Practical Approach towards Charitable Giving via Interactive Web Application for Online Philanthropy

Saurabh Mahajan¹, Pranati Paidipat², Rasika Khangarle³, Mona Mulchandani⁴

¹Department of Computer science & Engineering, Jhulelal Institute Of Technology, Nagpur, India
Email: saurabhvnmah@gmail.com
²Department of Computer science & Engineering, Jhulelal Institute Of Technology, Nagpur, India
Email: pranati.pr18@gmail.com
³Department of Computer science & Engineering, Jhulelal Institute Of Technology, Nagpur, India
Email: khangarlerasika@gmail.com
⁴Department of Computer science & Engineering, Jhulelal Institute Of Technology, Nagpur, India
Email: mona_mulchandani@yahoo.co.in

Abstract— Giving to charity is a manifestation of our liberation and our sense of social accountability. It fodders and nurtures us and those around us. Giving charity or making donation is a very common activity among individuals. These can be specific to occasion or can be a random deed. There is no limit for making donations as the amount of donations depends on the income standards of people. On the other hand, the advancement of technology has been changing the lives of individuals greatly. The exchange of information, goods and resources is excelling over Internet. With the transition from manual methodology to electronic methodology, the needy can also be helped through electronic medium of donations. This transition supports convenience, speed and ease of use. In this paper, we thereby focus basically on the issue of charitable giving and describe a prototypical solution for charitable aid by making it centralized for electronic transactions which will thus allow the donor to choose the NGO of their choice and will even locate the NGO if the giving is of tangible form. Rather than searching NGO’s and the cause they support manually, one can just make choice of the city and accordingly support a cause and respective NGO for the donation they want to make.

Keywords— endowment, interactive, online philanthropy, secure donations, web design.

I. INTRODUCTION

The paper presents you a practical approach towards the process of charitable donation. As the world is booming with new discoveries because of digitization and so are technocrats finding solutions to replace manual work with technologically sound applications. This paper plays a significant role in bringing a change in the lives of donation seekers and donors. In computing, web application is a client-server application in which the user interface (client) runs in a web browser. The web application is designed keeping in mind the convenience of donors and recipients to transact endowments.

According to a foreign survey, the trend of online giving has raised up to 13.5% in 2013. Survey even notes a benchmark that the website traffic for non-profit organization have rose to about 11% from 2014. Apart from this though the average giving received is smaller but through the web the non-profits have reached people in huge numbers. The Digital Giving Index observed by Network for Good finds that “Online giving still represents less than 10% of overall giving but it endures and promises to grow in coming time.”

The implementation is broadly divided into two subparts: individual particulars and analysis. The donor will register himself/herself, login with the id and then search for the cause he/she wants to contribute. In the same way, the NGO will register themselves by filling in the basic details and attaching mandatory documents for verification. Every NGO is uniquely identified with its FCRA number and name. The analysis part involves donor choices of supporting cause and the projects published by NGO which are stored in the database. This prototypical solution basically aims at developing a centralized and smart web application for the users who believe that online giving can endure the interaction of humans with smart technologies.

While making choice of donation and transacting the amount, the donor has the liberty to choose the NGO of...
their choice and even go through the NGO particulars to find out if its authenticated or not. The analysis is done and accordingly the required amount or tangible charity is executed.

The back end of the prototype is implemented on MySQL workbench which is a unified visualization tool that allows to create and develop data models. MySQL is a database system that runs on server and works well for both small and large applications.

II. METHODOLOGY

This paper includes the following modules:
A. Login Module
B. Admin Module
C. Donor Module
D. NGO Module

A. Login Module:
In this module, the user has to register as donor or NGO first by filling in the necessary particulars in the registration form. All the data entered is stored in the database server. If the user has registered as donor then it will navigate user to donor module and similarly if user has registered as NGO then it will navigate to NGO module. Only genuine users can feed their data into login form and use their profile.

