



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact Factor: 6.078

(Volume 7, Issue 4 - V7I4-1206)

Available online at: <https://www.ijariit.com>

DonateEazy: Web application to assist local donations towards NGOs and non-profit organizations

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ABSTRACT

Around 1.89 billion people, nearly 36% of the world's population lives in extreme poverty. Most people lack the basic necessities such as daily meals and housing. Several NGOs and independent organizations work relentlessly around the globe to help deliver the resources to the people in need every single day. In these unprecedented times of COVID-19, the pandemic has hit the unprivileged hardest. The number of people suffering with unemployment and critical health issues has skyrocketed and donations are needed now more than ever. DonateEazy aims to make the majority of the process online, from creating and running campaigns to supporting social causes. It allows the donors to directly get in touch with the NGOs and the volunteers to the donors making the process easier.

Keywords— Web application, donation website, MERN stack

1. INTRODUCTION

In the rise of digitisation, people have largely begun to prefer online services to their traditional counterparts. [1] The popularisation of web applications in the recent years has led to people expecting efficient, quick and reliable services from the comfort of their homes. Hence, creating useful website to meet the general public's needs and filling the gaps in online services has become necessary. DonateEazy is an innovative solution to navigating donations in a way that it is comfortable at both ends of the process.

Being completely web based, the services of the website can be accessed and utilised from anywhere across the globe in a matter of minutes. The website provides those with disabilities a chance to receive aid without having to travel and transport resources on their own making it more accessible than the traditional methods. The user is allowed to choose from a variety of causes and start one on their own if interested. As the name suggests, the website makes the whole process significantly easier as the page is user

friendly and minimal in its design approach. The addition of secure payment gateways and user authentication increases the reliability of the site as well [5],[9]. By making donations effortless we aim to increase the number of people participating and coming forward to donate in times of need as the lengthy procedure of the existing methods can turn people away from supporting what they believe in [11].



Fig. 1 Online donation website

2. EXISTING TECHNIQUES

2.1 In-person Donations

Most donations, even today happen on site, usually taking place at charitable organisations or community events. The donor is often required to visit the donation centre and make donations. As most donation centres aren't technologically up to date, the donor would have to visit the site regularly for future donation or updates. The process is tedious and not efficient as both the donors and the volunteers would have to schedule events accordingly and take time out to conduct and attend events. This usually drives a crowd of people away from donating and spending time on the lengthy procedures. The existing solution to the pitfalls and drawbacks of this technique has been an increase in door-to-door volunteer visits which has proven to be inefficient as it doesn't fully resolve the issue. The visits are random and don't cover a lot of area, missing out on many donation opportunities.

3. SYSTEM DESIGN

3.1 User flow diagram

A flow- diagram is a flowchart that represents the flow of control of the system from one activity to another. The user can choose between 'login' or 'guest' mode. The Fig.2 shows the user-flow diagram for a user who has chosen the 'Login' option. Once the user has entered their login credentials, the same is checked for authenticity. If the details do not match with that of the backend database, the login fails. If the credentials are recognized as authentic, the user is successfully logged in to the home page, where based on the type of user (donor or campaigner) they can navigate the website.

The users who wish to donate can search through the 'explore campaign' page and choose any individual campaign to donate to. After selecting the project, they can donate the amount or cancel the transaction if they wish to. In case the user intends to start a new campaign on the website, they can fill a form with their organization details (depends on whether they are representing an NGO, non-profit organization or any Individual group) and requests for the campaign. Once the intended work is completed, the user can log out.

