CHAPTER THREE

SYSTEM ANALYSIS, DESIGN AND METHODOLOGY

3.0 INTRODUCTION

In this chapter we will take an overview of the system design and the entire research work; we will present a skeletal approach to the design and analysis of the whole system.

System analysis has to do with the process of studying a procedure or a system in order to identify its goals and purposes and create systems and procedures that will achieve them in an efficient way.

3.1   Analysis of the existing system

The existing system of the employee appraisal system is web-based just like the proposed system, but unlike the proposed system the existing system is very rigid and most of the system is still controlled by the employers or management, the employee has little or no effect on the data that is entered into the system.

The existing system is more of a direct electronics equivalent of the manual system where paper forms are used, the current system mainly serves as the repository for the various appraisals, the system does not give recommendations based on the analysis of data collected, in most cases, the system does not analyze the data at all it mostly provides a way of visualizing the inputted data.

3.1.2 Advantages of the existing system

- Easy access as it is web-based
- Allows the organisation to use one rating system for all employees.

- Quicker to fill out than paper appraisal form, which can require having a supervisor answer question from a human resources team member.
- Is less biased compared to non-electronics methods

3.1.3 Disadvantages of the existing system

- What to make out of the appraisal-related data is still very much dependent on management and so still very much prone to bias.
- The existing system does not provide a mechanism for analysing data and giving feedback based on the analysis, all that is still mostly done manually.
- Transparency is still an issue as the data from which the employee is ranked may not be disclosed.

3.2 Analysis of the proposed system

The proposed system will use a decision tree to try and make sense of the data stored in the knowledge base (database), the system will use a normal web form to collect evaluation data from management, staffs and customers about a particular staff, the data is stored in the database using a scripting language (PHP in this case), the form fields will be in a questioner with the following questions

- Is the employee really interested in the task assigned?
- Is he/she respected by his colleagues (co-workers)?
- Does he/she give respect to his superiors?
- Does he/she follow instructions properly?
- Does he/she make mistakes frequently?
- Are customers satisfied with his/her service rendered?

The questioner will have responds sections of yes, no, and skip, the response will be of varying weight, the decision three will transverse through all the response and come with a conclusion and display a recommendation that will be used by management, to know the next line of action as it has to do with the employee.

3.2.1 Advantages of the proposed system

- Transparency: the decision tree makes explicit all possible alternatives and traces each alternative to its conclusion in a single view, allowing for easy comparison among the various alternatives. The use of separate nodes to denote user defined decisions, uncertainties, and end of process lends further clarity and transparency to the decision-making process.

- Specificity: the proposed system will assign specific values to outcome of the analysis of data entered thereby reducing ambiguity in decision-making.

- Ease of use: all that is needed is to collect the necessary evaluation data and the system does the rest of the work including reaching a decisive conclusion.

- Less bias: The system only manipulates the data available to it without any external influence on the inner working of the system, this means the same rules applies to all with no exceptions.

3.2.2 Disadvantages of the Proposed System

- Instability: the proposed system has the tendency to be slightly unstable because of some problems associated with decision tree algorithms like over fitting (www.saedsayad.com/decision_tree_overfitting.htm, 2014),

- The proposed system will not work without internet access

- The proposed system is quiet complex to implement and so require more time and resources than most other decision support systems

3.3 System Design

The system design pertains to the layout of the system and it consists of the input and output layout.

We are going to deploy the proposed methodology in developing an online performance evaluation system using the decision three algorithm which will receive inputs from users and use that data to reach a conclusion about an employee and give necessary recommendation to management on actions to take.

3.3.1 System Development Methodology

A system development methodology (SMD) refers to the framework that is used to structure, plan, and control the process of developing an information system. In this study, we adopted the Object Oriented Analysis and Design Methodology (OOD). The methodology employed for the development of the system is the OOAD. The OOAD development model comprises the elements of both design and prototyping. The model has four stages namely:

- Planning
- Analysis
- Evaluation
- Development

Object-oriented analysis (OOA): This is the process of defining the problem in terms of an object: a real world with which the system must interact, and candidate software objects used to explore various solution alternative. The nature fit of programming objects to real-world objects has a big impact here in the all real world objects can defined in terms of their classes, attribute and operations. Moreover, object oriented design (OOD) is the process of defining the component, interfaces, objects, classes, attributes, and operations that will satisfy the requirement. You typically start with the candidate object defined

during analysis, but add much more rigor to their definitions, then you add or change objects as needed to refine a solution.

