4 System Analysis

4.1 introduction

Lonnie D.(2007) explains system analysis as the process of dissecting a system with the sole objective to learn how the component pieces interact to achieve their functions. The aim of performing this activity is to find out how the current system operates (i.e. where one exists) and thus identify where the problems are incurred hence solutions to these problems can then be identified. This activity further enables the analyst to further identify some additional requirements which the user needs and thus incorporate the same in the construction of the new system. This is further realized in the data collection process where the additional information is gathered from the respective stakeholders. System analysis answers the questions of who will use the system, what the system will do and where and when it will be used.

4.2 Problem Specification

With the increasing number of web based Applications and users registering or opening many accounts online these applications, there is a high tendency of users choosing simple or easy passwords. Also users make a mistake of writing these passwords on paper or anywhere they would reach for them easily. In addition to social engineering, password phishing using spyware for passwords stored in electronic form causes a lot of risk to users information. designing One Time password, that is send to the mobile phone of the user and used once can help secure many user's web based accounts. The task is therefore to come up with an application that allows for this kind of online access control using OTP to personalize such online access, which is more secure than static passwords. Access control systems are responsible for authenticating and authorizing users to access content in the system.

4.2.1 Feasibility Study

The feasibility analysis examines the technical, economic, and pros and cons of developing the system, and it gives a slightly more detailed picture of the advantages of investing in the system as well as any obstacles that could arise. It also identifies the important risks associated with the project that must be addressed if the project is approved. The fact finding process that revealed the ability to successfully complete the proposed system thus providing the justification for the

efficiency and effectiveness of the system. It was aimed at establishing whether it is necessary to develop the proposed system Feasibility study includes three techniques namely:

4.2.2 Technological Feasibility

Most organizations are connected to network and it is technologically feasible The SMS based means of sending the OTP is compatible to most mobile phones and so the system is technological feasibility is viable.

4.2.3 Technical Feasibility

Familiarity with the application: The analyst of the application is familiar with the web based Applications area and OTP. Therefore, there is a lesser chance of misunderstanding the user needs or missing opportunities for improvement. Familiarity with the technology: The developer is familiar with web application development and thus there are lesser chances that problems will occur and delays be incurred because of the need to learn how to use the technology. This section looks to answers 3 questions:

1. Are the required resources available?
2. Is the required technology available or not?
3. Is the required knowhow available or not?

It also establishes the proposed system's interaction with other systems. Only designers, analysts and developers constitute the team foundation in terms of skilled labor. Users only ought to be computer literate. The system seeks to be resource friendly.

4.2.4 Operational Feasibility

This basically deals with how well the system will be accepted by its users and incorporated into the ongoing activities of the users. It was of great importance to include users in the analysis of the system in order to get feedback on acceptable ways of implementing the lock mechanisms on user access controls. From the users' feedback, the system was deemed to be operationally feasible as it improved on the security of user

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4.2.5 Economical Feasibility

This section is aimed at determining the positive economic bene\_ts to an orga-

nization that the proposed system is to provide. It includes identi\_cation and

quanti\_cation of all bene\_ts projected. It answered the following question: 1.

Will users derive an economic bene\_t from the proposed system? 2. Will the cost

of implementation be justi\_able? The system will enable users derive an economic

bene\_t as they can sell their research papers online. The added security layer

that will be included will not be costly to incorporate and manage. From the

\_ndings, the added security layer will also increase cost of attacking the system

hence ensuring income from using the system will be more secure hence increasing

computational trust of the system.

4.3 System Analysis

4.3.1 Requirement Analysis

This is the process of studying and analyzing the customer or the user needs

to arrive at a de\_nition of software requirements.The software requirements were

identifed by analyzing existing systems and online. Three organizations were se-

lected for case study as common application platforms some times uses OTP bt

not always. Facebook dont usually use OTP unless suspects an intrusion. so unless

us request for it users usually log in with thier username and passwords.