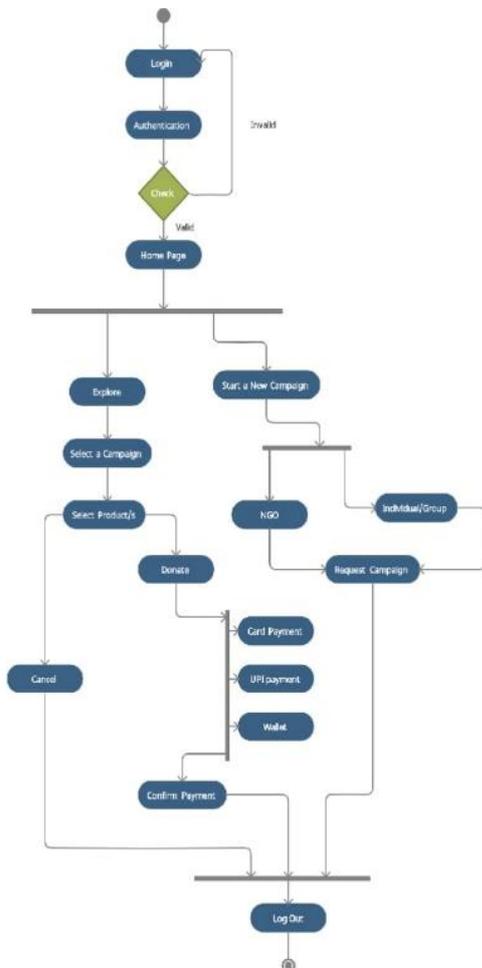


Fig. 2 User Flow Diagram

3.2 Site map

A site map makes it easier for a new user to navigate through a website and access the pages they're looking for. It provides an overview of all the services and everything the website has to offer. The site map in Fig.3.2 Shows the contents on each page of DonateEazy. It also represents how the pages are connected to each other and the relations between them. The Home page acts as the point of access to all other pages as it is the starting page of the website. It leads to other main pages such as Explore campaigns, Start Campaign, How it Works and User Login. The user can access any part of the website without confusions by following the site map.

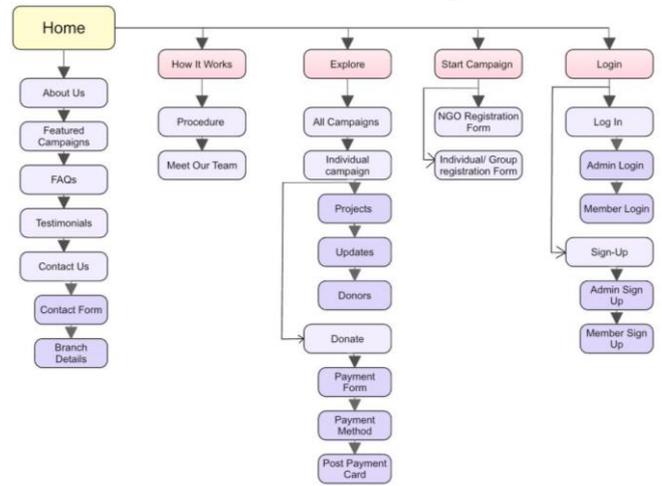


Fig. 3.2 The Site map of DonateEazy

3.3 Empathy map

Empathy Map is a collaborative visualization used to articulate what we know about a particular user. This knowledge about the user helps us to create a shared understanding of user needs. It also aids in decision making. Empathy map is very useful to get a user's perspective, which helps to understand the users' needs and develop the website accordingly.

The Empathy map in Fig. 3 explains what a user says, thinks, does and feels. If we were to consider a single user, the donation website might raise questions such as 'Is the website safe and secure?', 'Will the donations reach the needy?', etc. These questions help us to develop a website that is safe and secure as any user expect it to be. Also, we have a Receipt download option and authentication so that the user can trust the website to be safe. The website will ensure that all the payments are secure and transparent to the user. The user could keep track of the donations that they have made which guarantees them that their donation reaches the intended target. The user might want to do more research in which case we have an about us page that gives detailed description of the objectives of the website and ways to reach out to us. Likewise, all the user's needs are taken into consideration as the website is developed.

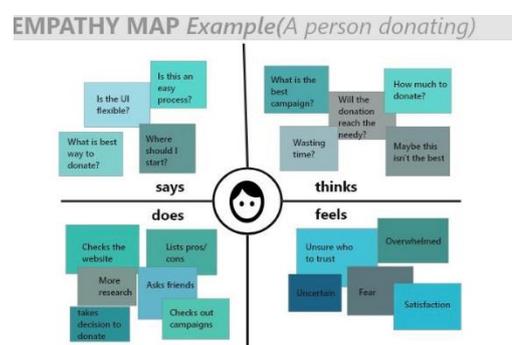


Fig. 3: Empathy map for the Donation Site

3.4 High level block diagram

Fig.4 illustrates a high-level overview of the steps involved in the process of donation. As a first step, the user is presented with the Register/Login screen, alternatively the user can also continue to browse in 'guest-mode' where logging-in/registering is not required. The user can now browse the different campaigns set up by the beneficiaries after which they can decide upon the causes they would like to donate to. The user will be able to view more details about the campaign of their choice. A number of payment options may be provided to make the payment and the amount will be transferred to the

NGOs bank account or wallet. The campaigner then purchases the necessities and distributes them to the needy. Finally, the NGO/Campaigner provides timely updates on how the products are being used.