B. Admin Module:
In this module, the administrator acts as a scrutinizer to all the data entered by the differed users of the web application. All the information that is stored in database is accessed and validated by the admin. The respective admin can run through the entries of registered list of foundations and make or request changes as and when needed. If the user data is fake or invalid then admin has the complete right to block or delete that respective user.

C. Donor Module:
In this module, if anyone desires to be a donor, one should register in the application by filling some requisite data like name, phone number, email id, password and other basic details. Using the email id and password provided while registration the user can login and view self-profile. The user can then search the list of foundations with respect to desired cause of donation and beneficiary organization’s city. The funds can be raised by choosing the campaign they want to support and thereby making proper payment to complete the charitable endowment’s transaction. The contributor can also bestow materialistic things like clothes, toys, furniture, etc. Such donations will be accepted by the NGO only after the bestowed materials are in practical condition of usage. After approval of endowment, a thanksgiving mail is sent to the contributor with an intimation about the collection of the contribution from their corresponding address by means of volunteers.

D. NGO Module:
NGO’s can register themselves and then can login using entered email id and password. They can update their profiles and also can publish project campaign details related to their organization to raise funds. Only registered organizations will be allowed to do so. The NGO can also validate volunteer requests received by varied donors and even approve the requests for the bestowment of tangible items.
Figure 4: NGO MODULE

III. FLOW DIAGRAM

Figure 5: DIAGRAMATIC REPRESENTATION OF E-DONNER WEB APPLICATION WORKING

A. System Overview:
The figure shows the input and output flow of the proposed prototype. The input includes user information at donor and receiver end and the execution of secure transaction at the output end. The web application allows safe and stable endowment operation on online giving.

B. Basic Working:
Step 1: The user opens up the web application UI and after scrutinizing the website details and authenticity, the user registers himself on the website.
Step 2: All the information entered by the user is stored in the database server for use by admin to validate the user. The user can be a donor or a certified non-profit organization.
Step 3: After logging in to the user profile, the user can make choice of the type of donation he/she wants to make and accordingly proceed with the transaction.
Step 4: The donor chooses the particular campaign for which they want to raise funds and then later proceed for payment.

If the giving is of materialistic type then the NGO validates the images of the contribution first and later a volunteer is sent for its collection.

Step 5: The completion of successful and secure transaction is notified with a transaction statement which is mailed to the respective user’s email id and even a success message is displayed on the web application UI for better results.

IV. IMPLEMENTATION

The proposed prototype is a 3-tier application program, i.e. it comprises of three key parts namely data access layer (the bottom tier), the business logic layer (the middle tier) and the client layer (the top tier/presentation layer).

The Presentation Layer is the UI and authorizes data manipulation and data entry. It is the one which displays data to the end user. The Business Logic Layer acts as a server for client requests which allows fetching and insertion of data via data access layer. The bottom tier (Data Access Layer) is built up of the Database Management System (DBMS) which provides information to all the above layers.

The paper presents a model that is being designed with the help Model-View-Controller architectural pattern which splits up the web application into 3 main components: the model, the view, and the controller. These constituents are built to manage definite development aspects of an application. This pattern allows developer to create accessible and extensible projects.

The Model component relates to all the information related logic and acts as a bridge between the other two components. The View component relates to the UI logic (i.e. the appearance of UI) of a web page and the Controller component acts as an interface between Model and View component to practice all the business logic and incoming requests and data manipulation to render the absolute output.

This paper also describes the various classes used in the prototypical solution for charitable giving. The diverse classes of MVC pattern include:

a. Model
b. **Action**

c. **Services**

d. **DAO**

a. **Model:**
The 12-blocks of *Plain Old Java Object* which carries data and logic to update controller if any changes are made in data. The varied models used here are:

i. **Donor**

ii. **NGO**

iii. **Admin**

b. **Action:**
The action class is a part of Model class and resembles a wrapper around the business logic of an application whose main purpose is to transform HttpServletRequest to the business logic mentioned in the jsp pages. Here all the database processing is done.