What's a one-time password and how do I get one? You can use a one-time

password to log into your account anytime you feel uncomfortable entering your

real password on Facebook (ex: in a library or internet cafe). Here's how: 1. If

you're in the US, send a text message to 32665 with the message otp. If you're not

in the US,check out this list to see which mobile carriers support this feature and

what number you should use. 2. If your mobile number is already linked to your

Facebook account, we'll reply with a unique, 8-character temporary password. If

you haven't added this mobile number to your account, we'll send you an email

with instructions on how to add it and collect your code. 3. Once you get your

code, just enter it in the Password section of the Facebook login page. Your one-

time password will be valid for 20 minutes and can't be reused. Note: One-time

passwords are not available if you have login approvals turned on

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4.4 Requirement Speci\_cation

A requirement is simply a statement of what the system must do or what char-

acteristic it must have. Requirements can be mainly divided into two: either

functional or non-functional.

A functional requirement relates directly to a process the system has to perform

or information it needs to contain.

A non-functional requirement refer to behavioral properties that the system must

have, such as performance and usability.

4.5 Functional Requirements

1. Create an account:

Anyone wishing to use this online service must register as a user by creating

an account. The system should allow for creation of unique accounts for each

user

2. Sign up a registrered user of the web based Application. Those wishing to

sign up as users will submit their application through \_lling in an online

form. The form will be relatively short but just enough to capture all the

relevant details.

3. The system should be able to deny access to Unauthenticated users. Without

correct username and password and the OTP, the system should not allow

access to the secure user information in the web based application.

4. Generate and send the One Time Password.

5. Search for user details: The users of the system will be able to access the

system to look for user record . The search can be done based on speci\_c

attributes such as speci\_c username. Alternatively, the search may be done

via the user name which case a detailed record the user will be provided.

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4.6 Non-functional Requirements

1. Accuracy and timeliness in the process of producing and sending OTP. This

is very important because the six digit OTP in only valid for a short period

of Time.

2. Performance -this refers to the speed, capacity and reliability of the system.

The requirements include: a. The system should be available for use 24

hours a day, 365 days per year. b. An interaction between the user and the

system should not exceed 2 seconds.

3. Usability: Should allow ease of use. Documentation: Should be well docu-

mented to facilitate use of the system.

4. Security -this basically refers to how secure the system is in terms of allowing

only speci\_c people to access the system at speci\_c times. The requirements

include: a. The users of the system can only access speci\_c information in

the web based application. b. The users cannot be able to modify data

related to other users, though they can modify data about them save for

unique identi\_ers

5. Performance -this refers to the speed, capacity and reliability of the system.

The requirements include: a. The system should be available for use 24

hours a day, 365 days per year. b. An interaction between the user and the

system should not exceed 2 seconds.

6. Operational -this basically involves the physical and technical environments

in which the system will operate. Thus, they include: a. The system should

be able to work on any web browser. b. The system will be able to operate

in Windows, Macintosh and Linux environments as it will be running in a

web browser

7. Adaptability: It should be easy for users to adapt to the application.

8. Accessibility :The user interface will be responsive to cater for the devices

that users might have to access the system.

4.7 Functional Modeling

Functional models describe business processes and the interaction of an informa-

tion system with its environment. In object-oriented systems development, two

types of models are used to describe the functionality of an information system:

a) Activity diagrams support the logical modeling of business processes and work

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ows. b) Use cases are used to describe the basic functions of the information

system.

4.7.1 Use case Descriptions

The use case communicates at a high level what the system needs to do. Use cases

capture the typical interaction of the system with the system's users (end users

and other systems). The following use cases were developed after reviewing the

requirements.

There are 3 actors in the system, namely user, admin and the public . The user

can perform the following actions. First he has to log in to the system. The log in

with user name and password utilzes the user private username and password and

database function to create account to check whether the user has an account. The

log in with OTP uses users information in the database to check or match.

After logging in, the user can create a pro\_le. This will show details about the

user that will be available for view by other users. This is where the user builds a

pro\_le that is trustworthy and that which will attract customers to download the

users content. The create pro\_le use case extends the edit pro\_le use case. Finally

user can upload research papers and journal, which he can set a price that will

be available for download by other users. A user can also view research papers

uploaded by other users click and purchase them. This is after he has deposited

money into his account for purchasing the documents.

