MAKERERE UNIVERSITY

BANTU FUND E-PORTAL SYSTEM

By
BSE 17-35

WEB SYSTEM

DEPARTMENT OF NETWORKS

SCHOOL OF COMPUTING AND INFORMATICS TECHNOLOGY

A Project Report Submitted to the School of Computing and Informatics Technology for the Study Leading to a Project in Partial Fulfillment of the Requirements for the Award of the Degree of Bachelor of Science in Software Engineering of Makerere University.

Supervisor
Mr. Kamulegeya Grace

Department of Networks

School of Computing and Informatics Technology, Makerere University

kougas@gmail.com, +256-75-6100946

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Declaration

We, group BSE 17-35, hereby declare that the work presented is original and has never been submitted for an award to any university or institution of higher learning. We can confirm that where we have done consultations either from published material or the works of others, it has been attributed in this report.

#	Names	Registration Number	Signature
1	KALUUMA HILLARY	13/U/5788/EVE	
2	KABOHA JEAN MARK KAIRUMBA	13/U/5545/EVE	
3	MWESIGWA DAVID KENETH	13/U/9267/EVE	
4	OKUJA ALLAN JOSHUA	13/U/13047/EVE	

Approval

This project report titled "Bantu Fund" has been submitted for examination with my approval as the supervisor of group BSE 17-35.

Mr. KAMULEGEYA GRACE

Department of Networks

School of Computing and Informatics Technology;

College of Computing and Information Sciences,

Makerere University

Signature: ..... Date: .....

Supervisor

Dedication

This report is dedicated to our project supervisor, Mr. Kamulegeya Grace, our project sponsors, Makerere University, colleagues, our friends and family.

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We would like to take this opportunity to thank foremost God Almighty for the guidance, wisdom, health and well-being that enabled us to complete this project.

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Abstract

The problem this project addresses is the difficulty faced by people in need of financial assistance as regards raising money in a legitimate transparent way through contributions from the general public.

The proposed solution is the BantuFund E-portal web system that provides a platform where genuine seekers of donations can post their drive campaigns so as to receive funding from donors in a way that promotes accountability and transparency.

In order to achieve the objectives, we followed the steps of the Software development lifecycle Requirements Elicitation, Analysis, Design, Implementation and System testing and validation of the system based on the test plan. We used an Object-Oriented Approach during these phases.

In conclusion, most people face difficulty coming up with money as a means of financial assistance from those around them. People also have little trust for such ventures advertised either as social media campaigns, in newspapers or when they receive messages on their phones or get calls.

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Table of Contents

List of Figures

List of Tables

Abbreviations/Acronyms

Table 1 Key terms and definitions

Key Term	Definition
Seekers	The people seeking financial assistance
Funders	Those willing to offer financial aid for example Non-Governmental Organizations, Philanthropists, Cooperate Social Responsibility funders and individuals.
Cooperate Social Responsibility	It refers to business practices involving initiatives that benefit society. A business's CSR can encompass a wide variety of tactics, from giving away a portion of a company's proceeds to charity, to implementing "greener" business operations.
Philanthropists	A very generous person or institution which makes an active effort to promote human welfare.
BANTU	It literally means our people. The word ‘ntu’ means people. A member of any of a large number of linguistically related peoples of East, West, Central and Southern Africa.

Table 2 Abbreviations and Acronyms

Acronym	Meaning
UML	Unified Modeling Language
NGO	Non-Governmental Organization
UCN	Uganda Crowd Funding Network
IT	Information Technology
ERD	Entity Relationship Diagram
PK	Primary Key
FK	Foreign Key
HTTP	Hypertext Transfer Protocol
API	Application Program Interface
SSL	Secure Socket Layer

Chapter 1

Introduction

1.1 Background

People need money to support various drives such as social community developmental projects to add value for the environment, health issues such as saving lives of critically ill patients requiring very expensive surgeries, transplants and medication to save lives, funding for education and sports scholarships of bright upcoming youth that are underprivileged and need a bit of capital to make their dreams come true.

People in times of need first turn to their closest relatives, family and friends to help contribute. When the need is great, they have to look outside that initial circle.

People then turn to banks to secure loans or deal with loan sharks. The issue here is that they have to pay back within a given time period with interest and have to put up collateral. This approach looks at the profit to be gained by the banks and does not support non-profit causes it instead looks into startups and investments that lead to financial growth.

People in communities, modeled the bank system and altered it to come up with the SACCOS (Community Savings and Credit Co-operatives) so as to solve common problems and have management themselves.

A SACCO is made up of minimum 10 people and has no upper limit. Members all buy shares and save money with the SACCOs and the SACCO management has the responsibility to determine that members get their money back with interest. The problem with SACCOs is that they lack common financial goals, strategy plans, have effective communication issues and the mix of politics makes it difficult for members to get their money in case of crises when they really need it.

Advancements in technology led to the birth of crowd funding websites such as Kickstarter, Indiegogo and StartupValley that are the largest and are International companies based in the United States of America. Their main focus is innovations and inventions; transforming ideas into businesses. Indiegogo has a mission to empower people to unite around ideas that matter to realize those ideas in real life. StartupValley focuses on startups in the field of technology. The problem is that these sites do not look into non-profit causes and categories such as Health and Medical Care, Education and Sports Scholarships, Women Entrepreneurs and Community Development Projects.

These sites do not prioritize drives as per their criticality so that people can see the most important ones first. They instead show the most trending. These sites are also complex in the steps to set up a drive campaigns. Indiegogo is the only Crowd funding site that offers the option for Seekers to keep all funds even when their drives do not reach their goals of 100% money completion within the

allocated time but only if someone chooses the Flexible funding option. If the Seekers choose Fixed funding, they do not receive the money if it is not at 100% within the allocated time. These sites also do not follow through as per the funders asking for the accountability on the project milestones through reports submitted by the seekers and visual evidence.

In Uganda, the Uganda Crowd Funding Network (UCN) is the native crowd funding platform that mainly focuses on investment in small start-ups and entrepreneurial ventures. It is not a non-profit organization. Uganda Crowd Funding Network is not applicable to publicly traded companies but any entrepreneur or business owner in any stage or type of private company can use it. [1] They do not provide a provision for individuals with personal problems and social community projects.

Emerging trends in the Information Technology field have led to growth in the Social media industry. People are always clicking away on their phones. In Uganda, social media campaigns are the most popular way of raising money for instance the recent 'Save Viola from Cancer' campaign. The issue with these kind of campaigns is there is little or no accountability offered hence limited trust as people start to believe that they are shams and the amount of money needed does not reflect dynamically so people have issues knowing how much to contribute reducing the motivation.

1.2 Problem Statement

The problem this project addresses is the difficulty faced by people in need of financial assistance raising money to support their legitimate causes in a transparent way through collection of money from the concerned members of the general public.

1.3 Main Objective

To create a web based E-Portal system that provides a platform where genuine seekers of donations can post their drive campaigns so as to receive funding from donors in a way that promotes accountability and transparency.

1.4 Objectives

- To elicit requirements by gathering information from the stakeholders and existing solutions to get an in-depth understanding of the causes and effects to fund raising problems.
- To analyze the requirements in order to understand the key requirements.
- To implement (build on the design) the proposed system according to the well analyzed requirements.

- To test the system and maintain it to make sure the system is efficient, safe, reliable, and conforms to the requirements.

1.5 Scope

The boundaries of the system show what the system does and the limitations of the system according to the findings.

The stakeholders of the proposed system include NGOs, the government, donors, administrators, system developers and analysts, concerned members of the society, entrepreneurs, inventors, small business owners, students and medical patients. The boundaries of the system are divided in different areas as follows;

1.5.1 System Scope

The system has three types of users. The Funders who are providing the funds, the Seekers of these donations and the Administrators who vet and approve these drives before they appear on the portal.

1.5.2 Geographical Scope

The focus of the system is Uganda. We focused on behavior of these firms in areas of central Uganda that is Kampala, the capital where we got our sample to run the pilot. We picked our sample focused on Seekers; people that needed funding around Kampala to pursue scholarships in education and sports, women entrepreneurs, those creating community projects and possible Funders; the concerned members of society with a little extra cash to spare to support those in need.

1.5.3 Functionality Scope

The following are the functional requirements;

- The system allows the administrator to approve and hence upload only the vetted requests for funding.
- The system integrates with pay pal enabling donations to be made.
- The system advertises fundraising campaigns to the donors who support those drives and are passionate about those causes.
- The system provides a platform that enables the posted drive campaigns to be seen by large group of potential donors enabling them to pitch their ideas improving their chances of getting funding.

- The system offers recognition for donors if they do not wish to be anonymous.
- The Seeker can request for withdrawal of their money before it has reached 100% and before the time for the drive campaign has gotten done.
- The system enables accountability reports to be uploaded to the system by Seekers and displayed next to their drives so as to show transparency.
- The system generates reports for each donation showing the donors, time, donation amount, percentage increased and does statistics using this data displaying using a line graph.

The following are the constraints (non-functional requirements);

- The Seekers for funds do not post directly to the system. Their drive campaigns are first vetted and then approved by the administrator before posting takes place.
- There is an evaluation algorithm used to calculate the criticality index of drives so that the most important drives appear first. It is based on qualitative and quantitative analysis.
- There is a time limit as for how long the campaigns can be up for.
- The system displays the amount of money needed for the funding.
- It also shows the percentages remaining to completion using a progress bar.

The following are the user requirements;

- A system user needs a basic understanding of the English language and basic I.T skills to know how to get around a computer and a mobile phone.
- To register the user's data requirements are simply their name, email address, telephone number, password and user name.

1.6 Significance

The project enables people (startup business owners) to pursue their entrepreneurship dreams that were only being hindered by lack of enough capital through providing them that platform.

The project helps women business owners with minor issues or challenges faced to raise appropriate funding for smooth running of operations.

The project provides donor satisfaction by giving donors a platform to support their passionate drives that they believe in, putting their money to good use.

The project provides donors with accountability for the use of their money providing them with reports and updates of the drives they are funding.

The project improves on transparency in the crowd funding business, hence fighting off corruption.

Chapter 2

Literature Review

2.1 History of crowd funding

Crowd funding is a method of collecting many small contributions, by means of an online funding platform, to finance or capitalize a popular enterprise. Crowd funding gained traction in the United States when Brian Camelio, a Boston musician and computer programmer, launched ArtistShare in 2003. It started as a website where musicians could seek donations from their fans to produce digital recordings, and has evolved into a fundraising platform for film/video and photography projects as well as music.

ArtistShare's first crowd funding project was Maria Schneider's jazz album "Concert in a Garden." Schneider offered a tiered system of rewards. For a $9.95 contribution, for example, a backer got to be among the first customers to download the album upon its release in 2004. Fans who contributed $250 or more (in addition to receiving an album download) were listed, in the booklet that accompanied the album, as participants who "helped to make this recording possible." One fan who contributed $10,000 was listed as executive producer.

Schneider's ArtistShare campaign raised about $130,000, enabling her to compose the music, pay her musicians, rent a large recording studio, and produce and market the album (it was sold exclusively through the ArtistShare website), which won a 2005 Grammy Award for best large jazz ensemble album. [2]

Donation-based Crowd funding

Large charitable organizations began collecting donations online long before Web-based crowd funding emerged. But by 2010, new donation-based crowd funding sites allowed very small organizations and individuals to solicit donations from the crowd. Examples range from local organizations set up for a Little League team's travel expenses to a championship tournament, or for a high school choir's trip abroad, to disaster relief and emergency fundraising.

GoFundMe, launched in 2010, is a pioneer in donation-based crowd funding. As of October 2013, the GoFundMe platform has enabled its users to raise $120 million in 350 campaigns, from 1.4 million donors. The platform takes 5 percent of each donation. Users also pay a processing fee on each transaction. As of October 2015, GoFundMe campaigns had reached the $1 billion plateau.

When teenager Farrah Soudani was critically injured in the Aurora, Colorado, movie theater massacre in November 2012, her family, friends, and social networking connections donated $171,525 in 15

months, via 6,088 donations, on the GoFundMe platform to help pay her medical expenses. Farrah and her unemployed mother had no health insurance at the time.

There are many issues and life related circumstances that may require individuals to look for assistance from others. Many companies in the world have come up with this idea of crowd funding portals most not around Africa.

2.2 Previous attempts at crowd funding I.T related systems

2.2.1 Kickstarter

Kickstarter is one of the fastest crowdfunding websites in the world. It has fundraised hundreds of millions for its clients who get funded through donations on the website. Each and every Kickstarter project is the independent creation of someone like anyone. [3]
This website is one of the prominent names in the crowd funding websites business and has solved its client's finance issues for a while.

2.2.2 Indiegogo

This is one of the most prominent and the first online crowd funding websites in the world. Indiegogo has a mission to empower people to unite around ideas that matter to them and together make those ideas come to life. With the help of our Indiegogo community, we are redefining entrepreneurship shifting it from being a privilege to a right. Because every inventive idea should have its shot and every creative entrepreneur should have their moment. Together, we can do anything. Indiegogo challenges the top-down model by affording artists the opportunity to make their case directly to the public. It's profoundly empowering. [4]

2.2.3 Startup valley

Startupvalley is one of these companies that have invested and participated in this field of crowd funding. Startup valley is currently in pre-launch status while the equity crowdfunding regulations are being finalized by the SEC and FINRA. Once the equity crowd funding regulations are finalized by the SEC and FINRA, startup valley will be positioned to become an equity crowd funding portal, platform, site and website that will allow technology startups, entrepreneurs, and businesses (commonly found in Silicon Valley) to raise seed and startup capital for their company through crowd fund investing (CFI). Accredited and non-accredited investors, as part of the crowd, will provide start-

up funding and early-stage investments to some of the best tech businesses, in exchange for an equity share in their company. [5]

From the above you can notice that this company only concentrates on startups in the field of technology and specifically in Silicon Valley. Our proposed system looks not only at startups but genuine community issues that need to be solved as well as individual issues that may need crowd intervention to supply assistance.

2.3 Crowd funding in Uganda

2.3.1 Crowd funding Network Uganda

In Uganda, this technology is not widely used among the population but there is hope that this is going to be the future. Some companies have however joined this of type activities one in particular is Uganda Crowd Funding Network (UCN). This is a private limited company registered in Uganda. Apart from operating locally, UCN has appropriate staff to handle projects of any scale outside Uganda as its nature of work is global-oriented. The company also follows up on its projects after completing them and incase of abroad clients it can also carry out and monitor projects for them. UCN keeps business information and idea confidential and secure since it has a privacy policy and terms of use that serve effectively as a non- disclosure agreement between the entrepreneur and investors. UCN is not applicable to publicly traded companies but any entrepreneur or business owner in any stage or type of private company can use it.

2.3.2 Uganda crowd funding platform

GoBigHub is a local company already connecting local investors to local enterprises; it has developed its system to leverage on availability of micro liquidity and the need for micro capital by micro enterprises. The partners in the project will then benefit through revenue share of all transactions out of the platform. The Uganda Investment Authority has the opportunity to provide brand building, publicity and opportunities for meeting with and partnering to build the project. [6]

2.4 Conclusion

From all the above attempts to come up with ways of helping individuals come up with financial assistance for the less privileged people in Uganda, through observation it is clear that all those crowd funding platforms in Uganda's main focus is around small startup entrepreneurs who may need this funding other than solving real world problems for the people in a way that promotes transparency and accountability.

Chapter 3

Methodology

3.1 Introduction

The methodology followed the waterfall (Software Development Life Cycle). It is a framework defining tasks performed at each step in the software development process. It has 5 stages, Requirements Gathering, Analysis, Design, Implementation and Testing.

We are using an Object-Oriented approach.

Qualitative methods were used to manage qualitative data for understanding and explaining social phenomena for example data from interviews and observation and Quantitative methods were used for prior data analysis.

It also involved data processing/analysis methods, techniques, and tools and testing and validation methods or techniques used.

3.2 Requirements Elicitation

Requirements of a system are a description of what the system should do-the services it should provide and the constraints on its operation.

Data collection is the process of gathering raw facts about a study of interest in a systematic way.

The methods that were used included the following;

3.2.1 Administering written Questionnaires

Questionnaires are a good data collection technique when dealing with sensitive information and qualitative data and quantitative data. (See Appendix C: Questionnaire).
We printed out a number of questions in a definite order on a form and gave the questionnaires to various respondents from different walks of life to read and answer the questions on their own.

The strengths of the questionnaire method are below;

- There is low cost even when the universe is large and geographically wide spread.
- It is free from the bias of the interviewer; answers are in the respondents' own words.
- Respondents' have adequate time to give well thought out answers.
- Respondents who are not easily approachable can be reached out to conveniently.
- Large samples can be made use of and thus results are more dependable and reliable.

The following are the limitations of using the questionnaire

- Low rate of return of the duly filled in questionnaires; bias due to no-response is often indeterminate.
- It can be used only when respondents are educated and cooperating.
- The control over questionnaire may be lost once it is sent.
- There is inbuilt inflexibility because of the difficulty of amending the approach once questionnaires have been dispatched.
- There is also the possibility of ambiguous replies or omission of replies altogether to certain questions; interpretation of omissions is difficult.
- It is difficult to know whether willing respondents are truly representative.
- This method is likely to be the slowest of all.

3.2.2 Interviewing

An interview schedule with questions was used for each key informant interview in order to ensure that all the questions are covered in an efficient and timely manner. (See Appendix B: Interview Guide).

The interview schedules varied by interviewee; however, each schedule follows a basic outline. The interviews began with asking the interviewees about their interest in our E-Portal. Next, the interviewees were asked about their opinion and perspective they hold towards the E- Portal.

Following that, the interviewees were asked a series of questions specific to them about their previous experience any donation towards funding any project.

The interview schedule features multiple questions posed to the interviewees, follow-up questions were also used when needed in order to clarify points or ask questions that we do not anticipate prior to the interview.

Here, the tools are interview guide, notebook, pen and a recorder. [7]

The chief merits of the interview method are listed below, as follows;

- More information and that too in greater depth can be obtained.
- Interviewer by his own skill can overcome the resistance, if any, of the respondents; the interview method can be made to yield an almost perfect sample of the general population.

- There is greater flexibility under this method as the opportunity to restructure questions is always there, especially in case of unstructured interviews.
- Observation method can as well be applied to recording verbal answers to various questions.
- Personal information can as well be obtained easily under this method.
- Samples can be controlled more effectively as there arises no difficulty of the missing returns; non-response generally remains very low.
- The interviewer can usually control which person(s) will answer the questions. This is not possible in mailed questionnaire approach. If so desired, group discussions may also be held.
- The interviewer may catch the informant off-guard and thus may secure the most spontaneous reactions than would be the case if mailed questionnaire is used.
- The language of the interview can be adapted to the ability or educational level of the person interviewed and as such misinterpretations concerning questions can be avoided.
- The interviewer can collect supplementary information about the respondent's personal characteristics and environment which is often of great value in interpreting results.

The weaknesses of the interview method are as follows;

- It is a very expensive method, especially when large and widely spread geographical sample is taken.
- There remains the possibility of the bias of interviewer as well as that of the respondent there also remains the headache of supervision and control of interviewers.
- Certain types of respondents such as important officials or executives or people in high income groups may not be easily approachable under this method and to that extent the data may prove inadequate.
- This method is relatively more-time-consuming, especially when the sample is large and re-calls upon the respondents are necessary.
- The presence of the interviewer on the spot may over-stimulate the respondent, sometimes even to the extent that he may give imaginary information just to make the interview interesting.