### 3.3.2 Proposed system architecture
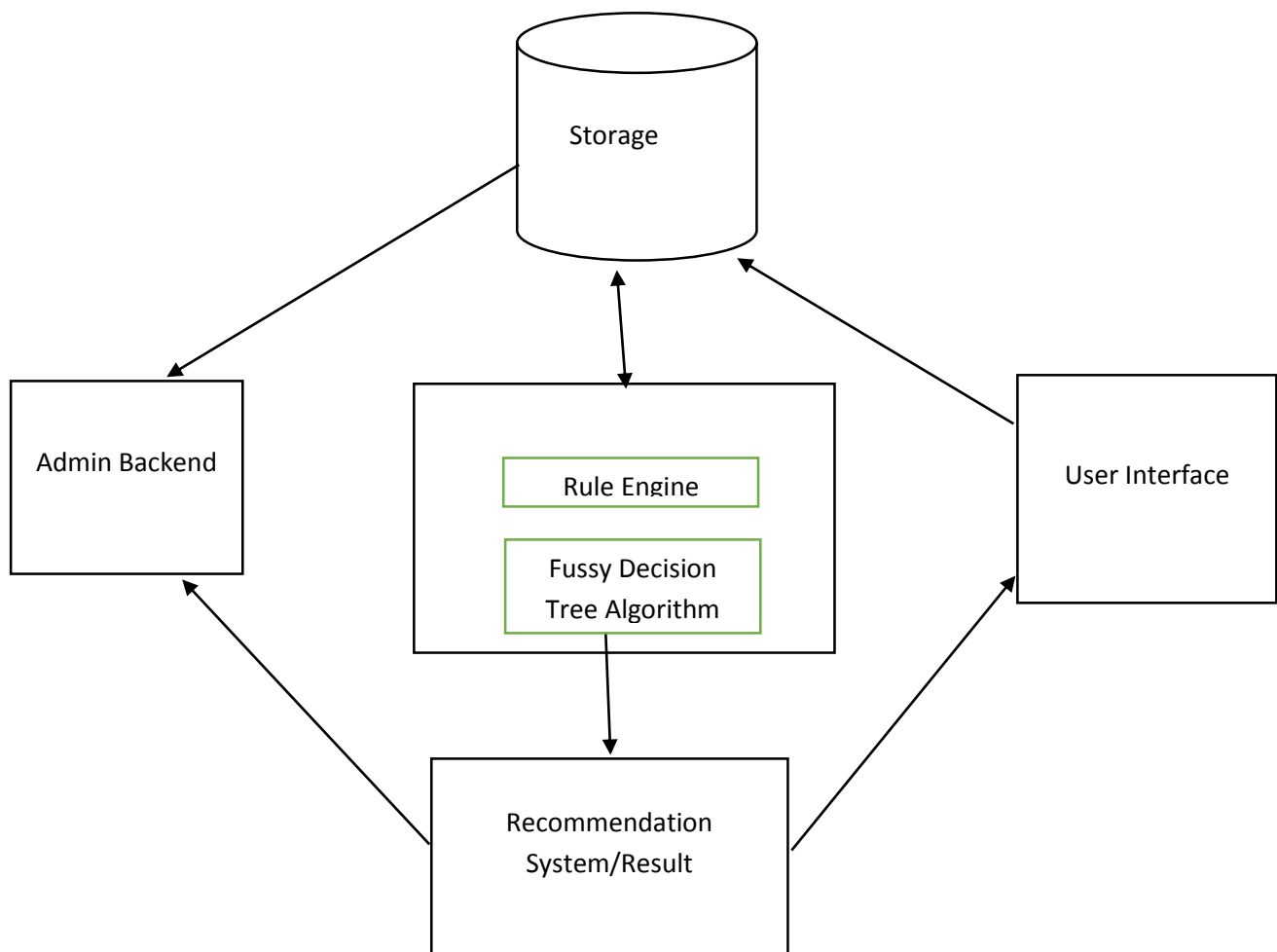
Figure3.1 proposed system architecture diagram

From the above figure, the proposed system will have five key components

- A list of rules base, which is a specific type of knowledge base as it relates to the evaluation criteria, and the fussy decision tree that utilizes those rules.