Admin actor has simple basic functions such as facilitating the users withdrawal.

He also has the basic functions of deleting unnecessary posts and dealing with user

inquiries. He can also withdraw income that the system accumulates.

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\_gure : Use case diagram

4.8 System requirements analysis

\_ Hardware constraints Minimum or actual hardware speci\_cation required: None

\_ Software constraints System interface will be implemented using HTML5, javascript,

Jquery (javascript framework) and CSS3 Backend of the system will be imple-

mented using Laravel 4.2, a PHP framework.

\_ Database constraints Database of the system will strictly be implemented using

MySQL database. Non-functional requirements This section speci\_es the quality

factors required by the system which are not related to the speci\_c functional

requirements:

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5 System Design

5.1 Introduction

The design of the system will aim to identify the subsystems in the project, the

interactions between the subsystems, system states and the logical ow of events

within the system. During the system design we identify the data relationships

and the database schema elements. The design also seeks to de

ne how the user will interact with the system and the desired system user inter-

faces

This chapter describes the process followed in de\_ning the architecture, compo-

nents, modules, interfaces, and data for the system to ensure that it satis\_es the

speci\_ed requirements. The system design was approached through the main sec-

tions as outlined below.

5.2 Behavioral Modelling

Behavioral models describe the internal dynamic aspects of the system that sup-

ports the business processes in an organization. It describes what the internal logic

of the processes is. In this chapter, we describe three Uni\_ed Modeling Language

(UML) diagrams that are used in behavioral modeling (sequence diagrams and

activity diagrams).

5.2.1 Logical Sequence of Activities in the System

Sequence Diagram: Login

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Figure: sequence Diagram

5.2.2 Logical Sequence of Activities in the System

Data and Database Modeling

5.3 Data and Database Modeling

Figure 4: The User Table

\_gure: database design

5.3.1 Database design

This section describes the process of creating data models of the system database.

These models help to give clear relations of objects and their interactions in the

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database. Below are the models that were chosen to represent the system:

5.3.2 Logical model

\_gure: Dtabase Table design

\_gure: database design.

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Figure 5: The Logical design

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5.4 Human Computer Interaction Layer Design

The human computer interface layer de\_nes the way in which the users will interact

with the system and the nature of the inputs and outputs that the system accepts

and produces. The user interface includes three fundamental parts which were

reviewed in the construction of the system: a. Navigation mechanism, the way

in which the user gives instructions to the system and tells it what to do (e.g.,

buttons, menus). The system thus consisted of menus and button which acted

as `guides' and when clicked resulted in the execution of various commands. b.

Input mechanism, the way in which the system captures information (e.g., forms

for creating new users). this application mainly deals with controlling access by

generating OTPs to be used by users. c. Output mechanism,the way in which the

system provides information to the user or to other systems (e.g., reports, Web

pages). This application provides SMS based One Time password.

5.4.1 Navigation Design

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The navigation component of the interface enables the user to enter commands

to navigate through the system and perform actions to enter and review

information it contains. A good navigation component is one the user never

really notices. It simply functions the way the user expects, and thus the user

gives it little thought.

The following navigation controls will be used: a. Menus: In the design of the

navigation, menus and links will be heavily utilized in order to prevent the user

from making mistakes e.g. during typing. Thus direct manipulation was

exempli\_eded. b. Messages: they are the way in which the system responds to a

user and informs him or her of the status of the interaction. There are many

di\_erent types of messages, such as error messages, con\_rmation messages,

acknowledgment messages, delay messages, and help messages. These will be

included in this system as shown in the sample below.

Figure 6: The Logical design

User modules/pages Log in page : This form requires users to input the

necessary details that are required to validate a user and create a session. Upon

successful validation users are redirected to the intended page otherwise they are

redirected back with error that the log in details are incorrect.

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This page will be used to collect the main details of a user that will be su\_cient

to provide quality service once the user successfully registers. registerDesign

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