- Under the interview method the organization required for selecting, training and supervising the field-staff is more complex with formidable problems.
- Interviewing at times may also introduce systematic errors.
- Effective interview presupposes proper rapport with respondents that would facilitate free and frank responses. This is often a very difficult requirement.

3.2.3 Focus Group Discussions

This method is good for getting the different groups of stakeholders together and separation of concerns. A focus group discussion template (see Appendix D) was used for each of the three focus groups (Seekers, Funders and we, the developers).

The template allowed for questions from the survey to be discussed in further detail while also allowing questions that could not be included in the survey to be posed.

All of the focus groups were recorded with an audio device, with the consent of the participants, and translated. For questions regarding their personal experiences, each individual was expected to provide an answer. For some of the more general questions, the translator facilitated the Seekers' responses as they chose to give them.

3.2.4 Observation

Here we plan to do both passive and active (participatory) observation to see how things work in the natural setting and pay out.

We have also observed current fundraising campaigns and how they are being addressed for example the recent WhatsApp campaign of Daphne Viola who needs money for fundraising an operation diagnosed with Leukemia. Asking people about this informally, they told us of their disbeliefs in that kind of thing.

Here, the tools are eyes and other senses, pen/ paper and camera.

Field Notes

During the data collection process, field notes were used as a tool for collecting

Observation data and conducting informal interviews at events such as community fund raisers.

Audio and Video Recording

At times during the focus groups and interviews, audio and video recording devices were used with a smart phone. The audio recording device was primarily used to create transcripts of the interviews

and focus group discussions. The video recording device was primarily used to create a mini-documentary that will accompany the paper as a visual reference.
Participants have the right to request not to be recorded, and verbal consent was acquired from every participant before recording begins.

3.2.5 Internet Research

We looked into current companies doing crowd funding both local and International so as to learn from what they are doing so as to find and exploit the research gap by solving problems they are not addressing.
Google searches about the topic turned up a great deal of useful information to help us better understand the requirements. We looked into sites like Indiegogo.com, kickstarter.com and StartUpValley.com.

3.3 Requirements Analysis

We are going to use an object-oriented approach to analysis and design. The objective of Object Oriented analysis is to develop a series of models that describe computer software as it works to satisfy a set of customer-defined requirements.

Object Technologies reflect a natural view of the world. The intent of Object Oriented Analysis is to define all classes (and relationships and behavior associated with them) that are relevant to the problem being solved.

The following tasks occurred;

1. Basic user requirements were communicated between the customer and the Software engineer.
2. Classes were identified (i.e. attributes and methods are defined)
3. A class hierarchy was specified.
4. Object-to-Object relationships (object connections) were represented.
5. Object behavior was modeled.
6. Tasks 1 through 5 were reapplied iteratively until that model was complete.

Use case scenarios were created based on the gathered requirements. These use case scenarios provide a description of how the system is used.

The class-responsibility-collaborator (CRC) modeling technique is then applied to document classes and their attributes and operations.
Classification of objects and development of a class hierarchy is then done. Subsystems are used to encapsulate the related objects.
The object relationship model provides an indication of how classes are related to each other.

3.4 Design

We used an Object-Oriented approach. Objected-Oriented design transforms the analysis model created using Object-Oriented Analysis into a design model that serves as a blueprint for object creation.

This phase involves designing the user interface and identifying necessary outputs, inputs, and processes.
In addition, it also involves designing internal and external controls, including computer-based and manual features to guarantee application's reliability, accuracy, maintainability, and security.

During the systems design phase, the application architecture was determined, and used to transform the logical design into program modules and code.
We look at the OOD process as a pyramid of layers. The foundation is the design of the system and subsystem, then the design of individual objects.
The purpose of the systems design phase is to create a physical and logical model.
We properly implemented the following sections in Chapter 4, Section 4.1 SYSTEM DESIGN.

3.4.1 Process modeling

This involves the use of sequence diagrams, activity diagrams, state diagrams and class diagrams. This illustrates the different processes involved in the system. Object Oriented Analysis Design approach (OOA) by use of UML (Unified Modeling Language) that include use case, sequence, and activity diagrams were used to illustrate the flow of information, sequence of events, the transition of objects from one state to another and the flow of activities within the system.

3.4.2 User Interface Design

A user-friendly interface was implemented. This was done with the help prototyping tools. This prototyping was in two phases i.e. low fidelity prototyping which was done on paper to help in getting a better face of the system and the high-fidelity prototyping was done using the tool Paint.
During this design, several prototypes were developed in order to come with up the best user-friendly interfaces for the system.

Figure 1 Home Screen Prototype

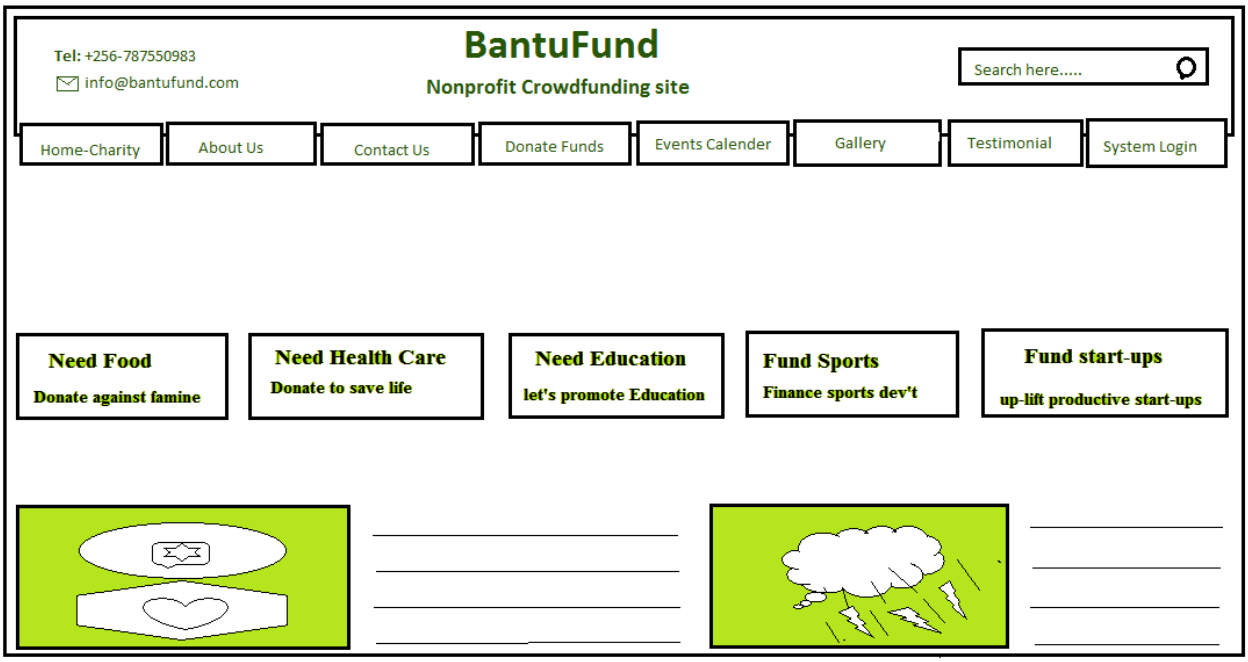
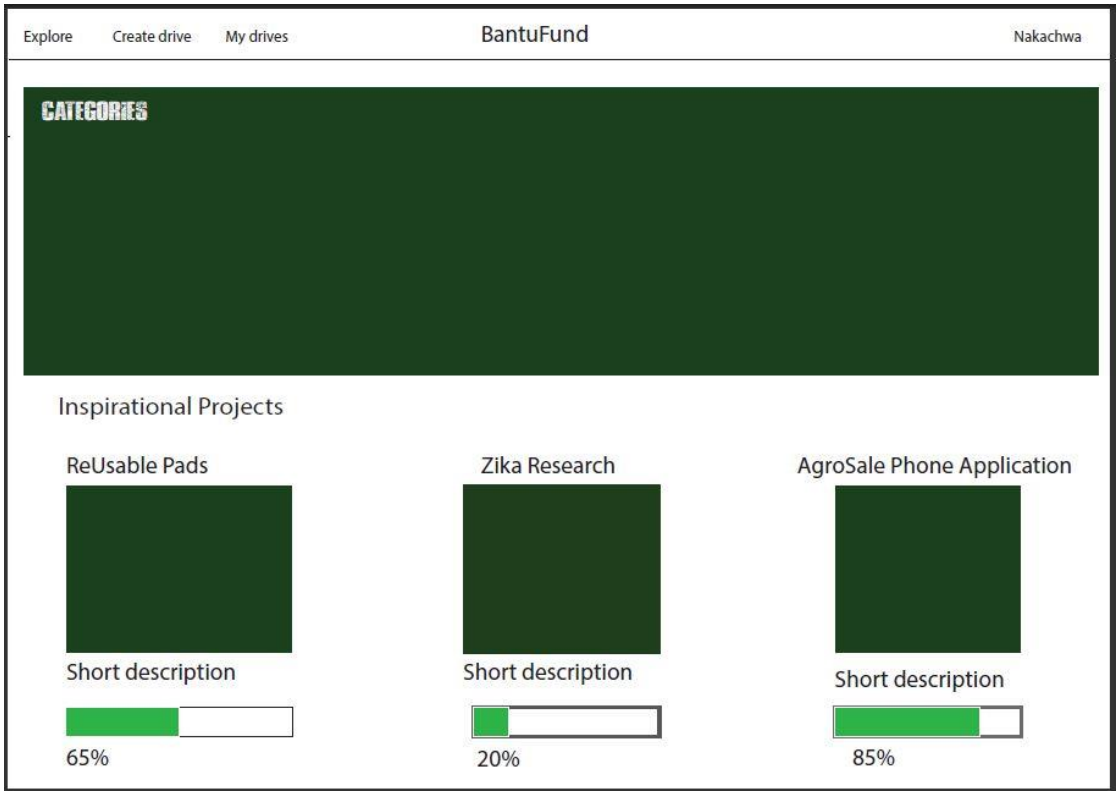


Figure 2 Explore Projects Screen Prototype



3.4.3 Modeling

Universal Modeling Language (UML). The techniques of use case diagrams, sequence diagrams. Class Responsibility Collaborator Diagram, index cards and class diagrams while doing the Object-

Oriented Design. To identify candidate classes and indicate their responsibilities and collaborations. Class-Responsibility-collaborator (CRC) modeling provides a simple means for identifying and organizing the classes that are relevant to system or product requirements.

A CRC model is really a collection of standard index cards that represent classes. The cards are divided into three sections. Along the top of the card you write the name of the class. In the body of the card you list the class responsibilities on the left and the collaborators on the right.

[8]

3.5 Implementation

This section illustrates the actual realization of the system as far as interaction between the various components is concerned.

3.5.1 Application frameworks

The application frameworks that were used in the development of the system include Bootstrap and web services. These frameworks were used in the development stage of the development cycle.

- **Web Services**

Different web services are used to access the system online. These services help in accessing the system interfaces and entering data into the database. However, one requires internet to access these services.

- **Bootstrap**

It is a sleek, intuitive and powerful mobile-first front-end framework for faster and easier web development. It uses CSS, HTML and JavaScript.

3.5.2 Programming Tools and Technologies

The technologies/programming tools that were used include MYSQL, CSS, JavaScript, PHP, jQuery, Ajax and HTML.

- **MySQL**

This is a server-based database programming tool that we used to implement database development. It supports standard SQL which is used to create the database, tables together with their entities and

constraints as well as populating the tables. MySQL is a free, fast, reliable and open source relational database management system.

- **HTML**

This is used to design interfaces and different graphical components helped to support interaction between users and the system. HTML is easy to use since it has loose syntax and it is supported almost by every browser, if not all browsers.

- **PHP**

This is used to connect or link the interfaces to the database and for security purposes to prevent unauthorized access to the system. PHP is executed on the server and supports many database management systems. It is fast, secure, stable, open source and easy to use.

- **CSS (Cascading Style Sheets)**

This is a style sheet language that is used to describe the presentation semantics (the general look and feel) of documents written in mark-up language.

3.6 System Testing and Validation Techniques

We used an Object-Oriented testing approach.

Testing however, is still being done. The testing process never ends.

The over-all objective of Object-Oriented testing is to find the maximum number of errors with minimum effort. It is identical to the objective of conventional testing but the strategy and techniques differ significantly.

Software testing serves as a way to measure and improve the reliability of the system. The main aim of validation is to verify the functionality, scalability, concurrency and other non-functional requirements.

Test case design was done to derive a set of tests that have the highest likelihood for uncovering errors in the software.

Because the OO analysis and design model are semantically coupled, testing begins with these engineering activities. It takes place through all the phases of the software development life cycle. (requirements phase testing, design phase testing, program phase testing, evaluating test results, installation phase testing, acceptance phase testing and maintenance phase testing).

This involved the following:

3.6.1 Unit Testing

Unit testing focuses the verification effort on the smallest unit of software design-the module which in this case is the encapsulated class or object.

The unit test is normally white-box oriented. White-box or glass-box testing is a test case design method where the software under test is observed as a white-box or glass-box; the structure and flow of the software under test is visible to the tester. Here, the internal workings are known. White-box testing was done early on in the process.

This was done by us, the System developers because we have thorough knowledge of the applications logic. It was done in parallel for multiple classes.

Once Object-Oriented programming has been accomplished, unit testing is applied for each class. Class testing uses a variety of methods; fault-based testing, random testing and partition testing. These methods exercise the operations encapsulated by the class. We designed test sequences to ensure that the relevant operations are exercised. We determined the state of the class, represented by the values of its attributes to find out if errors exist.

We observed how different classes function independently as single units.

This was to ensure that the code is working fine and meeting the user specifications. In this case, if bugs and errors were detected, they were fixed for efficient system functionality. In this method, we used statement coverage condition to test different statements in code.

3.6.2 Integration Testing

This testing was done to ensure that all the unit modules work together as a system to produce the required functionalities. This testing has to continue progressively until all the unit modules are working harmoniously. In this testing method, we used top-down and bottom-top testing approaches to determine if there were any defects in the integration components.

Integration testing was done using a thread-based and use-based strategy.

Thread-based testing integrated the set of classes that collaborate to respond to one input or event. Each thread is integrated and tested individually. Regression testing was then done to ensure that no side effects occur afterwards.

With use-based testing, we constructed the system by testing those classes (called independent classes) that use very few if any server classes. After testing the independent classes, we tested the dependent classes. Keep testing layers of dependent classes until the entire system is constructed.

Then, cluster testing was done to test the collaborating classes. Here, a cluster of collaborating classes, (determined by examining the CRC and object-relationship model) was exercised by designing test cases that attempt to uncover the errors in the collaboration.

3.6.3 Validation Testing

This was done by presenting the system to specific users who are supposed to perform different tasks using the system. This was done to ensure that the requirements of the specification are met. In this testing, we will use case testing to discover interaction defects from the user's interaction.
Here, we test the use cases that are part of our analysis model. Validation focuses on user visible actions and user recognizable outputs. The use case provided scenarios that had a high likelihood of uncovered errors in user requirements.

Conventional black-box methods were used to drive validation tests.
Black-box testing focuses on the functional requirements of the software. Here, the software is viewed as black-box with internal workings unknown. If expected output behavior is given for all the inputs, it passes the test.
It can even be done by our colleagues who did not write the code because it does not require thorough knowledge of the logic and internal workings of the code.
This was done later on after white-box testing has been done. It is a complementary approach that uncovers a different class of errors form what white box testing uncovers.

Chapter 4

System Design and Implementation

4.1 System Design

4.1.1 System Architecture

The system design followed an object-oriented approach using the Unified Modeling language. The architecture was a 3-tier client server architecture with the presentation layer, business layer and data layer described as follows;

- Presentation Layer is responsible for the presentation of system information objects to the user or to software components within the system.
- Business Layer is responsible for the implementation of the Business Rules of the system. This tier is used to manage the system objects and their interactions with the Data Layer.
- Data Layer is responsible for the storage of data into a persistent store

