**CHAPTER THREE**

**ANALYSIS AND DESIGN**

**3.0 INTRODUCTION**

In this chapter we will takes an overview on 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**

In this part of the world (Nigeria) the existing system for managing depression is still the use of human experts, this requires interactions between therapist and patience either directly in the same physical location or through mediums like video call, chat rooms, telephone calls and so on. The therapist ask the patience questions related to their symptoms gets feedback from the patience then make a diagnosis of the type of depression and make appropriate prescription, this system is effective in regions with adequate exposure to health education about depression and facilities, but less effective in region where people are less informed about depressive symptoms.

**3.1.1    Advantages of the Existing System**

The current systems of managing depression do have some advantages and they are:

1. The system does the job of diagnosing depressive cases and managing them properly.
2. The system encourages extensive interaction between therapist and patients.
3. The system keeps track of patients’ progress until fully recovered.
4. The system keeps adequate record of patients past diagnosis and prescriptions.

**3.1.2    Disadvantages of the Existing System**

The weakness of the existing system includes:

1. The existing system is not fully automated, that is, it still requires booking of appointments with the therapist, that makes it a first come first serve system and the implication of that is that patients will wait in line for the limited therapist available to get to them.
2. The existing system is not very efficient as it take more time and resource to get in a session with a therapist.
3. A lot of people in this part of the world (Nigeria) still see depression and other related cases of mental illness as something to be ashamed of and so may prefer to keep their situation private.
4. The issue of affordability is another key issue as many persons(expecially those in the rural communities and low income level citizens) may not be able to afford the services of a human therapist

**3.2    Analysis of the Proposed System**

Most cases of depression are usually mild and mostly do not require a visit to a therapist so long as the patient knows a few things to do to manage the situation, in some cases just taking a walk for a few minutes can bring some improvement, even a change in diet can turn a situation around. The proposed system will use expert knowledge to diagnose the type of depression and the severity and give advice on how to manage the situation. The system will be web based and will not require any appointment with a human expert as the system will be fully automated and will utilize the knowledge of experts in the knowledge base to make diagnoses and suggest possible ways to manage the situation. The patient will not be required to sign up or login to use the system to maintain the user’s privacy as most users will prefer to remain anonymous.

**3.2.1 Advantages of the proposed system**

Some of the advantages of the proposed system are as follows:

1. Availability: the proposed system is always available, does not go on holidays or breaks all you need is an internet enabled device and access to the internet.
2. Accessibility: the system can be accessed by anyone from any location, at the same time, no queue or booking of appointment is required
3. Privacy: access to the system will be anonymous, anyone can take the test and get help without need to feel ashamed or have a feeling that someone is mining their data.
4. It will save the user a lot of time and money as the assessment time will be very fast and the platform will be totally free of charge.

**3.2.2 Disadvantages of the Proposed System**

The proposed system has two major setbacks and they are:

1. The system will be web based and so cannot be access without internet connection and internet enabled device.
2. The second drawback is that severe cases of depression like clinical depression that requires prescription of medication will not be managed by the system as such cases requires close monitoring by a human expert.

**3.3    Methodology**

The methodology adopted for the development of this system is the rule based expert system methodology.

A rule-based expert system is a system that contains set of rules that are used to describe certain patterns. Observed data are collected and evaluated using these rules. If the rules are logically satisfied, the pattern is identified, and a problem associated with that pattern is suggested. Each particular problem (symptom) might imply a specific treatment. These rules do not take into consideration the uncertainty and the impreciseness of human observed data and reasoning and real world knowledge that characterized by incompleteness, inaccuracy, and inconsistency. The rule-based approach uses IF-THEN type rules. IF-THEN rules take the following form: IF there is a flame THEN there is a fire.

**3.4    System Design**

The proposed system will have four basic components:

1. A list of rules base, which is a specific type of knowledge base as it relates to depression.

2. An inference engine, which infers information or takes action based on the interaction of input (user symptoms) and the rule base.

4. A user interface or other connection to the outside world through which input and output signals are received and sent. The user can be either the knowledge engineer inputting new symptoms into the knowledge base or the patient that is taking a test on the platform.

The proposed system design is as shown below

USER INTERFACE

DATA BASE/

RULE BASE

(Symptoms)

INFERENCE

ENGINE

RESULT AND

EXPLANATION

FACILITIES

**Fig 3.1 Design of proposed system**

**3.5    Use Case Diagram**

The use case diagram of the proposed system is shown in figure 3.2. It shows the process the user takes to allocate hostels to students. The admin inputs students databased on the categorized earlier mentioned. With the click of a button the admin clicks on optimize using GA and the genetic algorithms performs the function of allocating the students to the hostels by evolving the population of students.

Knowledge engineer

Patient

Fig 3.2 Use case Diagram for Depression Management Expert System

**3.6 Software Requirements**

1. Operating system- Windows and mobile operating system is used as the operating system as it is stable and supports more features and is more user friendly.
2. Database MYSQL-MYSQL is used as database as it easy to maintain and retrieve records by simple queries which are in English language which are easy to understand and easy to write.
3. 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.

**3.6.1 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, Bootstrap, CSS, Java script

1. **HTML**- HTML or 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.
2. **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.
3. **JAVA SCRIPT**- 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 metaparadigm language, supporting object-oriented, imperative, and functional programming styles.
4. **Bootstrap is a touch-optimized HTML5 UI framework designed to make responsive web sites and apps that are accessible on all screen sizes including smartphone, tablet and desktop devices.**

**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.

1. **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.
2. **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 RasmusLerdorf 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.

**3.7 Hardware Requirements**

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