c. **Services:**
The services include the web services the prototype has been using as a client-server application which help in communication over the World Wide Web’s (www) Hypertext Transfer Protocol (http). The distinguished services provided by the proposed model include:

i. **Advanced validation techniques** at server side pages to exhibit significant behavior when user inputs data.

ii. The **CAPTCHA verification** is used to validate if the user is human or not. CAPTCHA is a backronym for “Completely Automated Public Turing test to tell Computers and Humans Apart” which is a type of challenge-response test used in computing.

iii. The use of **location based services** through J2ME helps in abstracting user’s location boundaries.

iv. To encrypt user’s password credentials, specialized **hashing algorithms** like MD-5 (*Message Digest version 5*) and SHA-512 (*Secure Hash Algorithm*) have been used.

MD-5 splits the user data into 512 bit blocks and has 64 rounds of operation, where SHA-512 is similar to padding and breaks the user data into 1024-bit blocks of data and each of the block of data is processed in loop that repeats 80 times in steps of 4.

Thus the use of these hashing techniques makes it infeasible for unauthorized access of user data.

**d. Data Access Object (DAO):**

Here we have written the body of all the methods that we have used in developing our application from start to end.

V. RESULT ANALYSIS

Various kinds of testing were done to check the functionality of the application.

- **Unit Testing:**

Unit testing focuses verification effort of the smallest unit of software design—the software component or module. Individually, each modules and sub-modules were tested for errors and all the control paths were tried to uncover errors within the connecting methods of every module.

For example, the Admin module had sub-modules Validate Users, Delete/Block Users, and View User Profile. So every sub-module was tested individually.

- **Integration Testing:**

Integration testing is a systematic technique for constructing the whole structure of the modules by combining the unit tested modules to get the final code without errors.

In our system, Admin, NGO and Donor modules were tested after they were unit tested for their sub-modules.

- **Regression Testing:**

Each time a new element is added as part of integration testing, the software changes. In the context of an integration test strategy, regression testing is the re-execution of some subset of tests that have already been steered to confirm that fluctuations have not proliferated inadvertent side effects.

- **Black-box testing:**

Black-box testing enables the software engineer to descend sets of input conditions that will fully exercise all practical requirements for a program. Black-box testing attempts to find errors in the following categories: (1) incorrect or missing functions, (2) interface errors, (3) errors in data structures or external data base access, (4) behavior or performance errors, and (5) initialization and termination errors.

**Data models** are fundamental units to introduce generalization in a DBMS. Data models outline how data is connected to each other and how they are administered and stored inside the system.

In our application, **strict referential integrity** is followed which is a powerful way to ensure full and strict consistency of data between normalized pieces of data.

![Figure 8: A snapshot of the data model used for designing the prototype](image-url)
The web application is designed for a bestowment giver and the beneficiary organization. A donor can at a time choose multiple causes for fundraising and securely transact the donation. This data is fetched and stored safely in the database server. It depends on speed of Internet. High speed internet will result in fast access of application.

VI. CONCLUSION
This is an e-donation application that is designed to run on internet. Its basic purpose is to digitize the charitable giving scheme via online services. This will help to reduce the overhead of physically documented benefaction. It will also maintain contributor records which will be favorable for recipient beneficiary when the contributor wants raise funds in future. This application also aids to devise online transaction statement reports. This paper is designed keeping in mind the ease of use, cost, less overhead for end users like NGO’s.

VII. FUTURE SCOPE
1. In future our application may be linked with several NGO’s on global front.
2. A message pop-up regarding latest fundraising campaigns that the supporter supports may also be provided.
3. A chat client aspect may be added to initiate and improve the communication between the contributor and the receiver.
4. The final transactions may be completed using e-wallet instead of the multi-step payment gateway options.

REFERENCES
[1] Network for Good Survey | 14th September, 2015| “An Insight into Charitable Giving Among Young Adults & Students”
[4] Dong-Heon (Austin) Kwak | May, 2016 | “Three research essays on the effects of charity website design on online donations” | Version 1
[9] Network For Good | 2010 | “The Online Giving Study- a call to reinvent Donor Relationships”