- The user interface, where the evaluation-related data is inputted to the system and where the system also outputs evaluation results.

- The Storage where appraisal inputs and results are stored.

- A recommendation System that recommends action to management based on the output from the decision tree algorithm, it also displays the appraisal rating score to the users.

- An admin backend where the admin can visualize the content of the database and outputs from the recommendation system.
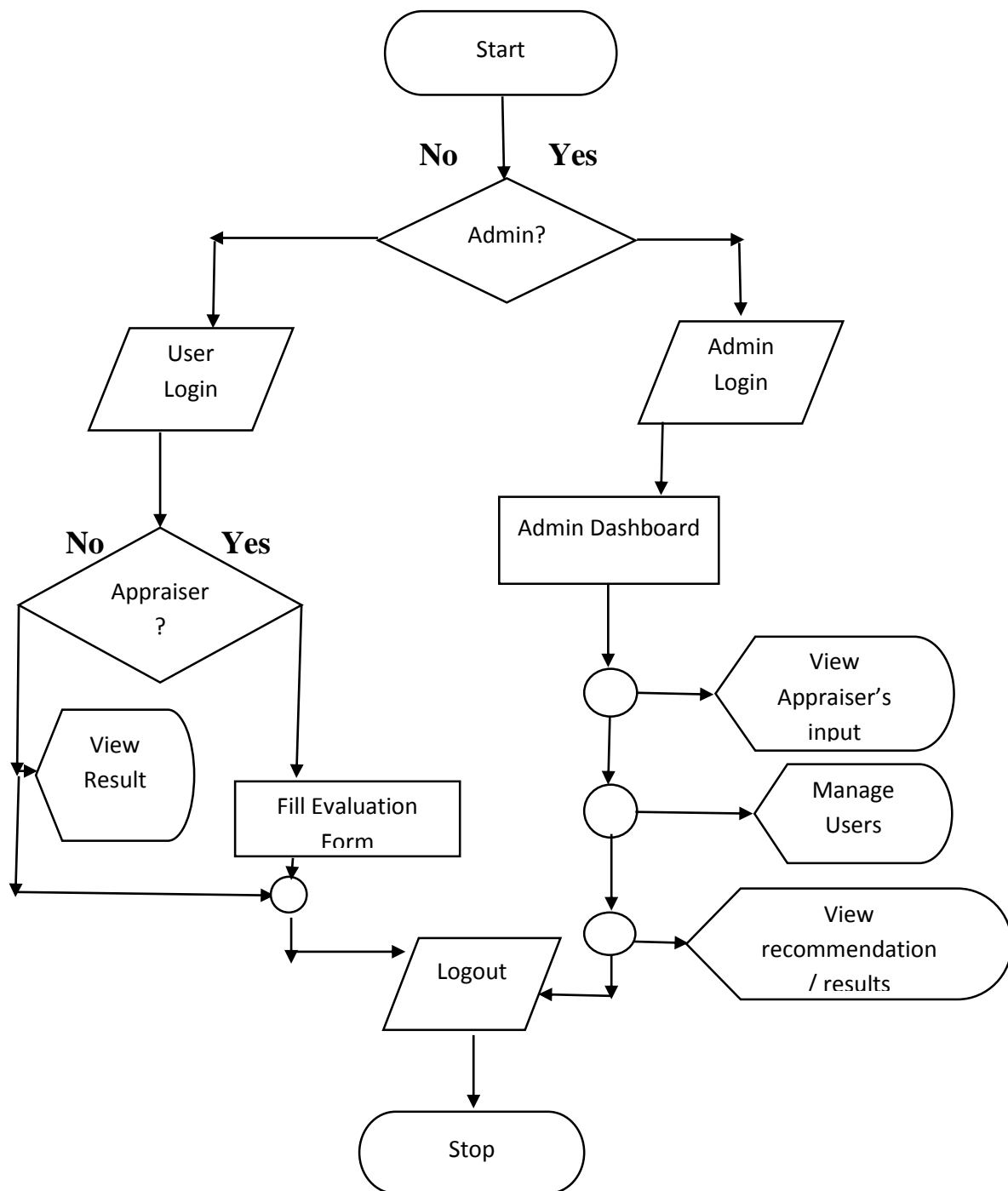
3.3.3 Proposed system use case diagram
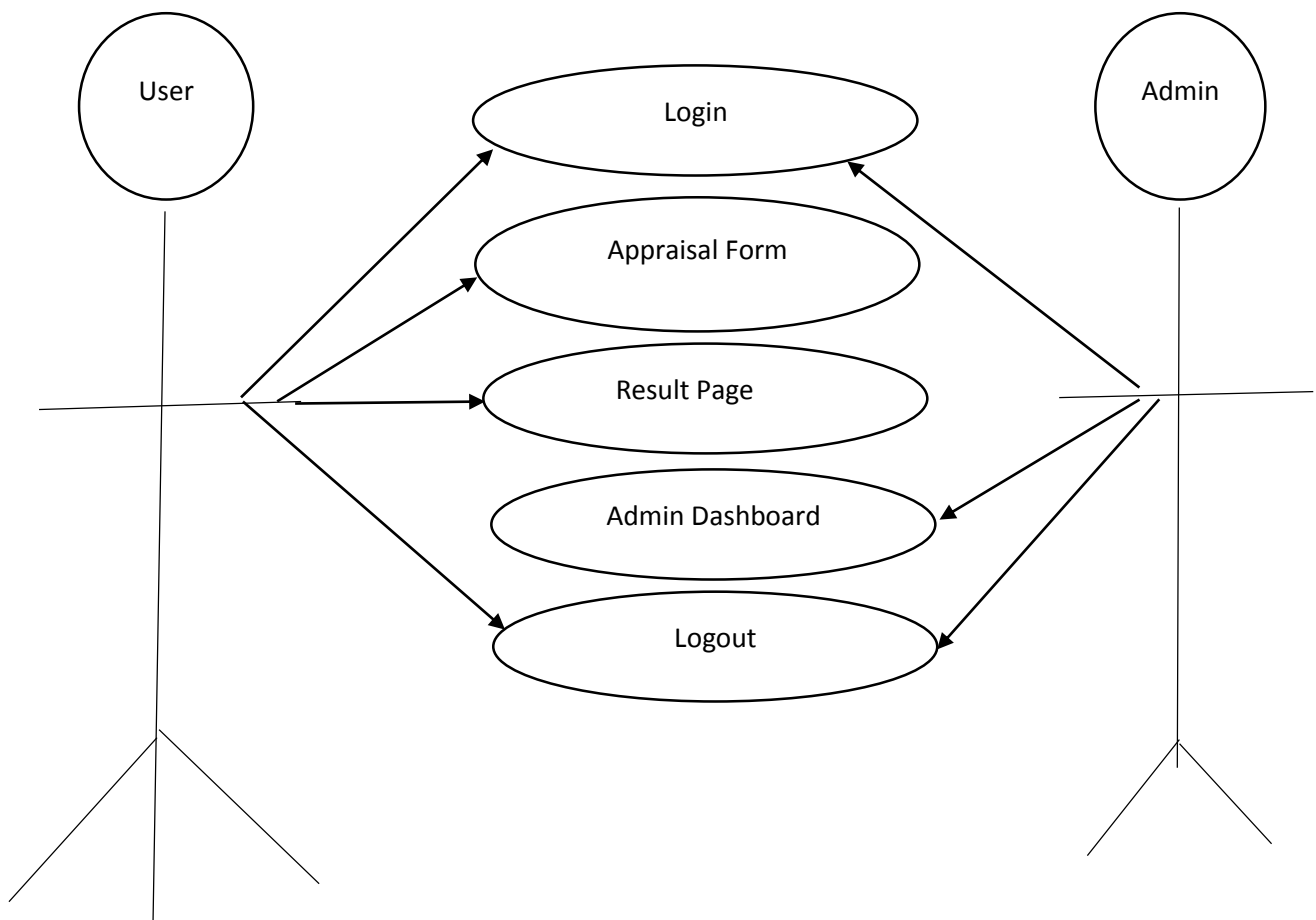
Fig 3.2 Use Case Diagram of the Proposed System