Figure 3 Overview of System Architecture

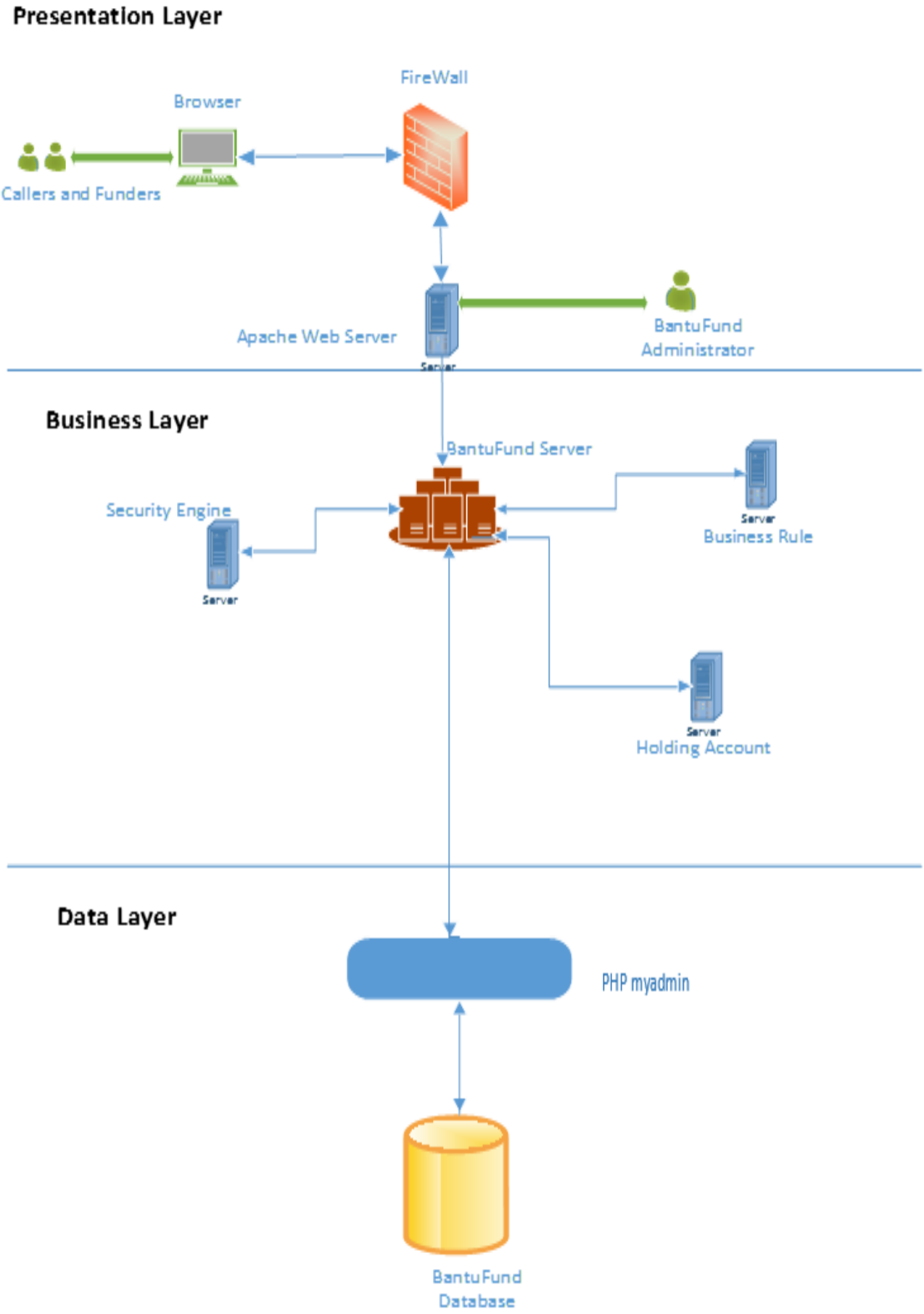
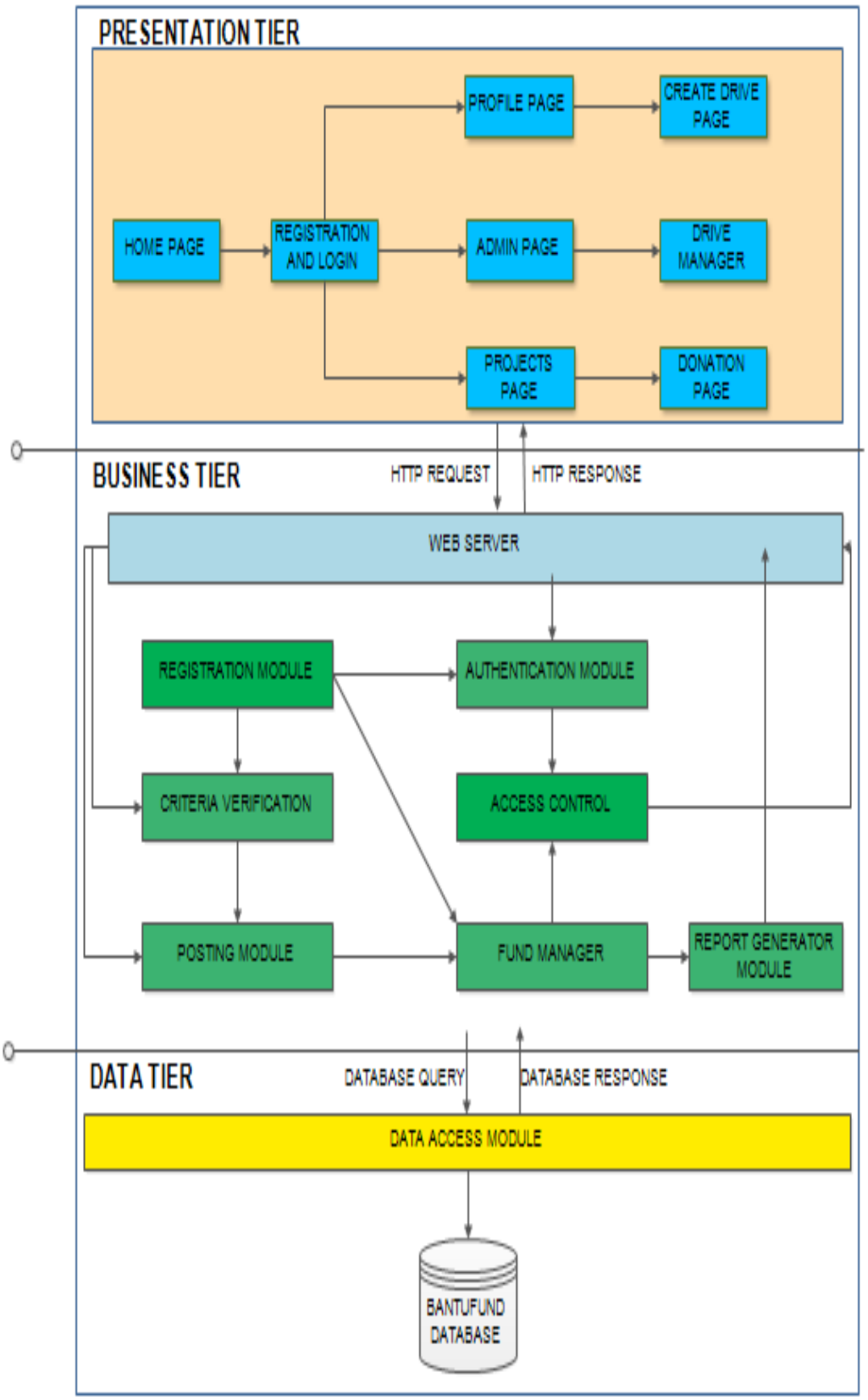


Figure 4 High Level Architecture



OBJECT RELATIONAL MODEL

Figure 5 Fund Manager Module

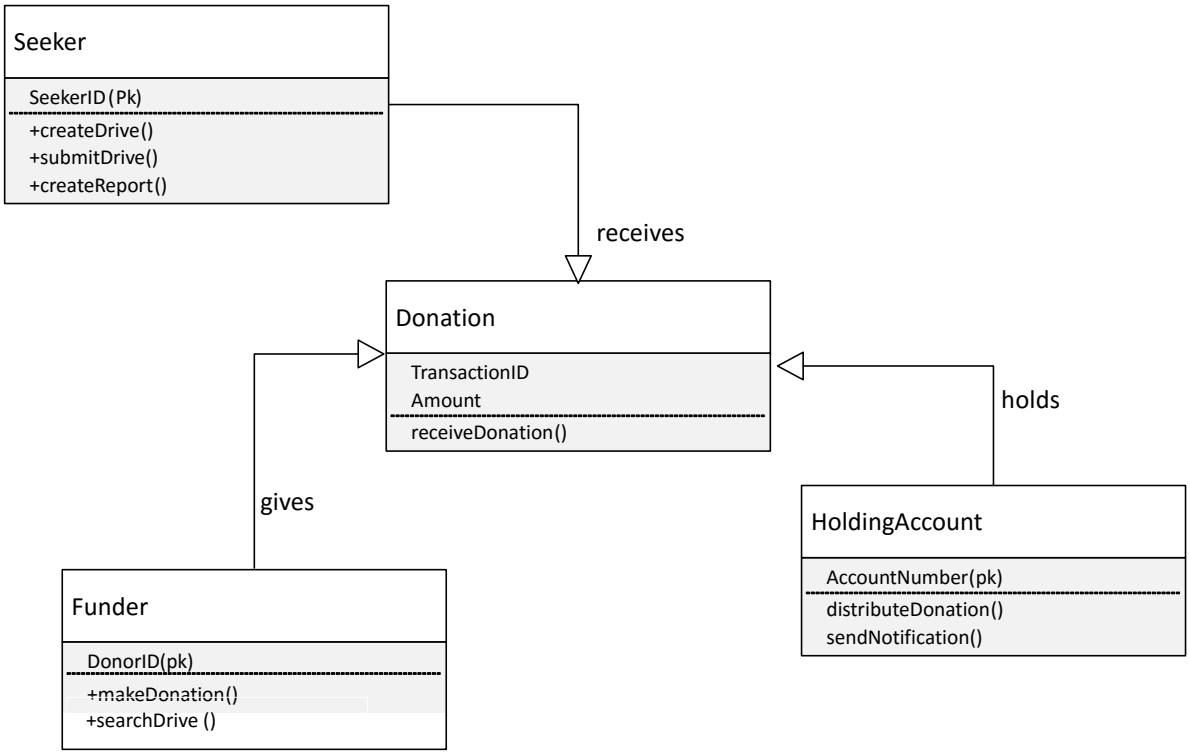
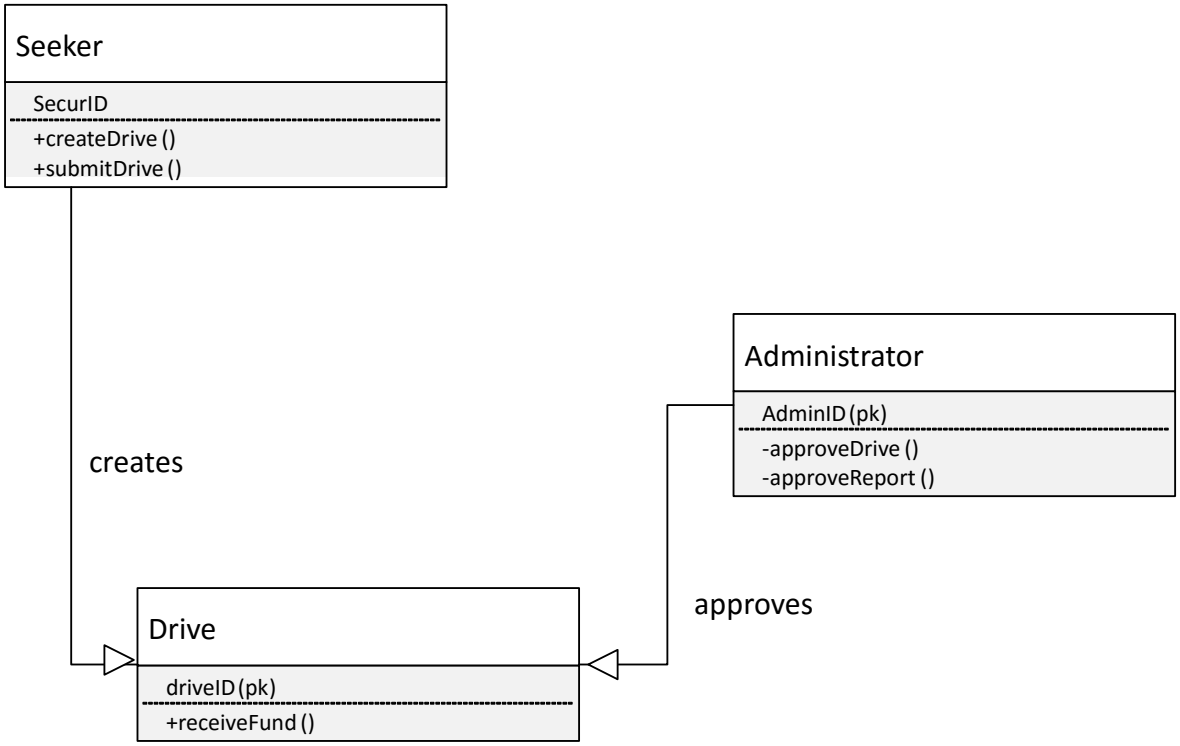


Figure 6 Posting Module



4.1.2 Design Constraints

We are using the Model View Controller design pattern to build our web system. This pattern has principal separations of the View from the Model and the Controller from the View that allowed us to develop multiple presentations and different interfaces for the same model code and allowed us to do testing of the domain logic easily. The View and Controller are on the client side and the Model is on the server side.

Security will be done by the host server's different firewalls that we do not have control over and are hence not going to configure.

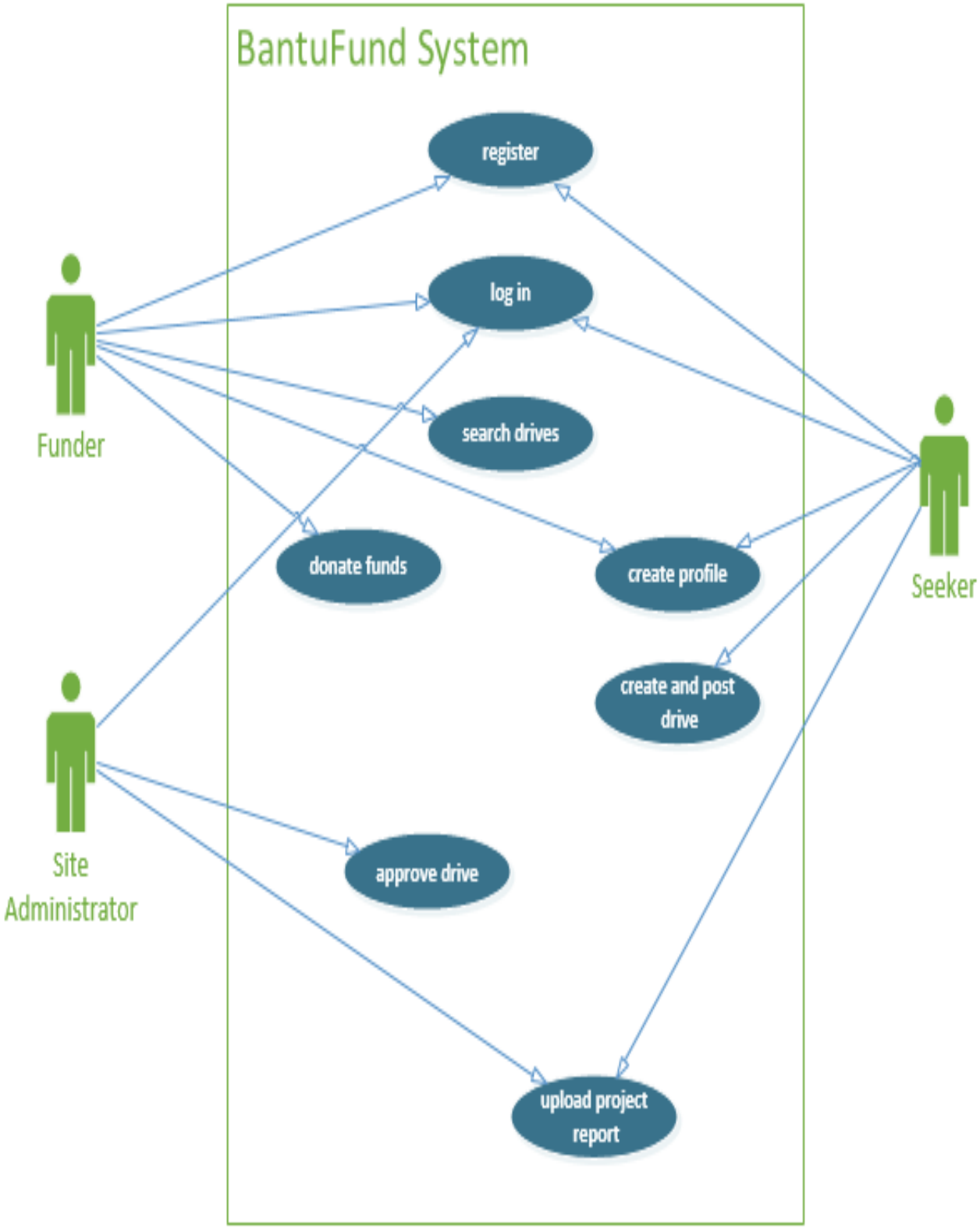
Due to the money constraint, we had initially planned to do an integrated web and mobile application system however now we are focused solely on the web system development as the initial phase. The mobile phone application will be designed later. This is because we have to pay a lot of money to access the APIs.

We have to gain access to mobile money APIs so as to come up with the mobile money integration with our system so as to get that support from the external system.

4.1.3 Design Methodology

We used Object-Oriented Analysis and Design techniques such as use case scenarios and sequence diagrams to show the flow of events and how the system works.
The subsystem design is derived by considering overall customer requirements (represented with use cases), events and states that are externally visible (the object-behavioral model).

Figure 7 Use Case Diagram



4.1.4 High Level Design

1. **Process View:** This view is the runtime view of the system. The components are threads or processes or distributed applications.

