**Chapter three: SYSTEM ANALYSIS AND DESIGN**

**3.0 Introduction**

System analysis and design is one of the crucial aspects in the development of a robust working system. Analysis involves the process of collecting and interpreting facts, identifying the problem and decomposing the system into its component, while design focuses on how to accomplish the objective of the system given the component and modules are available. This chapter discusses the methodology use in the development of the propose system, News recommendation system (NRS).

A news recommendation system is a website application that allows users to subscribe to a certain news categories of choice and have it automatically delivered to their email address in a timely control manner, and the methodology use in the development of this system is the object oriented analysis and design methodology (OOAD). OOAD is a technical approach in the development and designs of an application using object oriented programming paradigm and also visual modeling in the analysis and design of a system. The aim of OOAD is to breakdown the problem of the system into smaller problem called object so that those smaller problem(s) (object) can stand on their own without affecting one another, this make it easier to add functionality and behavior to each object and allow the system to adjust to the new changes.

**3.1 Description of the Existing System**

The existing systems of recommending news article to readers of news usually possess the following characteristics which are:

* Having to make use if either information filtering, collaborative filtering and hybrid filtering algorithm in the recommendation of news to readers.
* The systems don’t usually recommend the exact category of news that appeal to a user.
* The system recommends news to a user based on the statistic computed from a community of user (news readers).
* A user who may have interest in a particular news in a news category can only access it when online as the content might be remove at any moment.
* Some systems recommend news to readers based on the learned per click behavior of the user which might not all be exactly the preferred news for the reader’s choice of news category.
* Due to update or modification of information on some website, news feed update and modification are done within random time interval proving the need to be always online in order to get the latest and recent news.

After careful analysis, some reasonable problems were discovered in this existing system and they are as follows:

* Costly to use: To be always online to read the latest updated news is money consuming.
* Inaccurate prediction: The lack of accuracy of the system in recommending the choice of news to a user (news reader).
* Recommending news that doesn’t suit/fit the choice of news category of the reader.
* Time wasting: The act of always been online reading both choice and non choice news category that is recommended by the system is time consuming.
* News readers may not have the privilege to save important news for reference purpose.

**3.2 Analysis of the propose system**

The proposed system is a news recommendation system web application that is been designed to make reading of news of any category easily accessible, less stressful and more convenient for a news reader. In this system, news are recommended to readers based on the choice of news category of interest and it (News) is directly sent as a link to the subscriber’s email address. The system is also designed to be light weight and formatted for mobile device, it also allows subscription of multiple news categories and unsubscribe capability if the user wishes to unsubscribe. The proposed system has the following advantage over the existing system:

* It has a user friendly interface.
* Accurate recommendation base on user’s choice.
* Saving of news feed in the database.
* It saves cost and time by sending the news feed to the user’s email address.

All of the problem encountered in searching for choice news category will be resolve by the use of this news recommendation system web app.

**3.2.1 Design tool: Unified Modelling Language (UML)**

Unified modeling language is a standard developmental modeling language that is use in software engineering design. It was formally intended for object oriented design but has now sparse into different and larger set of design documentation. The aim of UML is to visualize a system’s architectural blueprint in a diagram and how the element(s) of the system interacts. The activities of the elements the UML visualize include:

* How the system will run.
* How entities interacts with other component and interface.
* How individual components of the systems interacts with other software component.

UML uses diagram to visualize its development process, there are many diagrams all of which are divided into two categories which are the *structure diagram* and *behavior diagram*. For this work, I will be making use of two diagrams which are:

1. Use case diagram which is under behavior diagram.
2. Class diagram which is under structure diagram.
3. Activity diagram which is under the behavior diagram.

**3.2.2 Use case diagram for news recommendation system**

A use case diagram is use to model the interaction between a system’s client (which is the subscriber) and the system and also the interaction of the system administration and the system. The aim is to show the kind of communication or interaction users have with a system without providing the details. Use case diagram are accompanied by informal text that describe the use cases in a more detailed manner i.e. the text that appear in the requirement document.