The Use Case Diagram represents the user and Admin behaviour. It defines the behaviour of both while using the system. The admin can log in, view the content of the database and the appraisal result, the user can appraise other users and can be appraised by them as well, he can view his/her own appraisal result, both user types will need to login to the system to carry out any activity on the platform.

3.3.4 Proposed System Flow Chart

Fig 3.3 Proposed System Flow Chart

Flowcharts are used in designing and documenting complex processes. Like other types of diagrams, they help visualize what is going on and thereby help the viewer to understand a process and perhaps also find flaws, bottlenecks, and other

less obvious features within it. The flow chart indicates a step-wise transition of the actions and decisions taken.

3.4 Software Requirements

- Operating system- Windows and mobile operating system is used as the operating system as it is stable and supports more features and is more users friendly.

- Database MySQL: MySQL is used as the database as it easy to maintain and retrieve records by simple queries which are in English language and easy to understand and to write.

- Development tools and Programming language- HTML and is used to write the whole code and develop webpages with cascading style sheet, java script for manipulating the document object model(DOM) and hypertext pre-processor (PHP) for sever side scripting.

3.4.1 Software tools used

The whole Project is divided in two parts the front end and the back end.

FRONT END: The front end is designed using of HTML, CSS, and JavaScript

- **HTML**: Hyper Text Mark-up Language is the main mark-up language for creating web pages and other information that can be displayed in a web browser.HTML is written in the form of HTML elements consisting of tags enclosed in angle brackets (like <html>), within the web page content. The purpose of a web browser is to read HTML documents and compose them into visible or audible web pages. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. It can embed scripts written in languages such as JavaScript which affect the behaviour of HTML web pages.

- **CSS**: Cascading Style Sheets (CSS) is a style sheet language used for describing the look and formatting of a document written in a mark-up language. While most often used to style web pages and interfaces written in HTML and XHTML, the language can be applied to any kind of XML document, including plain XML, SVG and XUL. CSS is a cornerstone specification of the web and almost all web pages use CSS style sheets to describe their presentation.CSS is designed primarily to enable the separation of document content from document presentation, including elements such as the layout, colours, and fonts. It can also be used to allow the web page to display differently depending on the screen size or device on which it is being viewed.

- **JAVASCRIPT**: JavaScript (JS) is a dynamic computer programming language. It is most commonly used as part of web browsers, whose implementations allow client side scripts to interact with the user, control the browser, communicate asynchronously, and alter the document content that is displayed. It is also being used in server-side programming, game development and the creation of desktop and mobile applications. JavaScript is a prototype-based scripting language with dynamic typing and has first- class functions. Its syntax was influenced by C. JavaScript copies many names and naming conventions from Java, but the two languages are otherwise unrelated and have very different semantics. The key design principles within JavaScript are taken from the self and Scheme programming languages. It is a meta-paradigm language, supporting object-oriented, imperative, and functional programming styles.

BACK END- The back end is designed using MySQL which is used to design the databases and PHP which is a scripting language for server side.

- **MYSQL**- MySQL ("My S-Q-L", officially, but also called "My Sequel") is (as of July 2013) the world's second most widely used open-source relational database management system (RDBMS). It is named after co-founder Michael Widenius daughter, My. The SQL phrase stands for Structured Query Language. The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL was owned and sponsored by a single for- profit firm, the Swedish company MySQLAB, now owned by Oracle Corporation. MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open source web application software stack (and other 'AMP' stacks). LAMP is an acronym for "Linux, Apache, MySQL, Perl/PHP/Python." Free-software-open source projects that require a full-featured database management system often use MySQL. For commercial use, several paid editions are available, and offer additional functionality. Applications which use MySQL databases include: TYPO3, MODx, Joomla, WordPress, phpBB, MyBB, Drupal and other software. MySQL is also used in many high-profile, large-scale websites, including Wikipedia, Google (though not for searches), Facebook, Twitter, Flickr, and YouTube.

- **PHP**- PHP is a server-side scripting language designed for web development but also used as a general-purpose programming language. PHP is now installed on more than 244 million websites and 2.1 million web servers. Originally created by Rasmus Lerdorf in 1995, the reference implementation of PHP is now produced by The

PHP Group. While PHP originally stood for Personal Home Page, it now stands for PHP: Hypertext Pre-processor, a recursive backronym.PHP code is interpreted by a web server with a PHP processor module, which generates the resulting web page: PHP commands can be embedded directly into an HTML source document rather than calling an external file to process data. It has also evolved to include a command-line interface capability and can be used in standalone graphical applications. PHP is free software released under the PHP License. PHP can be deployed on most web servers and also as a standalone shell on almost every operating system and platform, free of charge.

3.5 Hardware Requirements

A laptop, desktop, tablet or mobile device with at least 1gigabyte RAM and a functioning web browser e.g. Firefox and Chrome.