Sequence Diagrams

Figure 8 Create Drive Sequence Diagram

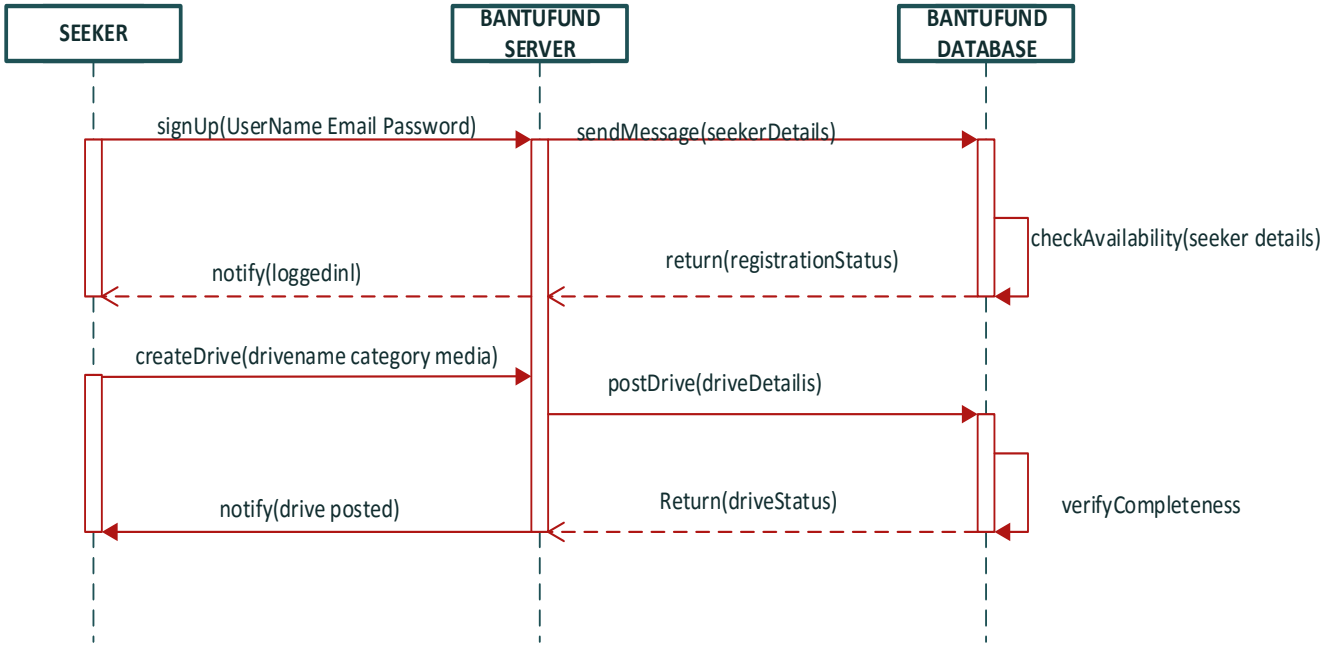


Figure 9 Donate Funds Sequence Diagram

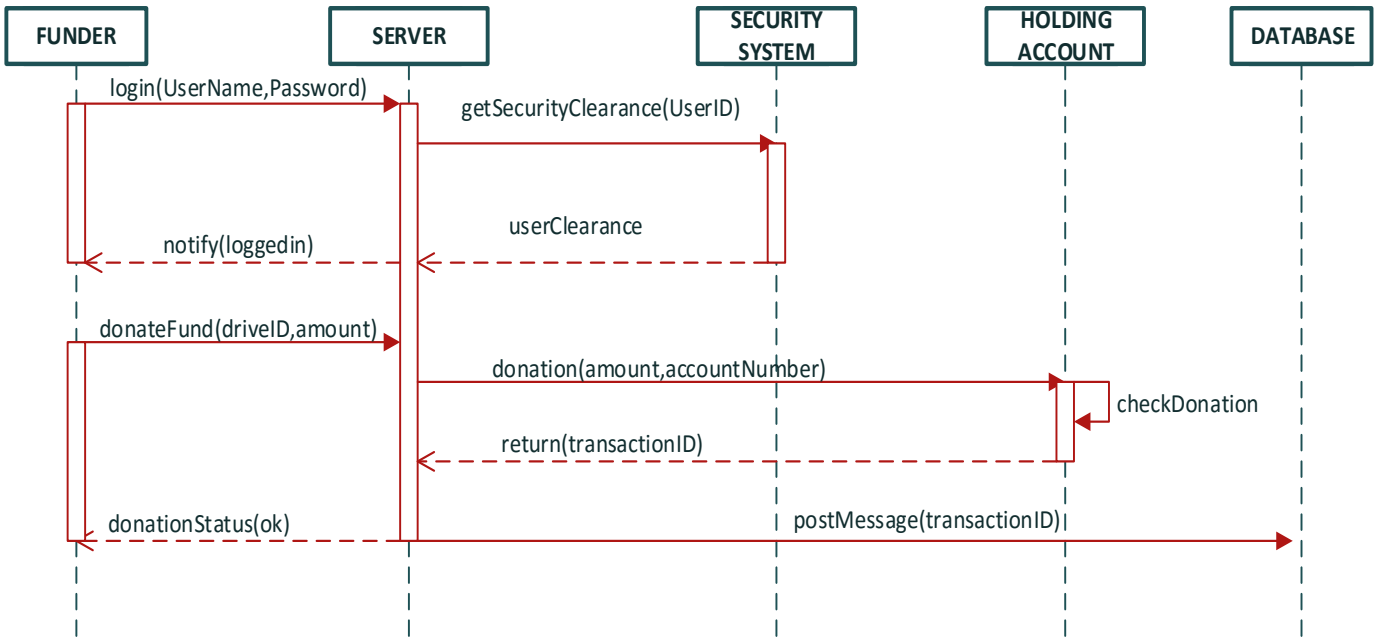
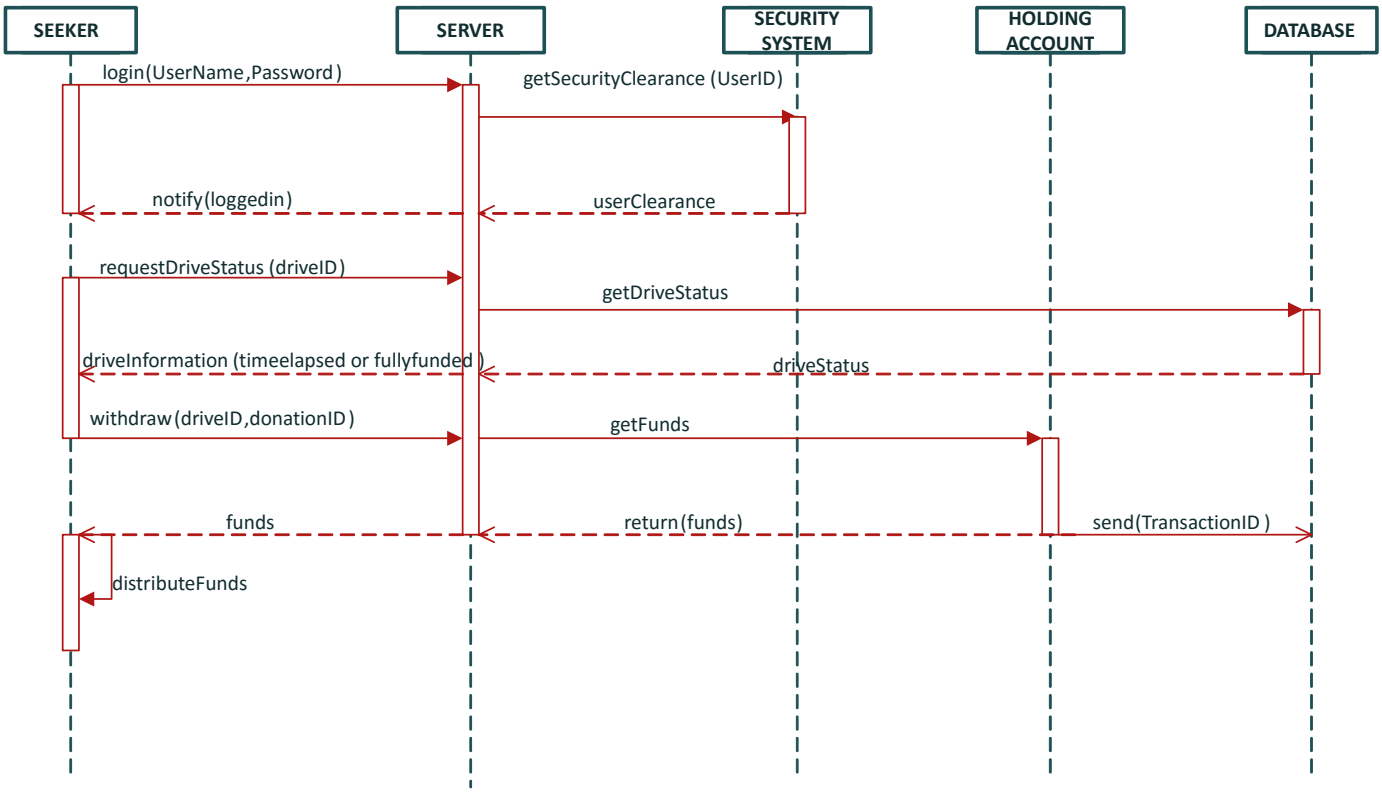
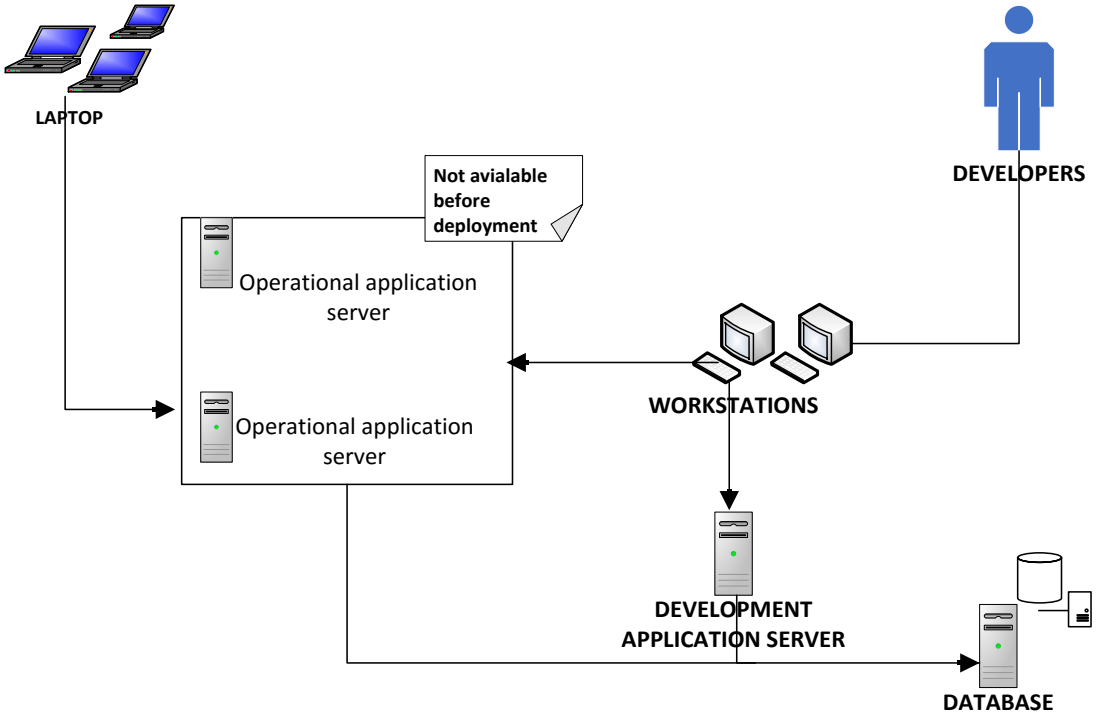


Figure 10 Withdraw Funds Sequence Diagram



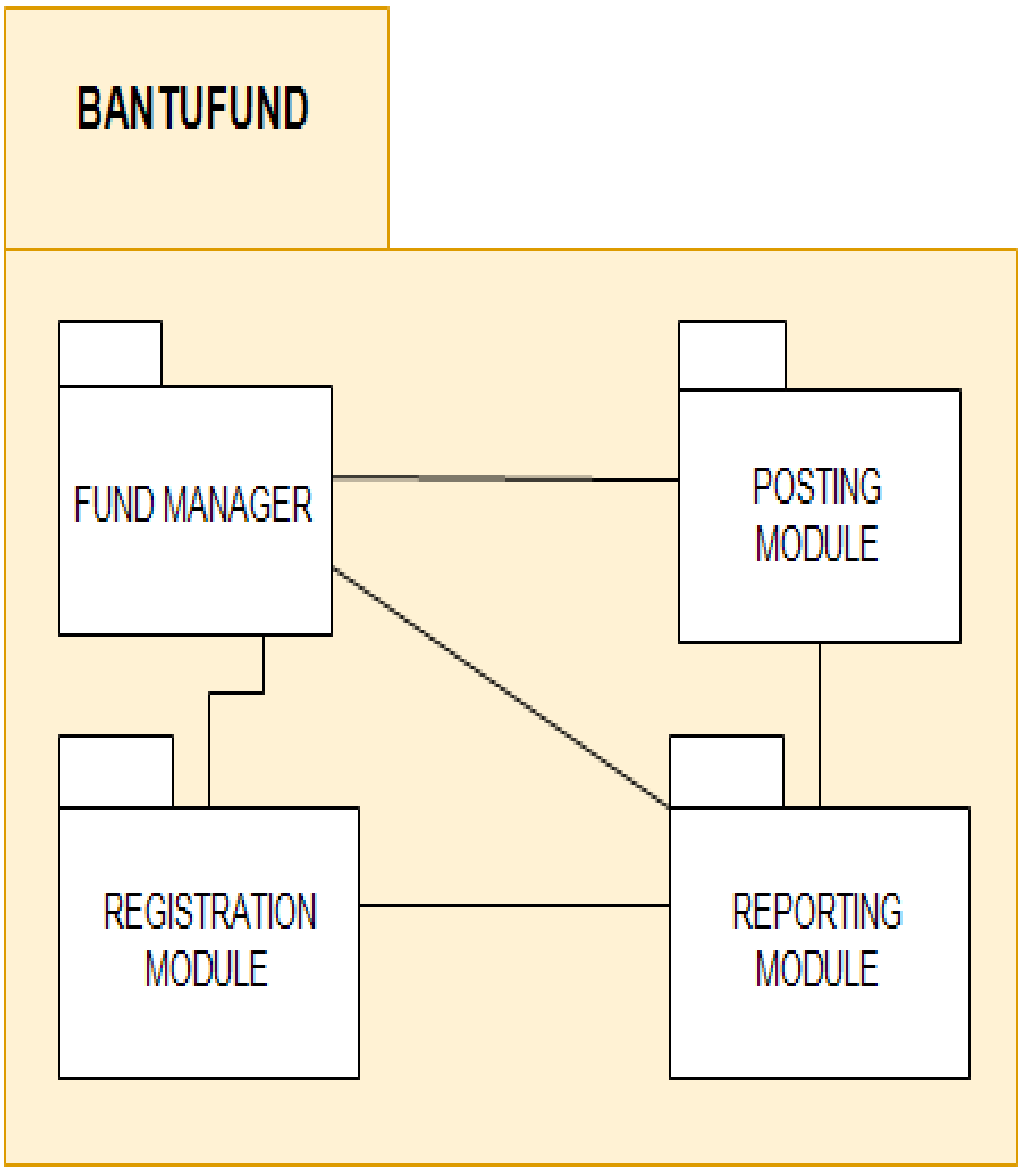
2. **Physical View:** this view is for distributed systems. The components are physical processors that have parts of the system running on them.

Figure 11 Physical Deployment of the System



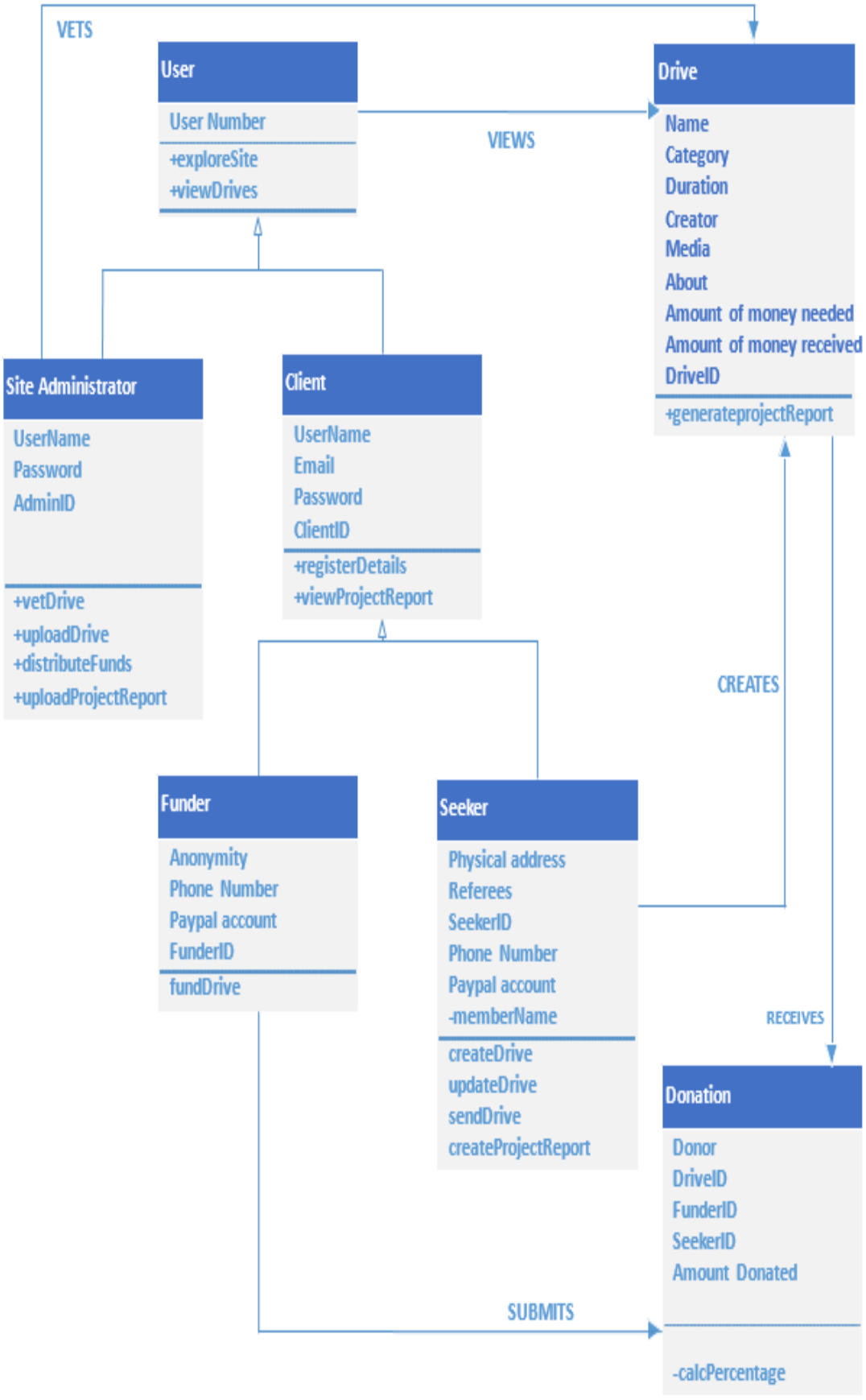
3. **Module View:** this view is for project management and code organization. The components are typically files or directories.

Figure 12 Module View of Components



4.1.5 Low Level Design

Figure 13 Class Diagram



4.1.6 Database Design

4.1.6.1 Data Description

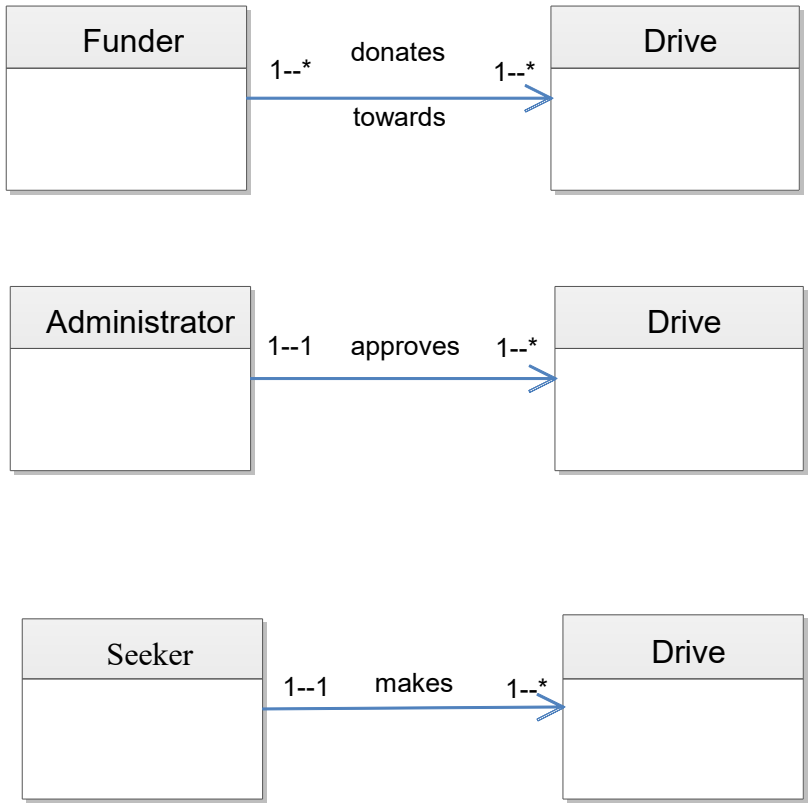
This section has the entities and entity relationship diagrams, which are to be used to model the data of the system the ERDS that we modeled into the database. The system has the following entities:

1. Seeker (Seeker_Name, Seeker_ID(PK), Paypal_Account, Seeker_Mobile, Seeker_Email, Seeker_Password)
2. Administrator (Admin_ID(PK), Admin_Name, Admin_Password)
3. Drive (Drive_ID(PK), Drive_Name, Drive_Category, Drive_Duration, Short_Description, Full_Description, Drive_Status, Donation_Goal, Subweight, Weight, Seeker_ID(PK), Funder_ID(FK))
4. Funder (Funder_ID (PK), Funder_Name, Funder_Mobile, Funder_Email, Funder_Password, Paypal_Account)
5. Donation (Donation_ID (PK), Donation_Time, Donation_Amount, Donation_Medium, Donation Time, Funder_ID(FK), Drive_ID(FK))

Binary diagrams

The diagrams below show the relationship between two entities at a time. The Binary diagrams show the communications between the entities paired and elaborates the relationship. [9]

Figure 14 Binary Diagrams

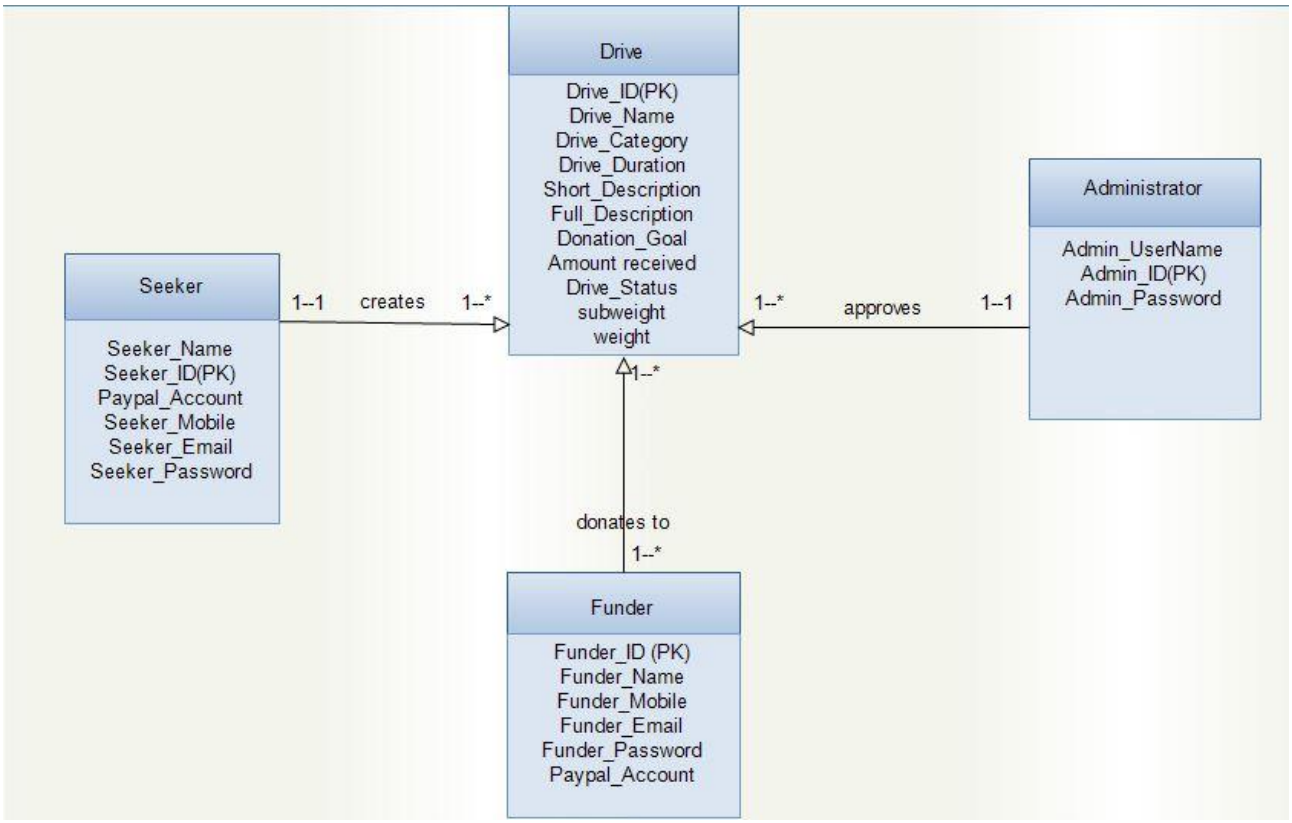


From the above binary diagrams, it can be observed that the following relationships exist between the entities.

