff members from the branch are to be trained with a lot of precaution concerned with operation of the system. User training also includes explanation of mode of operation of the new system through system documentation and instruction manuals

The researcher also recommends the further development of the system to include message or mail based record modification where the system users can communicate via local area to minimize on the cost of communication by telephone.

The researcher recommends that purchase order registration and messaging to suppliers be developed, this will enable the manager of the system to give order to the suppliers via the system

After analyzing the current system and in order to improve the current situations caused by the current system, considerations should be made to implement a new Digital Video Library Information system.

5.3 Further Research Area

Implementation of the online Digital video Library system whereby clients can interact with the system and select and download the video of their choice to their own remote computer via internet. The system should be able for members to register online, and able to view the contents of the movies available in the system and transfer them to their computer and watch them, this will reduce on time for clients to go to the physical place for borrowing movies. The system should also be connected to a high bandwidth server for fast access by clients.

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APPENDICES
APPENDIX I: INTERVIEW

Question 1

What is the current procedure used to recorded the Clients Movie Rental? What details are taken at that time?

Question 2

How Long does it take for a client to be served? How long does it take to get all the information from the current system?

Question3

What can you say about the current problem follow-up process of Movies from Client?

Question4

Approximately how long does it take to come up with urgently needed information from your files?

Question 5

How do you feel about the current system? Do you find any problems in using the current system? If yes, name then.

Question 6

What do you think about development and implementation of a computerized system?

Question7

What improvements would you like in the new system?

Objective

Conclude the interview: thank the interviewee

APPENDIX II: SAMPLE QUESTIONNAIRE FOR KNOWLEDGE ACQUISITION

Dear respondent,

We, AHMED MBARAK AHMED AND GEOFREY ISAAC pursuing a Bachelor of Computer Science and Bachelor of Information Technology respectively at Kampala International University, carry out a research on Digital Video Library Information System at Movie Land Entertainment Limited in Kampala. This research is a requirement for the partial fulfillment for our Award of Bachelor's of Computer Science & Bachelors of Information technology respectively and will help improve on information management of both clients and management.

The questionnaire is designed to investigate how Information management is done in this system. The information sought is for the academic research only and will be treated with confidentiality.

INSTRUCTIONS
Please Put a TICK on the opinion box of your answer and fill out the spaces where necessary.

1. Age

16-20	[]
21-25	[]
26-30	[]
Above 30	[]

2. Educational level

Primary	[]
Secondary	[]
Certificate	[]
Diploma	[]
Bachelors	[]
Masters	[]

2. For how long have you worked in this Company?

    1 to 3years   []

    3 to 5years   []

    5 to 7years   []

    More than 7 years   []

2. Approximately how many customers do you receive in a day?

    10 to 30   []

    30 to 50   []

    50 to 80   []

    More   86   []

4. How are data of the video records managed?

    File based system   []

    Computerized system   []

    Both   []

5. Which kind of tools do you use in keeping of these records?

    Computers   []

    Using books and pens   []

    Both   []

7. Are there any advantages you find in using your current system?

    Yes   []

    No   []

8. Do you face any problems with your current system?

    Yes   []

    No   []

9. Are you willing to change from your current system to a better one?

    Yes   []

    No   []

10. Would you welcome the introduction of computerized system to the MovieLand Entertainment Limited? If a manual system is used

    Yes   []

    No   []

11. What kinds of problems are faced with current system?

....

....

....

12. How are these problems being rectified?

....

....

....

13. What kinds of reports are generated?

....

....

14. How often are these reports generated?

....

....

Thank you for your time and contribution towards my research.