**<<Actor>>**

**System Admin**

**<<Actor>>**

**User**

**Figure 3.1 The Use Case Diagram of News Recommendation System**

**3.2.3 Class Diagram**

The class diagram helps in specifying the structural relationship between parts of the system in an object oriented manner. Each noun or “thing,” describe in the requirement document is qualified to be a class in the system, while each verb or “action,” in the requirement document is a candidate to be a function/method in the system.

|  |
| --- |
| Class: News Item |
| * Topic * Author   …1   * NewsArticle * NewsCategory |
| + post\_news()  + view\_post() |

|  |
| --- |
| Class: Subscriber |
| * Name * Email * News Category |
| + register\_subscribers()  + view\_subscribers() |

**Figure 3.2 The Class Diagram of the propose System**

1…

* + 1. **Activity Diagram**

The activity diagram defines or explains the work flow (sequence of action) of the system during program execution. It models the actions the objects performs and specify the order in which it performs them, it is model in flow chart and the activity display in the flow chart can be branched, sequential or concurrent.

**Type in Email Address**

**Type in name**

**Recommend news of choice to user**

**Save user profile**

**Choose News Category**

**NO** Incomplete details

Complete details

**YES**

**If user news category matches category in database**

**NO**

**YES**

**Figure 3.3 Activity Diagram of the propose system**

* 1. **Design of the propose system**

In the designing of the propose system, the system take into consideration the following area of concentration which are:

* Input design – how the interface will appear.
* Output design.
* Database design.
* System architecture.

**3.3.1 Input Design**

The fetching of data from the user/subscriber is an important factor in the design of the system and the interface has to be user friendly and must communicate the necessary element that is needed. The fetching of the data which corresponds to the user’s profile is gotten through HTML forms, processed by PHP script and stored in the database.

**3.3.2 Output Design**

The output design is all about the information that will be display to the user’s will appear taking into consideration that the news recommended to the user will be sent as a link to the subscriber’s email address, so for the design of the output it will appear as follows

Hello <*subscriber’s name>,*

Here are the following headlines:

Sad! Actress Toyo baby is dead, to read full details click <http://newsrecsys.com/gossipnews/toyo-baby-is-dead.html>

Fathia Balogun set to give marriage a second chance, to read full details click <http://newsrecsys.com/gossipnews/fathia-balogun-to-marry-for-a-second-time.html>

To unsubscribe click <*here>*

**3.3.3 Database Design**

The database management system use in the design of the system is MYSQL server database.

The required entities (table) include the following: subscribers, post\_news and admin tables.

**Table 3: Subscriber Table of the database**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column**  **Name** | **Data**  **Type** | **Length** | **Allow**  **Null** | **Unique** | **Primary**  **Key** | **Description** |
| sub\_id | Int | Null | No | Yes | Yes | Primary key |
| sub\_name | Varchar | 100 | Yes | No | No | Subscriber’s  Name |
| Sub\_email | Varchar | 150 | Yes | No | No | Subscriber’s  Email |
| news\_cat | Varchar | 100 | Yes | No | No | News category |
| Sub\_date | Datetime | 10 | Yes | No | No | Subscription date |

**Table 4: PostNews table of the database**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column**  **Name** | **Data**  **Type** | **Length** | **Allow**  **Null** | **Unique** | **Primary**  **Key** | **Description** |
| post\_id | Int | Null | No | Yes | Yes | Primary key |
| post\_topic | Varchar | 100 | Yes | No | No | News post topic |
| categories | Varchar | 150 | Yes | No | No | News category |
| author | Varchar | 100 | Yes | No | No | Name of author |
| article | Text |  | Yes | No | No | News content to be posted |
| post\_date | Datetime |  | Yes | No | No | Date and time of news post |

**Table 5: admin table of the database**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column**  **Name** | **Data**  **Type** | **Length** | **Allow**  **Null** | **Unique** | **Primary**  **Key** | **Description** |
| Id | Int | 100 | No | Yes | Yes | Primary key |
| Username | Varchar | 30 | Yes | No | No | Username of the admin |
| Password | Varchar | 30 | No | **No** | No | Password of the admin |
| Name | Varchar | 50 | Yes | No | No | Name of the  admin |

* + 1. **System architecture**

The architecture of the system design is a 3-tier application. The tiers are the presentation tier, middle tier and data tier. The presentation tier is the user interface and it is designed using HTML, CSS and BOOSTRAP framework for the design of the graphical user interface. The middle tier which is also known as the business logic connects the presentation tier and data tier together. The middle tier of the system is design using PHP programming language, while the data tier which together with the middle tier is known as the server side or backend of a system is the part of the system that is responsible for storing the data in a database. The database management system use for the design of this system is MYSQL server. The system architecture is shown below.

**Server side**

**Presentation Tier Middle Tier Data Tier**

**MYSQL**

**Database server**

**PHP Code**

**(GUI)**

**HTML**

**CSS**

**BOOTSTRAP**

**Internet**