1. The Funder can donate to one or many Drives and a drive can be donated to by one or many funders.
2. An administrator can approve one or many drives and a drive can be approved by only one administrator.
3. The Seeker can make one or many drives and a drive is made by only one Seeker.

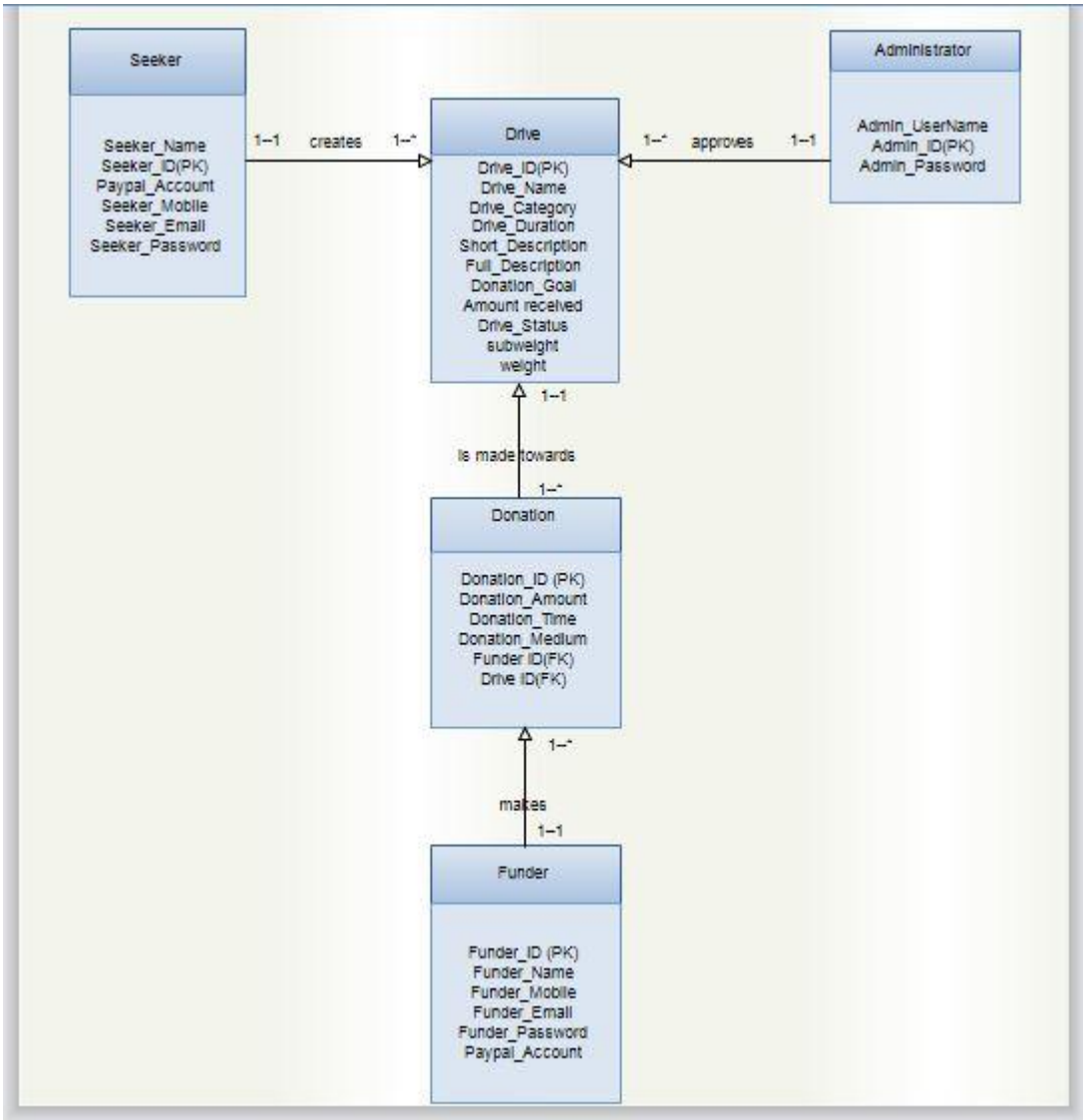
ENTITY RELATIONSHIP DIAGRAM

Figure 15 Entity Relationship Diagram



ENHANCED ENTITY RELATIONSHIP DIAGRAM

Figure 16 Enhanced Entity Relationship Diagram



Database schema

Table 3 Database schema

Entity	Attributes	Data type	Constraints
Funder	Funder_ID (PK)	Int (8)	Not Null, Auto Increment
	Funder_Name	Varchar (20)	Not Null
	Funder_Mobile	Varchar (15)	Not Null
	Funder_Email	Varchar (20)	Not Null
	Funder_Password	Varchar (20)	Not Null

	Paypal_Account	Varchar (20)	Not Null
Drive	Drive_ID(PK)	Int (11)	Not Null, Auto increment
	Drive_Name	Varchar (15)	Not Null
	Drive_Category	Varchar (11)	Not Null
	Drive_Duration	Time /date	Not Null
	Short_Description	Varchar (100)	Not Null
	Full_Description	Varchar (300)	Not Null
	Drive_Status	Varchar (11)	Not Null
	Donation_Goal	Int (11)	Not Null
	Subweight	Int (11)	Not Null
	Weight	Int (11)	Not Null
Seeker	Seeker_Name	Varchar (15)	Not Null
	Seeker_ID(PK)	Int (11)	Not Null, Auto Increment
	Paypal_Account	Varchar (20)	Not Null
	Seeker_Mobile	Varchar (15)	Not Null
	Seeker_Email	Int (20)	Not Null
	Seeker_Password	Varchar (200)	Not Null
Donation	Donation_ID (PK)	Int (11)	Auto increment, Not Null
	Donation_Time	Time / date	Not Null
	Donation_Amount	Int (11)	Not Null
	Donation_Medium	Varchar (20)	Not Null
	Donation Time	Timestamp	Not Null
Administrator	Admin_ID(PK)	Int (11)	Auto increment, Not Null
	Admin_Name	Varchar 15)	Not Null
	Admin_Password	Varchar (20)	Not Null

4.1.6.2 Data Dictionary

The data dictionary below shows the data entities, which are to be used in the database. It summaries the ERD entity attributes showing their names and description. [10]

Table 4 Data Dictionary

Attribute	**Description**
Admin_ID	It is a number which uniquely identifies the administrator.
Admin_Name	It the user name of the administrator.
Full_Description	It describes the drive in full or detail.
Short_Description	It describes the drive in brief.
Seeker	It identifies the user who made the drive by using their username.
Donation_Amount	It shows the amount which is donated by the funder.
Donation_Medium	It shows the means of payment or donation.
Drive_ID	This refers to the unique identification given to a specific drive.
Drive_Name	It is the name the seeker gives top his /her drive
Drive_Percentage_Funded	It is the percentage of the cause goal that has been achieved.
Drive_Category	It is the categorization of the drive which was created.
Drive_Duration	This is the time the seeker wants the drive to run.
Donation_Goal	This refers to the amount aimed to be collected for the drive
End_Date	This refers to the time the drive was made or created or ends.
Donation_ID	This uniquely identifies the specific donation
Time_Stamp	This refers to the time in which the donation was made.
Funder_Mobile	This refers to the personal phone number of the funder or Seeker.
Seeker_Mobile	This refers to the personal phone number of the seeker.
Funder_Password	This is the password to the funder.
Seeker_Password	This is the password to the Seeker.
Funder_Email	This is the email of the funder.
Seeker_Email	This is the email of the seeker
Subweight	This is the evaluated weight the system creates and lets admin adjust.
Weight	This is the evaluated weight the system creates after adding the admin weight and subtracting the days left.
Drive_Status	This is the drive status the drive has (approved, pending, declined)
Paypal_Account	This refers to the business or user account of paypal

4.1.7 GUI Design

The login page asks to input the username and the password enable the user login. If the user is an administrator the user name is **admin** and the password is specific to the team members that built the system.

The registration page enables a user to register their user name and password also enabling one to re-enter the password to enable consistency with an authentic password. The user forms are also validated to enable the user to only put in essential validated information.

On the profile page when creating a drive, the user has an alternative to submit an image into the database.

To elaborate more about the specific drives, the system also offers the user creating a drive to upload a video of their drive or project.

The system generates reports that show the donations that have been made to the specific drives. The amount of money that has been contributed to the specific drives.

The information got from the registration page is used as in put to the login page. The user name one uses to login is got from the registered information which is stored in the database.

4.1.8 External Interfaces

The Application Programming interface where we are integrating with the pay pal services so as to access all the methods necessary. We are using a Pay Pal developer sandbox which provides us with a platform to test transactions without using real money. It is a virtual testing environment that mimics the live Pay Pal production environment.

The Escrow holding virtual account. Each drive has a unique ID and each donation has a unique ID. All the money sent is stored on this Virtual Account and it is split up according to the unique drive IDs.

BantuFund uses MySQL version 5.6.17, Apache version 2.4.9 and PHP version 5.5.12 that can be run on any browser of any Operating System.

The external communicating interface that is the email service that we use to send the notifications to the Seekers for funds and the funders.

The user browsers that the clients will be using to access the system to send requests to the servers and get the responses.

Electronic forms are used to gather details about the financial Seekers and funders like email address, telephone number, user names and other information about their drives.

4.2 System Implementation

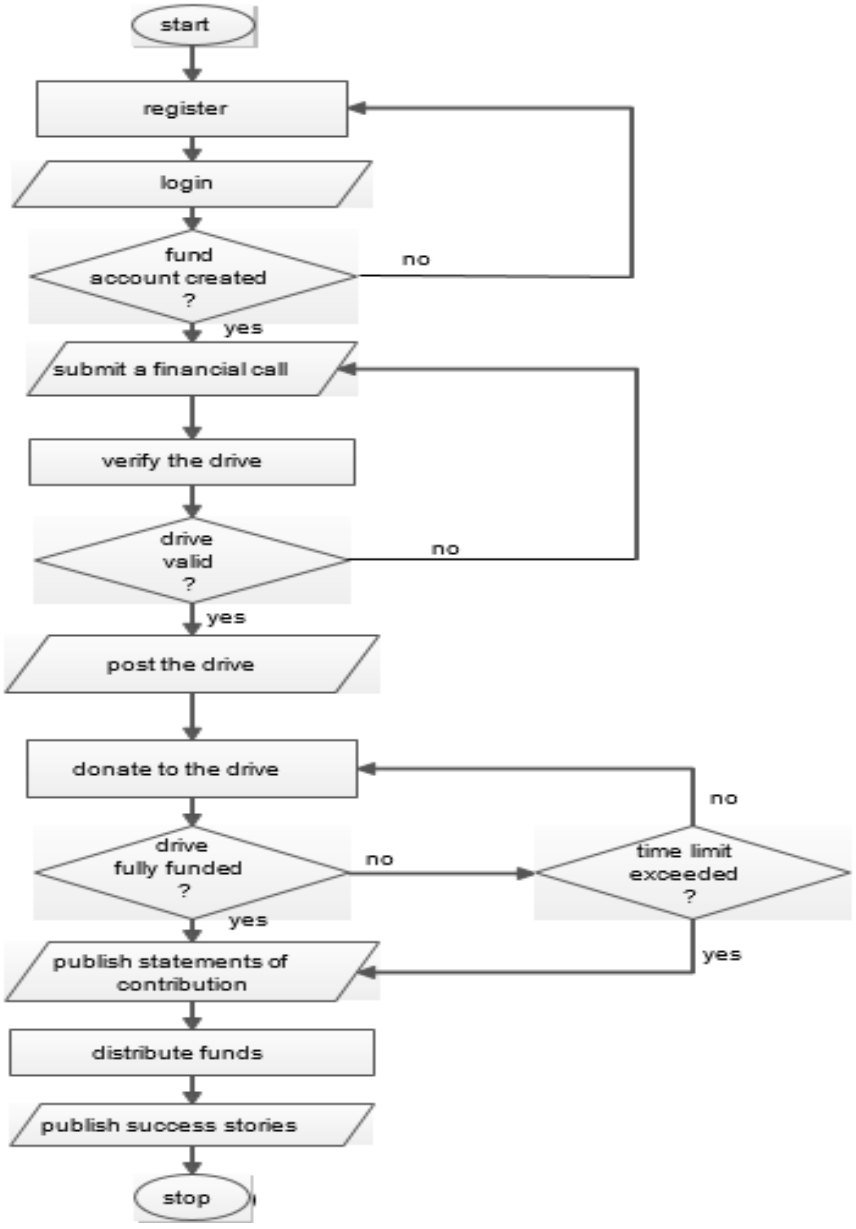
Here, we went through the steps of moving an idea from a concept into reality.

4.2.1 Component Design

In this section, we take a closer look at what each component of the **Bantu Fund** e-portal system does in a more systematic way to get a proper understanding of the high-level system architecture.

The Flow Chart Showing the Algorithm for Each of the Functions Performed by the System Components

Figure 17 Flow Chart



The Components of the System Architecture and What Functions They Specifically Perform

TIERS

Presentation Tier

In this architecture, the Presentation Tier is responsible for data collection and data presentation but does not control the business rules or data storage

Business Tier

The Business Tier is responsible for the implementation of the Business Rules of the system. This tier is used to manage the system objects and their interactions with the Data Tier. The Business Tier is supported by a set of software components that provide object access, security, and event delivery to the Presentation Tier.

Data Tier

The Data Tier is responsible for the storage of data into a persistent store. It provides a Persistence Service that gives the Middle Layer necessary data manipulation functions while shielding it from the specific implementation details of the persistent store.

MODULES

Registration Module

The registration module is responsible for handling registration of new users into the system

Criteria Verification Module

The criteria verification module allows the site administrator to check the legitimacy and legality of drive and the Seeker before uploading for public view.

Posting Module

The posting module is where the Seeker submits his drive and the site administrator approves or rejects it.

Authentication Module

This module is where the system performs checks to verify whether user is registered.

Access Control

The Access Control provides basic level of security whereby a user cannot edit drives that they did not create.

Fund Manager Module

This module is responsible for handling the donations i.e. receiving and distributing it to respective drives. It works hand in hand with the Holding account (Escrow).

Report Generator Module

The report generator module provides a service for creating reports and handling uploaded reports from the Seekers.

4.2.2 Tools and Technologies

The application framework that is used in the development of the system is web based. This framework was used in the development stage of the development cycle.

The Bootstrap framework is a sleek, intuitive and powerful mobile-first front-end framework for faster and easier web development. It uses CSS, HTML and JavaScript.

Different web services are used to access the system online. These services help in accessing the system interfaces and entering data into the database. However, one requires internet to access these services.

The technologies/programming tools that were used include MYSQL, CSS, JavaScript, jQuery, Ajax, PHP, and HTML.

- **MySQL**

This is a server-based database programming tool that was used to implement database development. It supports standard SQL which was used to create the database, tables together with their entities and constraints as well as populating the tables. MySQL is a free, fast, reliable and open source relational database management system.

- **HTML**

This was used to design interfaces and different graphical components helped to support interaction between users and the system. HTML is easy to use since it has loose syntax and it is supported almost by every browser, if not all browsers.

- **PHP**

This was used to connect or link the interfaces to the database and for security purposes to prevent unauthorized access to the system. PHP is executed on the server and supports many database management systems. It is fast, secure, stable, open source and easy to use.

- **CSS (Cascading Style Sheets)**

This is a style sheet language that was used to describe the presentation semantics (the general look and feel) of documents written in mark-up language.

- **Ajax**

It presents the option of updating sections or even all of a webpage with new data without the need to request and render the entire page from the server. It is best suited for uploading data that changes while the page may be open.

- **jQuery**

jQuery provides support of clear well-defined JavaScript libraries. jQuery is a fast and concise JavaScript Library. jQuery simplifies HTML document traversing, event handling, animating, and Ajax interactions for rapid web development. It supports DOM manipulation and Event handling.

4.2.3 Security Module

We did input validation on the forms dealing with user input to deal with user input using techniques such as indirect selection (a drop-down list) so as to limit the user input preventing them from directly entering input. The user input in such cases is not directly used by the system and does not get to taint other data White listing of all the valid patterns; here input is rejected unless it matches the listed valid patterns.

For black listing, all invalid patterns are listed and the input is accepted unless it matches those patterns. It is the least secure given the case that the we overlooked some dangerous patterns. It is a big risk.

It is a more secure approach than Black listing. That is why we chose to implement it.

Input validation was done so as to prevent attacks like SQL injection, PHP injection and HTML code injection attacks.

4.2.4 Use Case Implementation

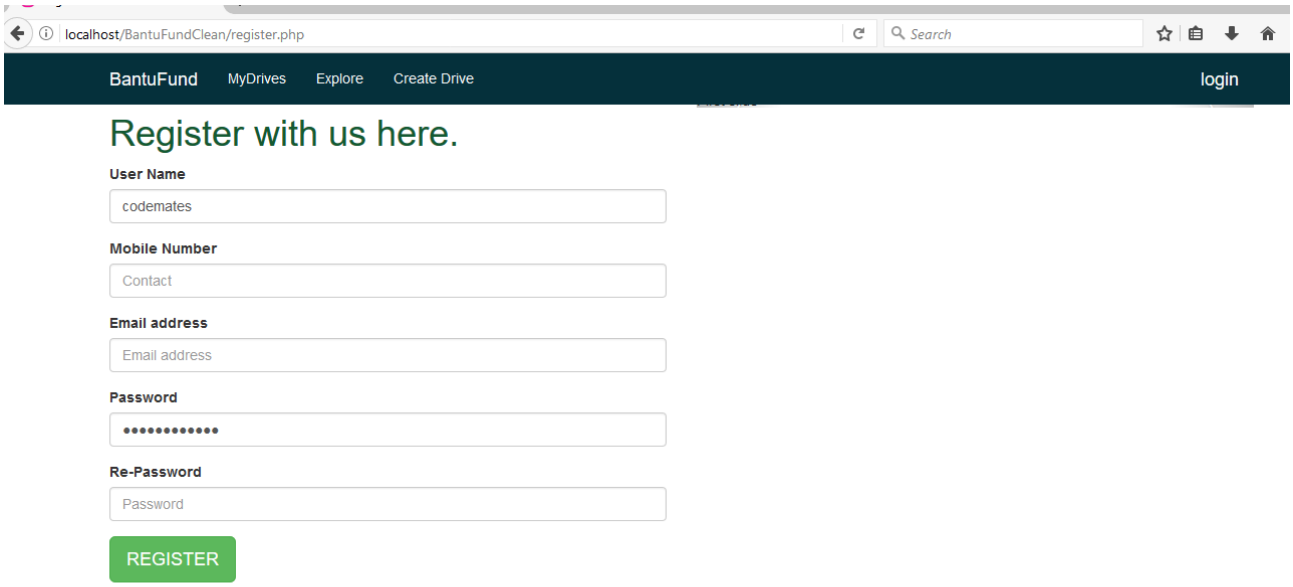
Implementation was done as per the different use cases in our use case diagram as our main functionalities for the initial prototype.

The main use cases are Register, Login, Create profile, Create drive, Donate Funds, Approve drive and Upload Project Report.

Register use case

People who request to register enter name, contact information and user credentials that are validated. This logs someone in to the Explore page.

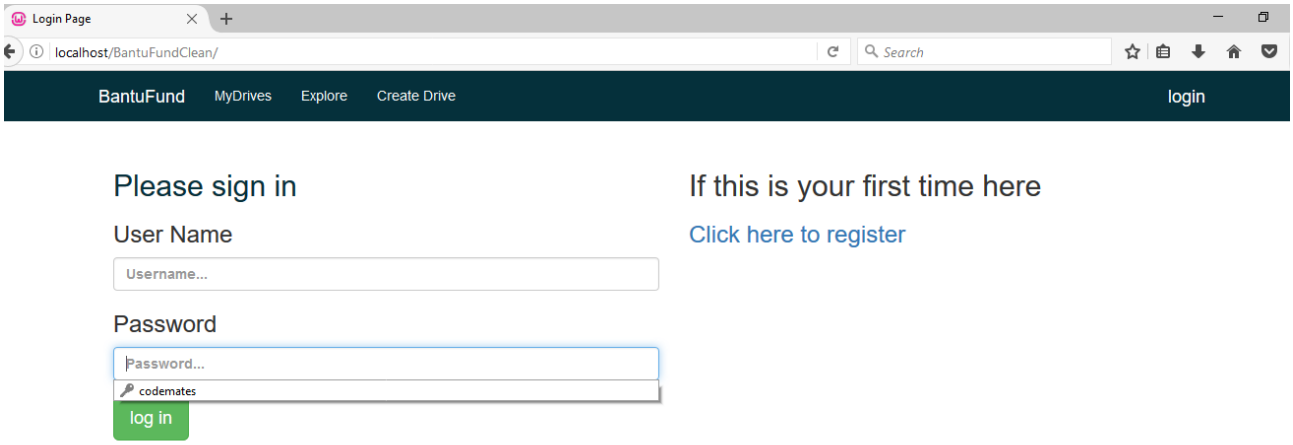
Figure 18 Register Screenshot



Login Use Case

It is implemented on the page below. It is in a form field. It accepts the two inputs user name and password. These user credentials are validated so as to access the system.

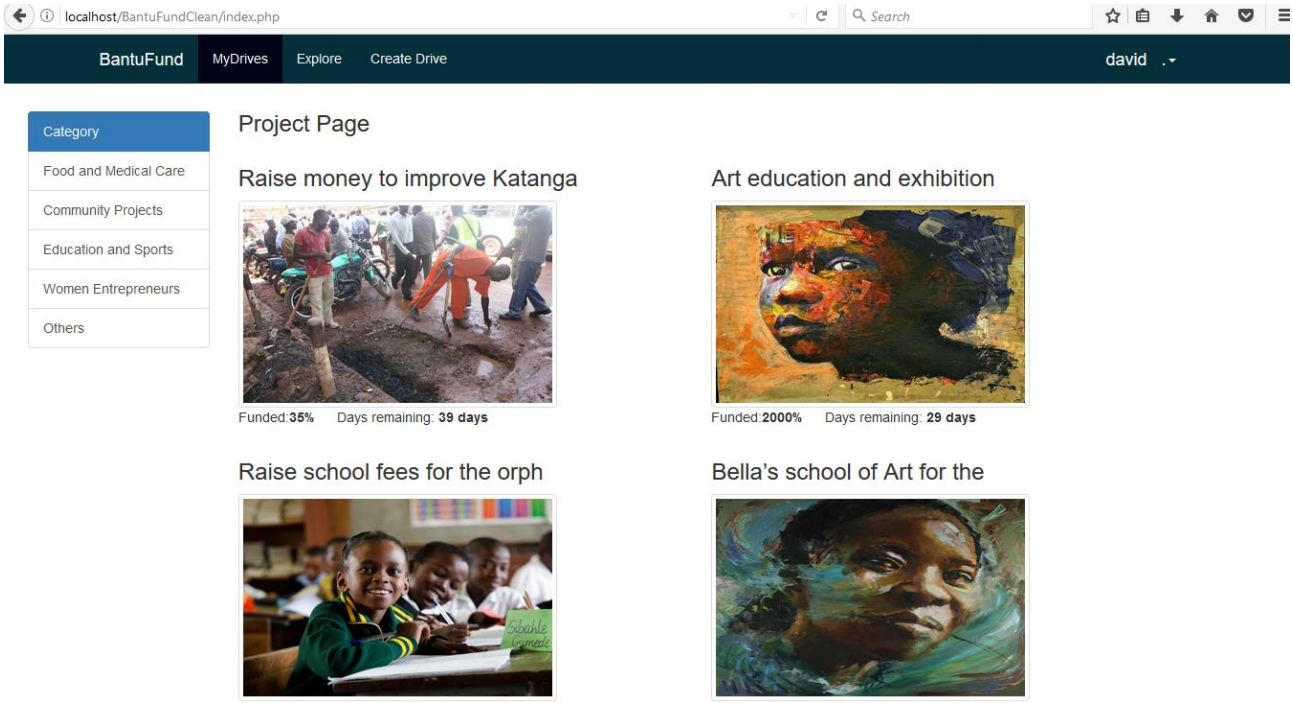
Figure 19 Login Screenshot



Create Profile Use Case

After signing up or logging in, the user goes to a page that displays a list of the drives that user has created over time are shown. It is the MYDRIVES page.

Figure 20 My Drives page



Search Drives Use Case

A user is able to search by drive name in order to access a specific drive and access it's details. The system user can also search by Category.

Figure 21 Explore Page Search Drives Use Case

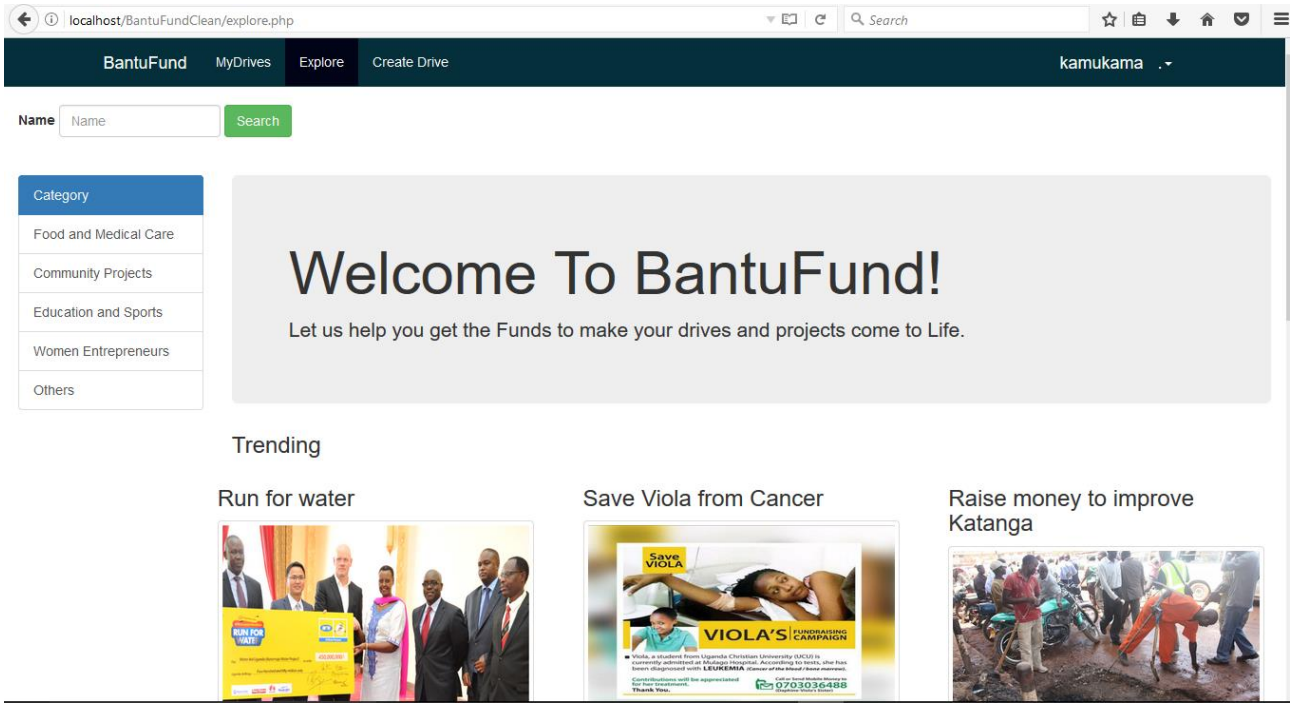
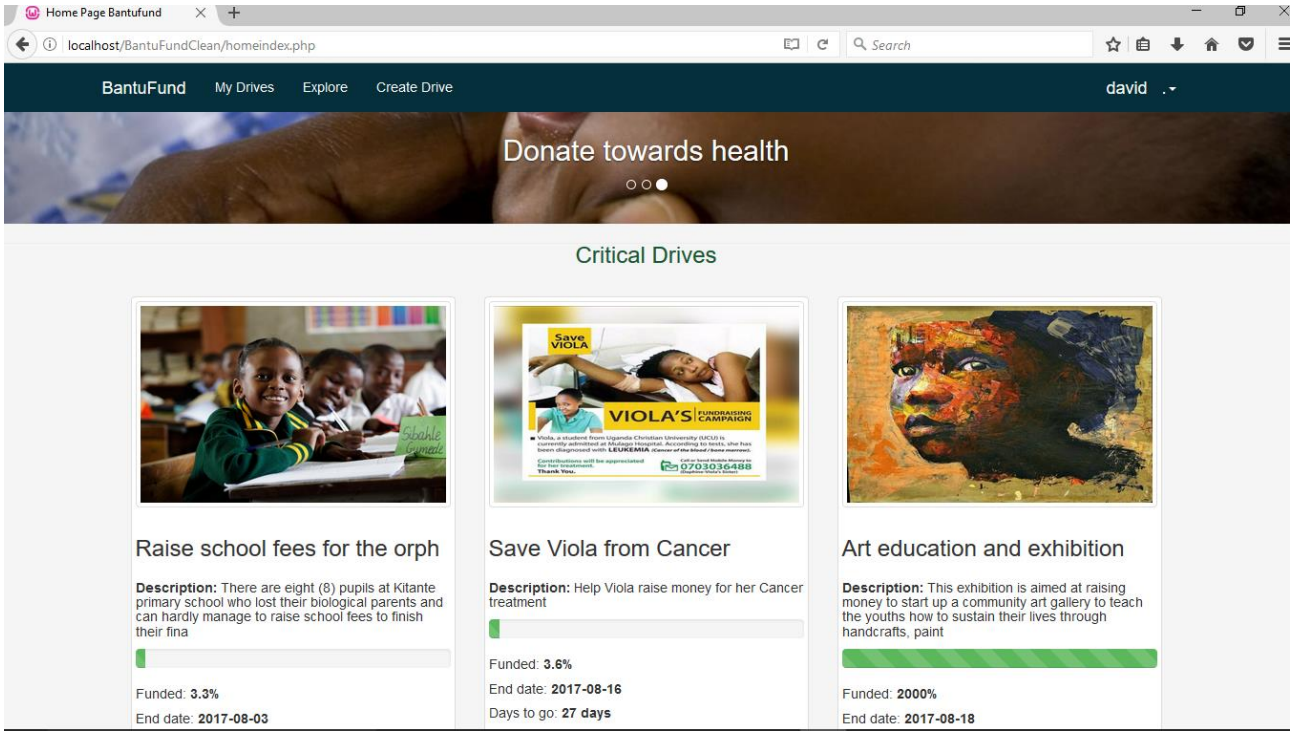


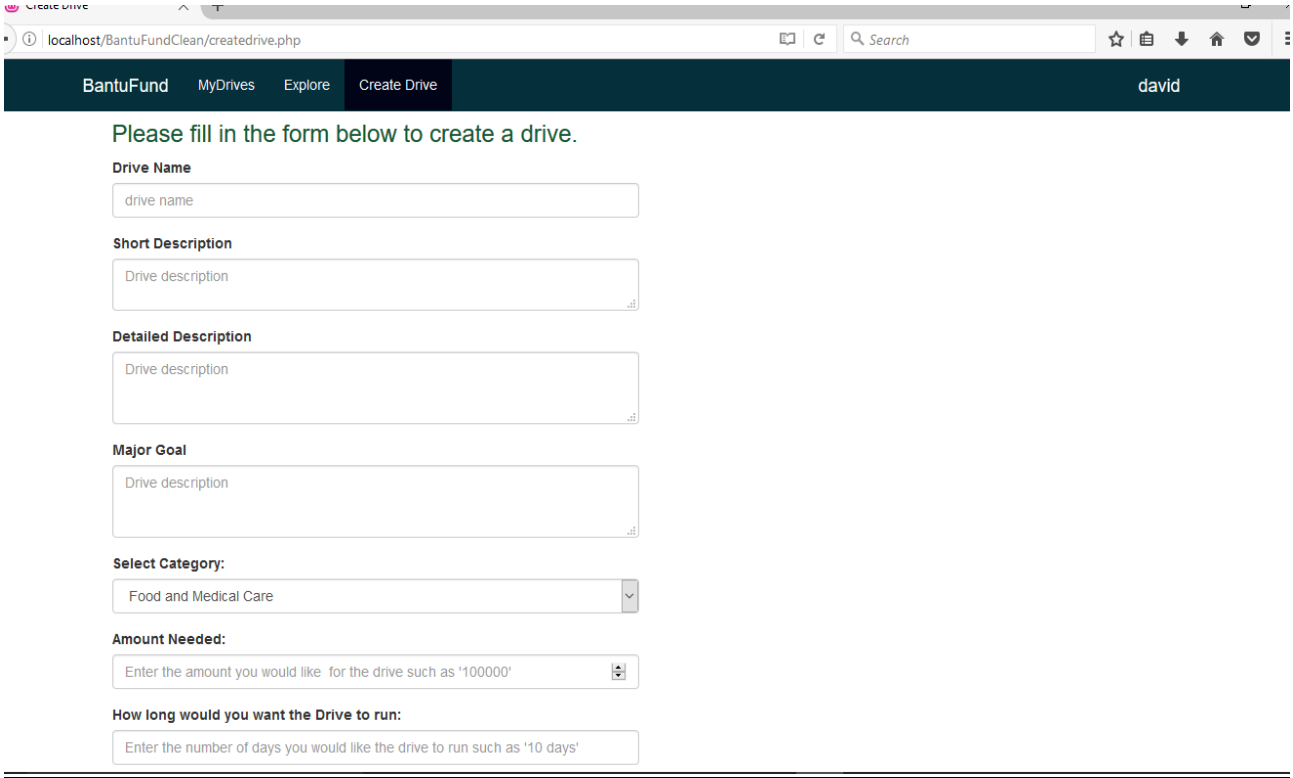
Figure 22 Home Page Screenshot



Create Drive Use Case

There is the create drive form. Using the create drive form, one gives it a name, description, selects a category, inputs the amount of money needed and the duration for which the drive should last

Figure 23 Create Drive Screenshot



Donate Funds Use Case

There is a projects page showing categories and lists of projects based on them. When a funder has selected an appropriate drive, it leads to a Donation page which has a progress bar at the end showing a drive's progress. On the donation page, one is able to enter their name, mobile number, pin and the amount of money they are willing to donate.

There is also the option to donate through Pay Pal.

Figure 24 Donate Funds Screenshot

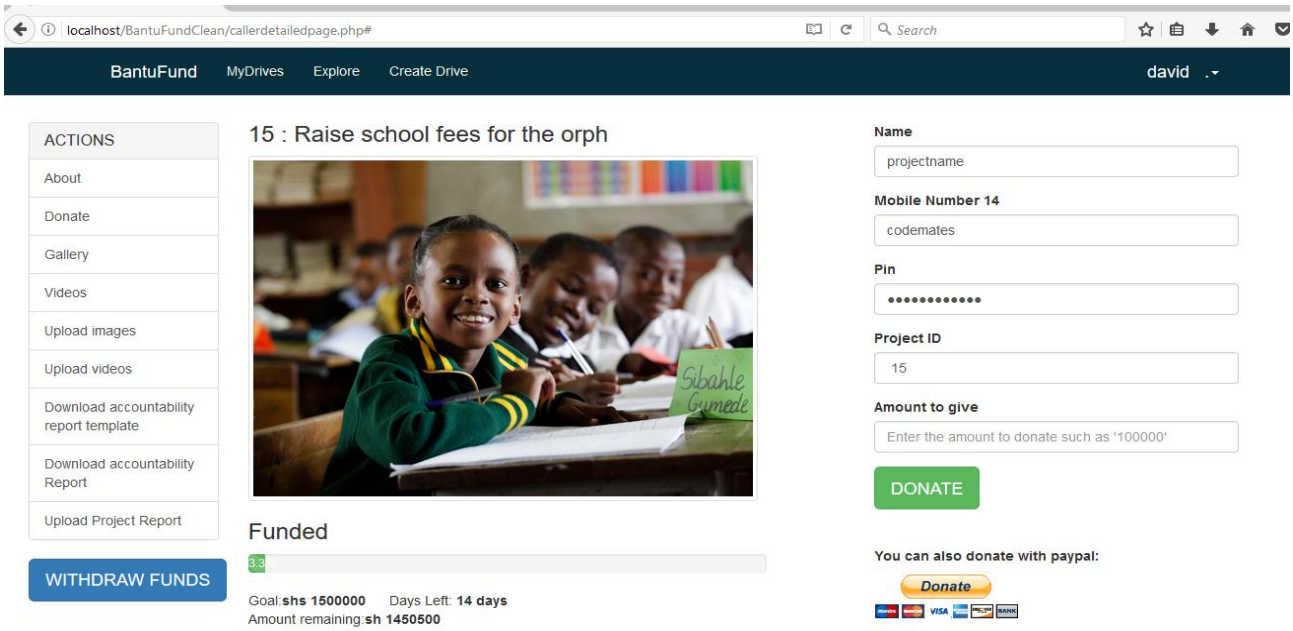


Figure 25 PayPal Donation Form Page

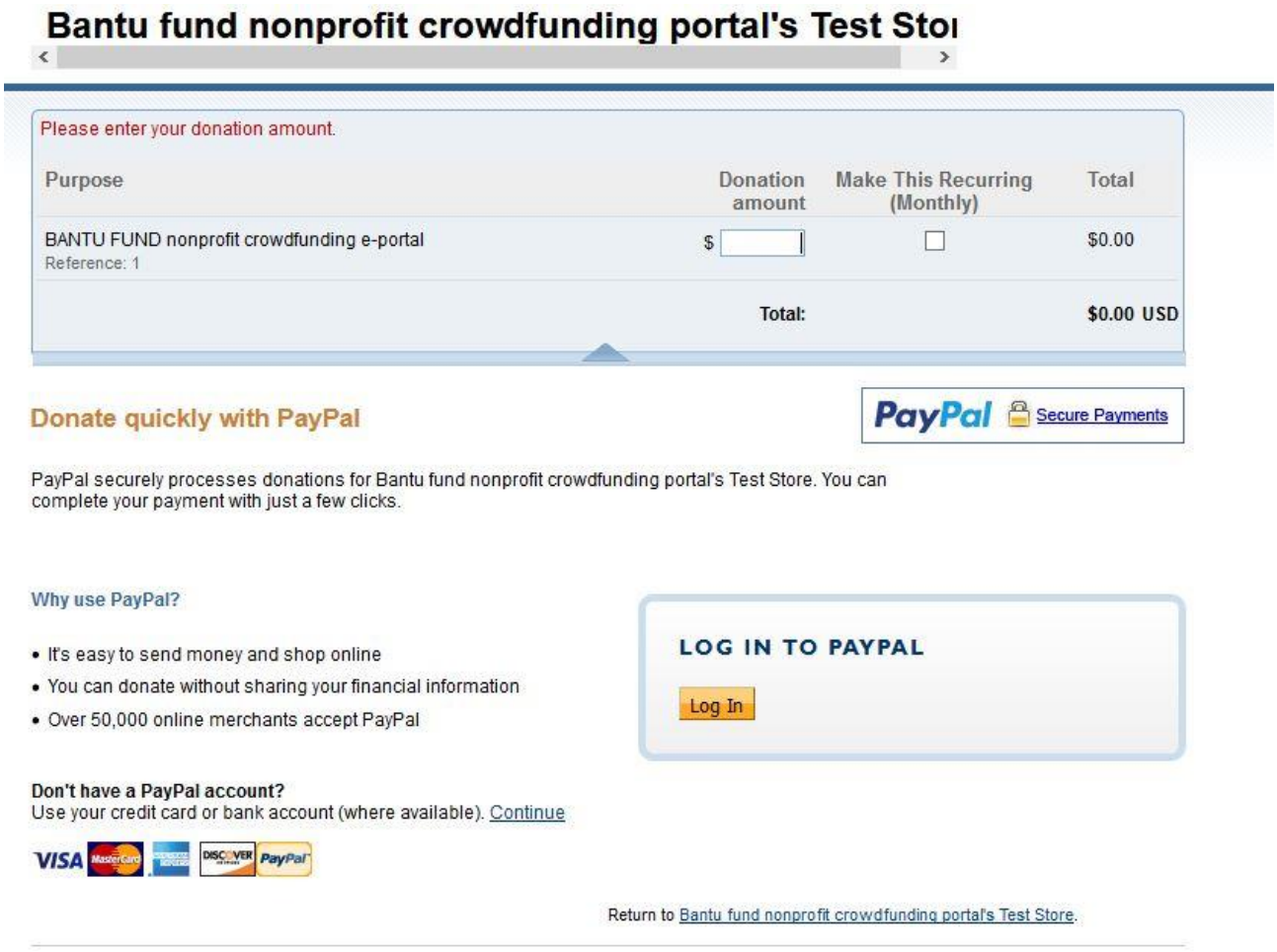


Figure 26 PayPal login Page

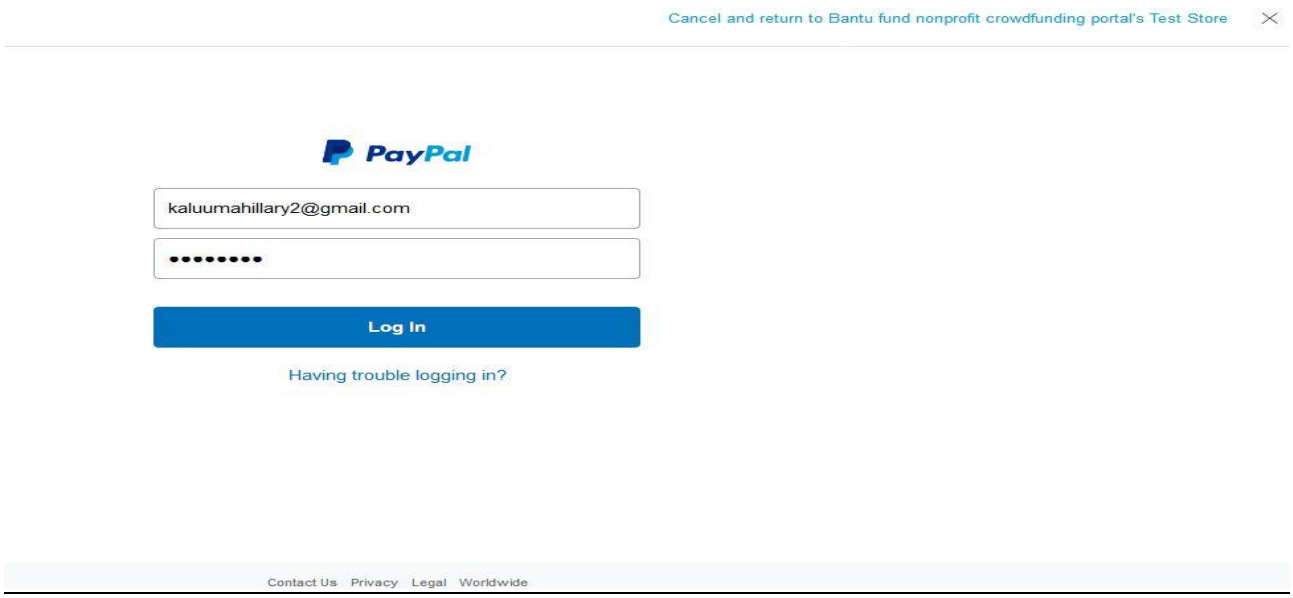
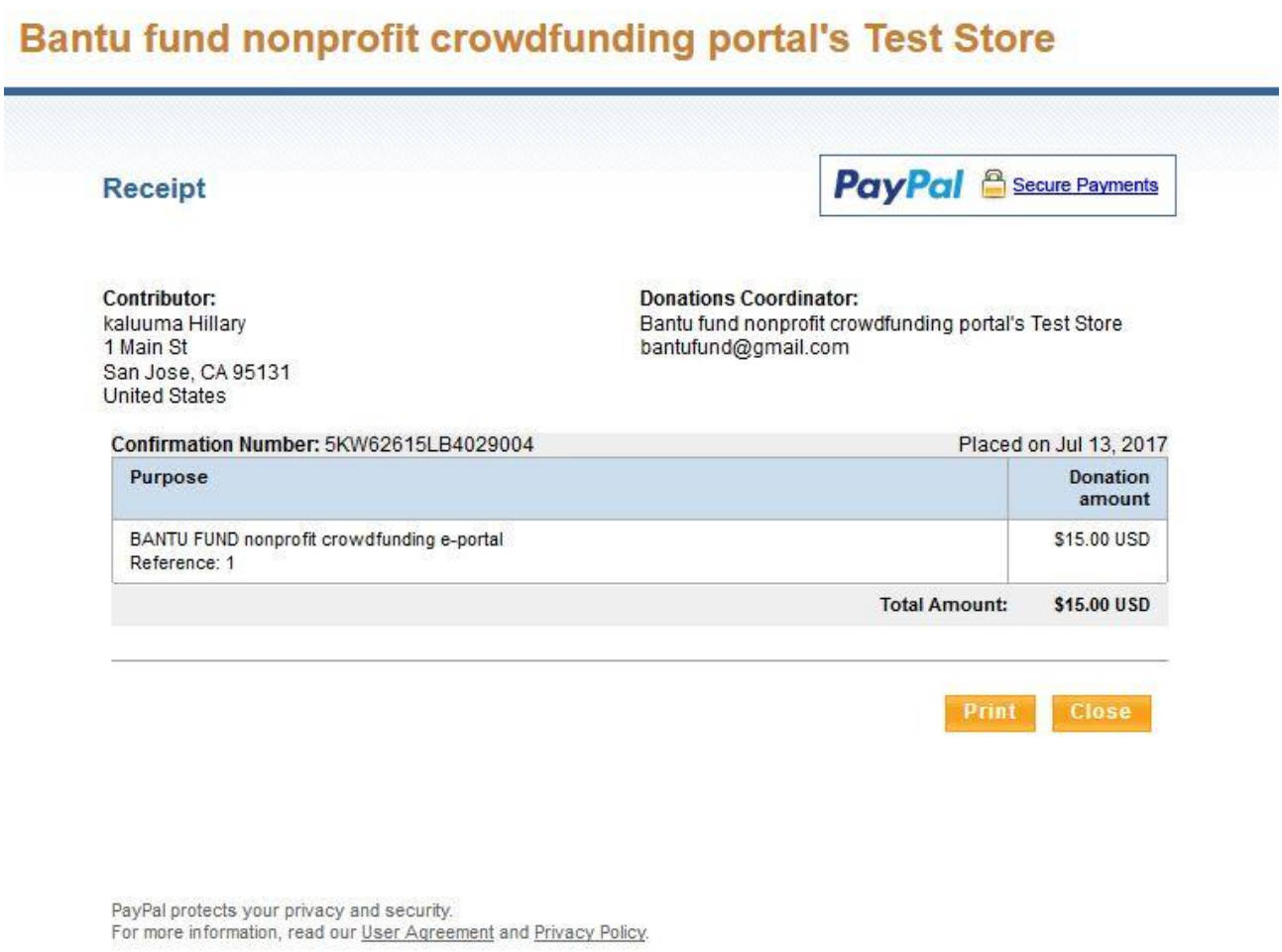


Figure 27 PayPal Donation Receipt

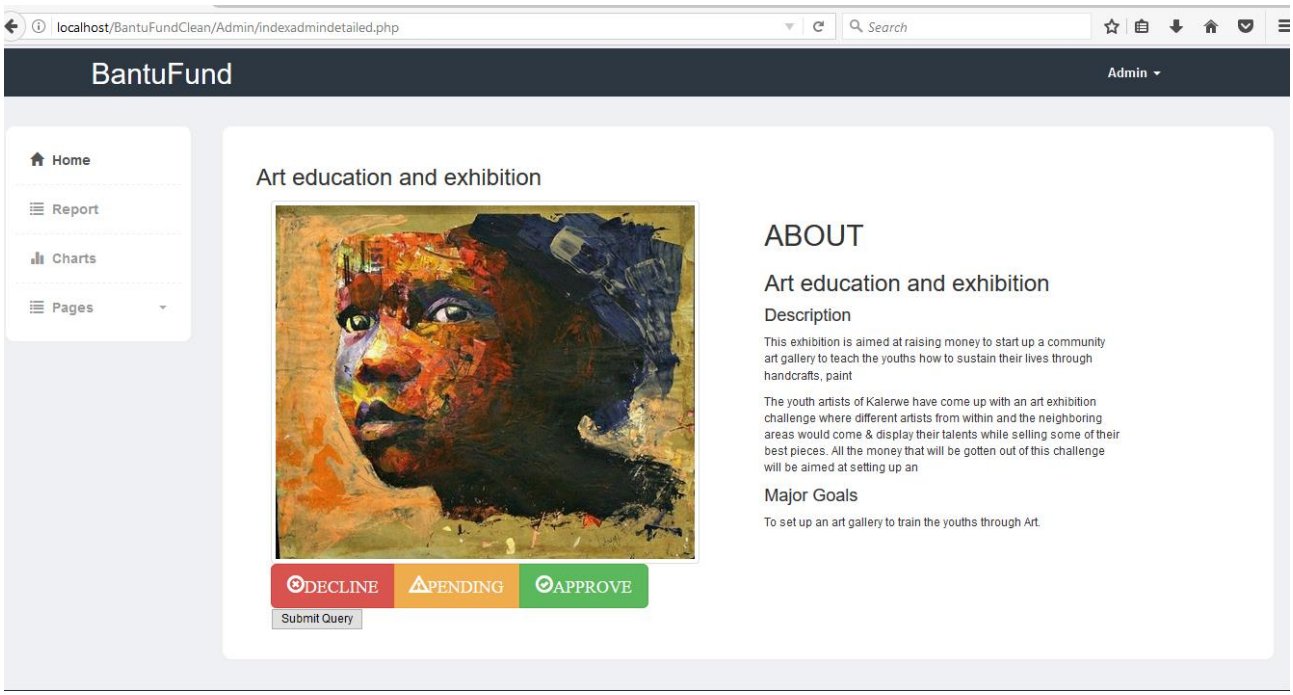


Approve Drive Use Case

This is an admin page where the administrator vets each drive, checking for their authenticity and either approves them, leaves them pending or denies them.

When the Admin logs in, there is a page where all projects for approval are displayed. When clicked on, it goes to a page offering a short description of the drive and the admin is able to choose whether to approve, leave pending or decline the drive.

Figure 28 Approve Drives Screenshot



When approving the drive, the Admin assigns a rank or weight ranging from Very Critical, Critical, Essential, Less Essential to Luxury in order of decreasing importance. This is so that on the home page, the most critical drives appear first.

The system has its own weights it assigns and it does this automatically based on an evaluation algorithm that looks at the index based on the attributes amount time and different categories having different weights. For instance, drive requiring less time are more argent hence prioritized and the category health is a life and death matter compared to education and sports scholarships. We neatly factored these different attributes into an algorithm which expresses the crucialness different drives have over their peers.

The database stores two values from the algorithm and those are the weight value and the sub weight. On the creation of the drive the insertdrive.php file calculates the weight of the drive from the category and the donation amount and inserts the total in the database as sub weight and also inserts the same value for the weight.

On loading the home page, the days to go for the drive are calculated and subtracted from the value of the sub weight retrieved from the database. The result is then submitted to the database as the new value for the weight.

The home page loads the drives from the database in order of weight in descending order and displays them as the critical drives and lists the leading six in descending order.

The most recent section of the home page loads the drives in the descending order in order by ID and only displays three but can be adjusted basing on client needs.

System Quantitative Analysis

Table 5 Quantitative Analysis of Categories

Category	**Food and Medical Care**	**Community Projects**	**Education and Sports**	**Women Entrepreneurs**	**Others**
Weight	5	4	3	2	1

Table 6 Weights assigned to amount required

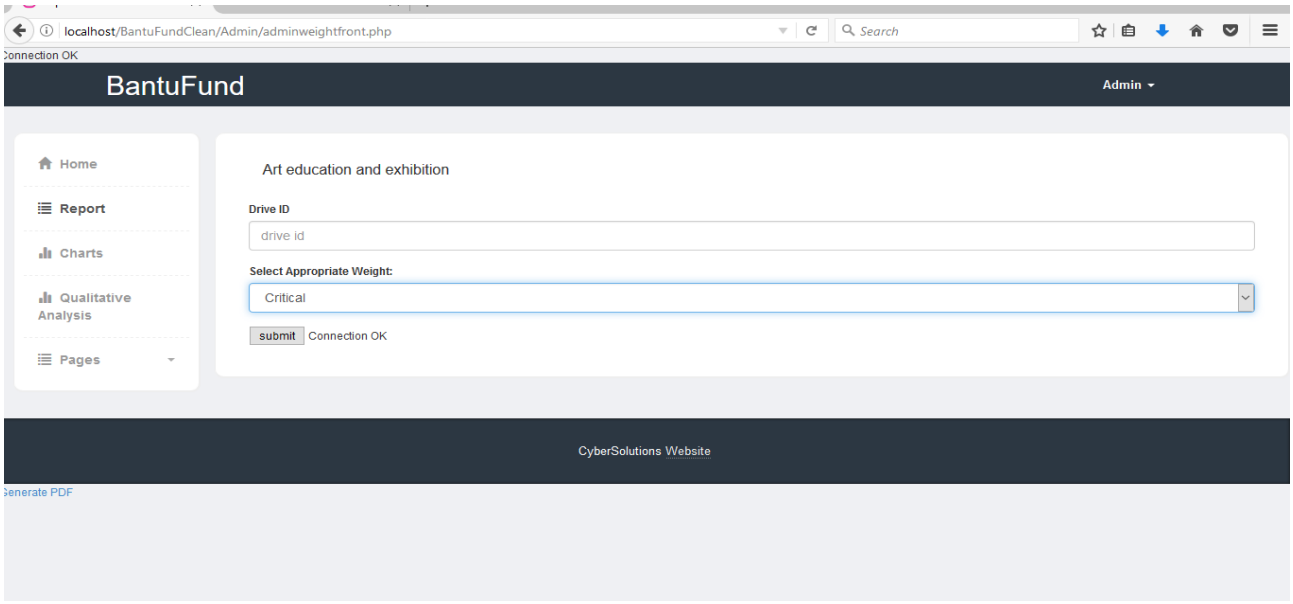
Amount	<=200000	<=500000	<=1000000	<=2000000	Others
Weight	5	4	3	2	1

Admin Qualitative Analysis

Table 7 Qualitative Analysis by Admin

Admin	Very Critical	Critical	Essential	Less Essential	Luxury
Weight	5	4	3	2	1

Figure 29 Assign Drive Weight Screenshot

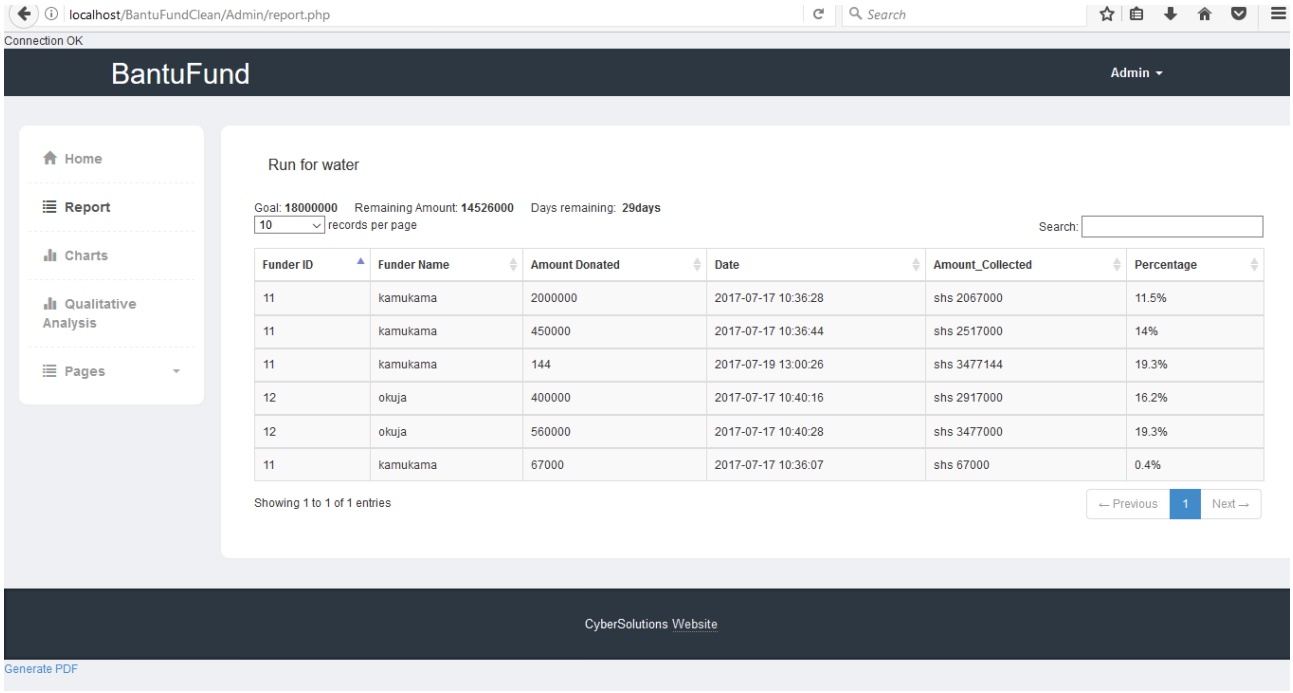


Upload project Reports Use Case

The system generates reports for each donation showing the donors, time, donation amount, percentage increased and does statistics using this data displaying using a line graph.

There is a provision for Seekers to download a word document template with instructions on what to include in the project report that they submit after getting the funding, an accountability report that explains how they used the money. (See Appendix E: Accountability Report). The edited, printed, signed and scanned report is then uploaded by the Seeker.

Figure 30 System Report Screenshot of Donations to a Drive



Chapter 5

Presentation and Discussion of results

This section discusses how we met our requirements of the systems, presenting our results and discussing them.

The BantuFund E-Portal system provides a simple easy to use interface where the navigation through the pages is quite simple for the Seekers for funding and donors.
We conducted a survey with a variety of different people from different walks of life. We had them navigate through the system and answer a few questions on the questionnaire about system complexity, ease of navigation and general understanding the findings are discussed below;

5.1 Presentation

5.1.1 Description of what we have built

We have built Bantu Fund, a Crowd-Funding E-Portal System that is a platform which helps the Seekers for funds post their drives, ventures or causes and get funded by large number of donors in a contributive way until the project or drive is either fully funded or is beyond the funding timeline.
Bantu Fund provides a convenient way for people to receive financial assistance in form of donations from the general public and concerned members of the society.
The system is web based and has three types of users; the Fund Contributors who are providing the funds, the Seekers for Funds and the Site Administrators
Donors can fund ventures or causes they believe in by raising monetary contributions to them Pay Pal.
The stakeholders of this system include NGOs, governmental organizations, Cooperate Social Responsibility funders, philanthropists, concerned members of the society, individuals and System developers and Administrators.
The project's geographical scope was initially a prototype released in Kampala, Uganda and it will eventually spread across internationally into other East African countries.

5.1.2 Comparison with existing techniques

Many crowd funding web-portals have been set up around the world to embrace this idea of crowd funding, and these include; Kickstarter, Indiegogo, crowdraise, GoFundMe, Youcaring and many others famous web-portals.

In Uganda, the Uganda Crowd Funding Network (UCN) is the native crowd funding platform that mainly focuses on investment in small start-ups and entrepreneurial ventures.

Bantu Fund platform doesn't major in investing in startups or entrepreneurial ventures but rather funds social-community projects and issues to make a better improved community.
Bantu fund intends to raise money for genuine causes in the categories of;

- The people in a critical need of money to complete their studies and Raise fees for outstanding sports individuals that need to further their studies (Education and Sports)
- The sick in hospitals and health centers around Uganda plus those in need of relief support due to issues like famine, droughts and landslides (Medical Care and Food support).
- The community concerns such as poor roads, bridges, centers and many others (Social Community Development Projects)
- Women Entrepreneurs supporting their families and pursuing their dreams (Women Entrepreneurs).

The other way people drive these campaigns when they need money for funding is though social media campaigns for example Facebook pages and WhatsApp messages sent to large groups of people for instance the "Save Viola" campaign. Viola a student from UCU diagnosed with Leukemia. The following are the problems with such campaigns;

- The amount of money needed that is remaining is not shown dynamically, meaning people do not know the change in the amount of money needed.
- There is little trust for such things as people believe they are shams.
- There is little or no accountability provided.
- People who have no interest in donating to causes and people who may have interest but have no money are also shown these adverts. The drives do not target a specific audience of potential donors.

Unlike social media fundraising campaigns, with BantuFund only a specific audience of interested donors view these campaigns. They are targeted. This saves a lot of time, effort and money for the Seekers for funds.

5.2 Discussion of Results

Based on the analysis done on the data gathered through the requirements elicitation, the design and Implementation of the system and the testing, we realized these results;

The strength of BantuFund system banks mainly on accountability and transparency that is enhanced through report generation and the provision for focusing on what the other systems do not, the non-profit causes.

The tracking of the progress of the funded projects is done through provision of reports and updates of how their money is making a difference as proof of accountability provision. The Seekers of donations are expected to show their progress posting images and videos as visual evidence and also uploading their project reports about how they accounted for the money. They can also use this to upload thank your messages to their funders.

The system has an easy to use and simplified interface for navigation. The users get adapted to it quickly and need minimal instruction or none.

The major weakness BantuFund web-portal is facing in comparison to similar existing web-portals is less marketing of the system to the communities around.

It is brand new and hence there has to be some skepticism especially when the issue of money comes into play. The sensitive data being handled gives cause for doubt and a great deal of concern.

In addition, our system needs to work on mobile phones as both on android and windows phone application, which we haven't yet accomplished. We also have to integrate with mobile money but we are yet to do this because of the cost of paying for the mobile money integrator so as to access the mobile money APIs, but, as a future work, we plan to implement it.

Therefore, we expect BantuFund web-portal to solve for the most part the problem of the need for money to support various projects and community development drives in Uganda with the high level of transparency, and accountability hence improved economic development through holding hands and supporting one another as communities.

Chapter 6

Conclusion, Recommendation and Future works

6.1 Conclusion

The use of Bootstrap framework for styling the user interface and laying out the pages comes provides a time-saving approach to development.

The use of Ajax beautifies the User Interface through updating sections or even all of a webpage with new data without the need to request and render the entire page from the server

jQuery, the first and concise JavaScript library simplifies HTML document traversing, event handling, animating, and Ajax interactions for rapid web development.

Input validation of user input in form data gave us a practical application to how to work on security of a web system to reduce the risk of attacks and make the system more secure.

SQLite is different from SQL. It binds with more advanced PHP versions to offer more advanced functionalities.

MVC design pattern has helped with the separation of concerns during development enabling multiple views to be worked on by the different team members simultaneously. This led to simultaneous development as all project members were able to work at the same time on the models, views and controllers. Due to the separation of concerns, modifying the code to add functionalities was also simpler since there is high cohesion and low coupling between the modules hence flexibility due to few dependencies.

Proper project management and scheduling is essential to properly accomplish the milestones of the project and output essential deliverables. We put it to work and saw the amazing effects of properly timetabling our group work and the side effects when we did not.

6.2 Recommendation

Most people face difficulty coming up with money as a means of financial assistance from those around them.

People also have little trust for such ventures when they see them advertised either as social media campaigns, in newspapers or when they receive messages on their phones or get calls.

Awareness of crowd funding online, through the internet is generally low. And in Uganda, the crowdfunding websites only fund investment options. BantuFund looks into the non-profit general issues affecting society as per money raising difficulties looking into categories like Food and

Medical Care, Education and Sports, Community Development projects and Women Entrepreneurs providing them a platform to advertise their campaigns and get funding in a way that promotes transparency and accountability.
We intend to solve this problem with the BantuFund E-Portal system.

6.3 Future Works

If we had more time, we would have done more research on all fronts, gathering more data and conducting in-depth surveys.
We plan to host and deploy the system so as to have it up and running on the Internet.
We would also have integrated the web-application system with a cross-platform mobile phone application (I-phone, Android and Windows) because, let's face it; mobile is the new world order. We would also have come up with more prototypes following an agile approach using Rapid Application Development through Agile so as to improve the system functionality and usability. We would also have done more testing of the modules (more user testing, unit testing, integration testing, validation testing, system testing and acceptance testing).

We are going to integrate the system with mobile money payment systems integrating with the mobile money Application Programming Interface so as to enable funding to be quite simpler. Currently, we are doing a simulation for the mobile money usage.

We are going to implement an SMS gateway for notifications through use of a dongle for clients that want to be reached by phone instead of through e-mail. This serves as an external communication interface.
We plan on implementing Email functionality services to send notifications to different users for example automatic notifications when the drive has been successfully created, approved by the Administrator, when funding reaches quarterly levels for example 25%, 50%, 70% and 100% money collected and also when the number of days left is 20, 5, 3, 2 and 1.

We also have plans of expanding across borders. Our initial prototype launch plans are just Kampala, Uganda but we intend to expand across major towns like Mukono, Entebbe, Jinja, Mbarara, Fort Portal and Gulu then eventually cross the border and reach out to Kenya and other countries in East Africa.

We intend to implement a chat room forum for discussion so that different people can comment about different drives that are being funded, exposing them in case people got money but are not using it for what we claimed.

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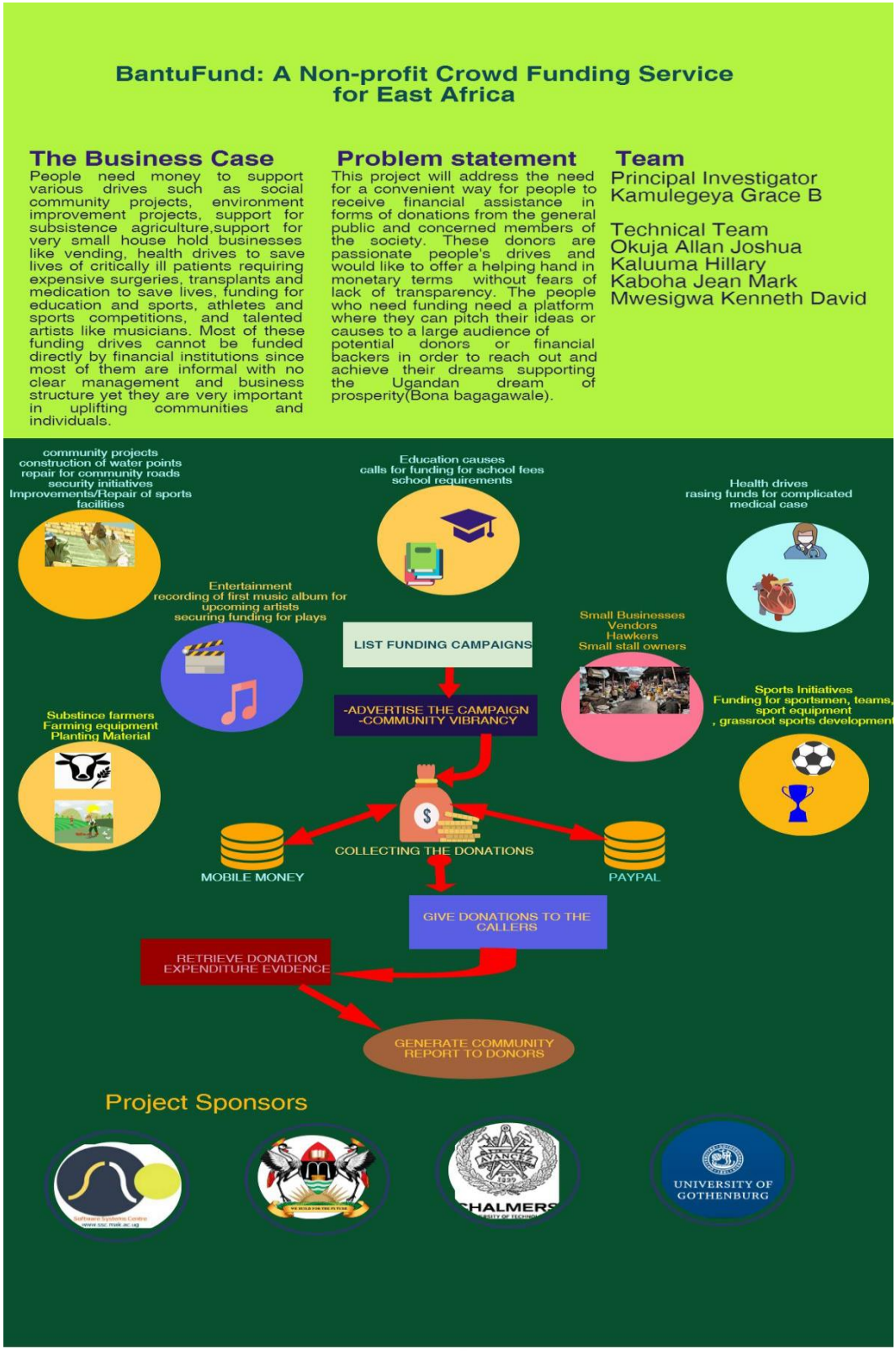
Appendices

Appendix A: Poster



Appendix B: Interview Guide

1. How relevant is your concern – really? Are you certain that people will be interested in it?
2. Why is your product, service or venture destined to become a success – what value does it offer the community?
3. What differentiates your project from existing ones, or alternatives that have come before?
4. Can you express your drive simply and at the same time get people excited about it? If not, it may be that the concern is not very compelling, or that you may not be the right person to communicate or present it.
5. Do you have something tangible to show when presenting your venture – a video or photo aspect of your project that can help other people visualize it?
6. How well do you know and understand your target audience?
7. Do you have confidence in your ability to reach out and connect with potential backers?
8. Have you calculated just how much money you need – *truly* need – to get your concern or project off the ground?
9. Have you factored in all financial variables, including the costs of reward fulfillment and payments to the crowd funding service?
10. Have you been cautious enough to build a budget that allows for breathing room in certain areas, and factors in conservative projections?
11. Are you positive that you can fulfill all your promises, including completing the project in the allotted timeframe and delivering on all features and content covered in your pitch?
12. Do you have some great rewards in mind to give backers and fans incentive to donate? Have you mapped out your reward tiers? How will you offer these rewards?
13. What specific or unique rewards will you use to get people talking? Can you create any singular ones that can be utilized in social media campaigns or for press outreach?
14. Do you understand all the personal and professional demands that the process of running a crowd funding campaign demands from creators? Are you prepared to put 110% effort into making your crowd funding project a success?
15. What promotional campaign activities do you plan to pursue leading up to and during launch? How will you keep the buzz going after your crowd funding project debuts?
16. Are you ready and able to take a big personal risk of either success or failure?
17. Do you – and at least a few other people you can look to for support, whether financial, emotional or otherwise – fully believe in your project?
18. Who can you turn to for help, whether in terms of assistance with asset creation, financial backing, raising awareness or just help spreading the word?

Appendix C: Questionnaire

Crowd funding is the practice of funding a venture or community based projects by raising many small amounts of money from a large number of people or donors, typically via the Internet.

Qn1. Have you ever heard of crowd funding?

☐ Yes ☐ No

Qn2. Which of these venture categories would you choose to fund?

☐ Education and Sports ☐ Community-based projects
☐ ICT projects ☐ Health
☐ Entrepreneurship

Qn3. Which of these venture categories would you create a drive in to call for funds?

☐ Education and Sports ☐ Community-based projects
☐ ICT projects ☐ Health
☐ Entrepreneurship

Qn4. What persuaded you to participate in crowd funding a project?

☐ Personal involvement (e.g. knew the person you were funding personally)
☐ Promotional material (e.g. videos, posts, etc.)
☐ Liked the product
☐ Other people recommending the idea (e.g. sharing it online)
☐ Celebrity endorsements

Other, please specify: ☐

Qn5. Would you be willing to help crowd fund a project?

Please assume that the project being crowd funded is something you are personally interested in.

☐ Yes
☐ No
☐ Maybe

Qn6. If you said that you would not consider crowd funding a project even if the project was doing something which you were interested in. Why not?

☐ I don't trust crowd funders
☐ I don't have enough money to help crowd fund

Other, please specify: ☐

Q7. Please tick to rank on a scale of 1 – 10, how important each of the following factors would be to you when making a decision whether to crowd fund a project or not.

	1-Not important at all	2	3	4	5	6	7	8	9	10-Extremely important
Rewards for backers										
The crowd funding looking like it would be a success										
Visual design										

Videos/photos showing you examples of the project										
There being an existing prototype of the project										

Qn11.Please tick to rank on a scale of 1 - 10 how important each of the following factors would be to you when making a decision whether to crowd fund a project or not.

	1-Not important at all	2	3	4	5	6	7	8	9	10-Extreamly important
Rewards for backers										
The crowd funding looking like it would be a success										
Visual design										
Videos/photos showing you examples of the project										
There being an existing prototype of the project										

Qn12. What do you feel would be most important to you if you were considering supporting a project?

- ☐ A reward for your support
- ☐ The visual design of the marketing material
- ☐ Video marketing material
- ☐ An existing prototype of the product
- ☐ In depth information about the project
- ☐ The creators having a good reputation
- ☐ Regular updates on progress from creators
- ☐ The idea itself

Other, please specify: ☐

Appendix D: Focus Group Discussion Template

Translator Notes

- Please translate everything said by the participants verbatim. I want to hear exactly what they say; even if you do not agree with it, please continue to say exactly what they say.

- I would like to hear from each participant. Please tell them that, while I will listen to those who are more eager to speak than others, it is important that I hear from everyone in the group.

- Please remain serious and neutral when translating; do not include personal views in the translations.

- If the question I am asking is in any way unclear, please ask for clarification right away. I want to ensure each question is posed to the participants in a way that is true its intent.

Appendix E: Accountability Report Template

ACCOUNTABILITY REPORT

How to use this template

Follow and delete these instructions in red for the document. Fill in all the forms and empty spaces as indicated, convert this file to pdf, print it out, sign then scan. Re-upload the scanned as to provide accountability.

DELETE ALL THIS **RED TEXT after** following its guiding instructions.

Introduction

Fill in this section with a short description of your drive stating the goals of the drive and campaign milestones…… [max. 5 lines]

Drive Name:

Category:

Start date: End date:

Funding Received: Balance:

By: Signature: Date:

Financial Statement

Table showing total expenditures

ITEM / NEED	COST
TOTAL COST	

THANK YOU TO FUNDERS

So as to show appreciation for the donors, type here to give thanks for the received contribution. [max. 5 lines]

CONCLUSION

State how the funding aided and how the different objectives were accomplished. [max. 5 lines]