High-level overview

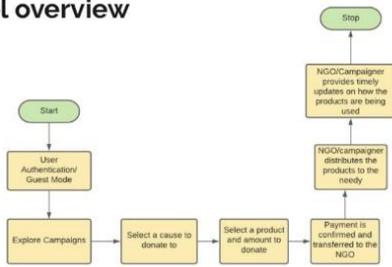


Fig. 4: High Level Block Diagram

4. METHODOLOGY

4.1 MERN stack in web development

4.1.1 Stack Technology: A Stack technology, also called a solutions stack is a list of all the technology services used to build and run one single application. It typically consists of programming languages, frameworks, a database, front-end tools, back-end tools, and applications connected via APIs. There are usually two parts: client-side and server side also called front-end and backend. Most often we use the first letter to name the technical stack: LAMP (Linux, Apache, MySQL, PHP), MEAN (MongoDB, Express, Angular, NodeJS).

4.1.2 MERN Stack: [12] MERN stands for MongoDB, Express, React, Node technologies that make up the stack. MERN is one of several variations of the MEAN stack. The MERN architecture allows to construct a 3-tier architecture (frontend, backend, database) entirely using JavaScript and JSON. MongoDB - document database
Express.js - Node.js web framework
React.js - a client-side JavaScript framework
Node.js - the JavaScript web server
ReactJS is used as a front-end framework to develop pages of the website that is, login page, sign-up page, explore campaign page
ReactJS builds up complex interfaces through simple Components, connect them to data on backend server, and render them as HTML [10].

ExpressJS is used as a backend framework, running inside a NodeJS server. Express.js has powerful models for URL routing (matches an incoming URL with a server function), and handles HTTP requests and responses [7],[8].

[6] MongoDB is the database that is used as a backend storage (user profiles, content, events, uploads etc.). JSON documents created in ReactJS front end are sent to the ExpressJS server, where they would be processed and are stored directly in MongoDB for later retrieval.

4.2 Wireframing and Prototyping

Wireframes are the 2D skeletal framework of a website's interface. It helps the front-end web developers visualise and experiment before setting to code and it is a very important aspect of the UX design process. Wire-framing includes positioning elements, such as buttons, headings and menus. It is usually a black and white diagram with no styling or colouring added to the elements as shown in Fig.5 Wireframes help organise ideas and get clarity of what the final product should look like. The wireframe of our website included image, slider and carousel elements. A prototype is a simulation of the final product that is the website which is used for testing. Just like a wireframe a prototype can be either high fidelity or low fidelity. For our website we created a full functional high-fidelity prototype which

has complexity and communicated how our website works in detail. The prototype is tested with a few users and modified when necessary. Prototyping is done after wireframe



Fig. 5 Donation Receipt Wireframe



Fig. 6. Contact us prototype

4.3 Building React Components

ReactJS is an open-source, flexible and useful JavaScript library that is used for building efficient user interfaces. It has a gentle learning curve and uses the virtual DOM to render views. At the heart of ReactJS we have components. A component is a reusable piece of code that renders the output and defines the structure of our application [10].

It corresponds to the elements of the interface. The reusable property of components helps increase the pace of work and development. React components were built for various sections of the website and helped simplify the workflow.

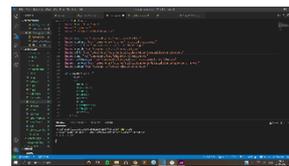


Fig. 7. Code for React Homepage



Fig. 8 Loading React App

5. DEPLOYMENT ON HEROKU

[7] The deployment of a website can be done using Virtual Private Server (VPS) or Platform as a Service (PaaS). The PaaS method has been used here. There are 4 steps to deploy a project on Heroku, which are as below:

- (a) Project Development: The project is developed using ReactJS, ExpressJS and NodeJS as described in the previous sections.
- (b) Version Control System: In the next step, we choose a version control system in Visual Studio code and place the code in a development platform in a repository. Git, along with GitHub is a popular version control system which is used for this purpose. We create a repository in GitHub and run some commands on command line to push our code onto the repository.
- (c) Linking the repository with Heroku: First step in linking GitHub repository to Heroku is creating a new application. Once the application is created, we choose 'Deploy' option in the navigation bar and then click on the GitHub icon and search for the desired repository and connect. Once the application is successfully connected with our Heroku account, we click on 'Deploy Branch' to deploy our application. Next, we enable the 'Auto deploy' option.
- (d) Configure Heroku: We must configure Heroku to run our application appropriately. Otherwise, it could pose an error. To update the application, we must push a new commit to GitHub. If the 'Automatic Deploy' option is enabled, the

code shall be automatically pulled to Heroku. If not, 'Deploy Branch' option must be clicked once again. Thus, the project is deployed effortlessly on Heroku.

6. RESULTS

Web application to assist local donations towards NGOs and non-profit organisations named 'DonateEazy' is a website designed to create and support fundraiser campaigns for social causes. It has a minimal but effective interface that allows the users to make donations effortlessly.

The home page is the starting page of our website. It allows the user to access every other page within the site through the navigation bar. The homepage introduces the main features and components of the page and gives the user an idea of what to expect from the site. The home page as shown in Fig.9 and Fig.10 has an About Us card, a FAQ corner, testimonials from the donors and a slider holding featured campaigns and instructions on how the donation process works.



Fig. 9 Home Page (1)



Fig. 10 Home Page (2)

The start campaign feature enables anyone to easily set up a campaign for a cause they believe, in a few simple steps. The interface is designed to be time efficient and clean. The various forms in the website are compact as shown in Fig.11 and Fig.12.

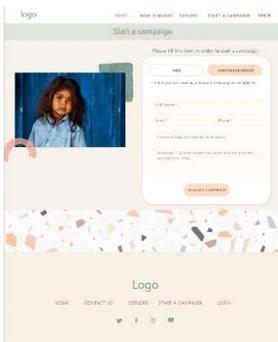


Fig. 11 Start Campaign form (NGO).

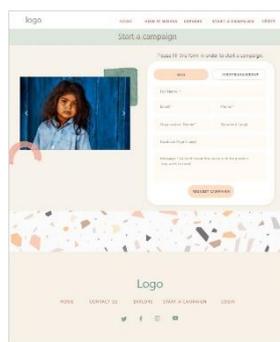


Fig. 12 Start Campaign form (Individual/Group)

Allowing for safe transactions within the app DonateEazy was of utmost importance. Hence, the website has an integrated secure transaction gateway that verifies the user through one-time passwords on their registered mobile phone numbers. The transaction pages are as shown in Fig.13 and Fig.14.

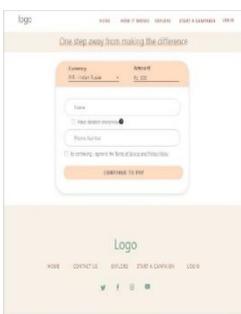


Fig. 13 User detail form for Transactions

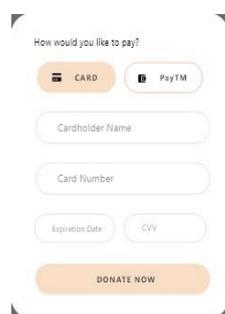


Fig. 14 Payment Page

Once the transaction is processed a thank you card along with the payment receipt is displayed to the user as shown in Fig.15 which they can download for future reference or have sent to their email if they are logged in to their account as a member.

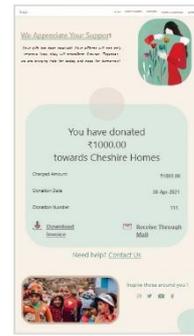


Fig. 15 Receipt for the donation paid

The users can browse through the site without signing up to be a member if they wish to but user login is mandatory to proceed with the transaction on the site. The user log in is email authenticated and the password for their account can be reset if forgotten, through the email linked to their account. Fig.16 and Fig.17 shows the user authentication forms



Fig. 16 User Log In Form

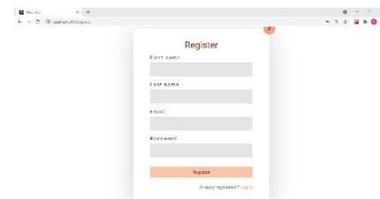


Fig. 17 User Registration Form

7. CONCLUSION

During times of crisis, communities are required to come together and help each other but the donation process is heavily hindered by the lengthy processes. Volunteers are unable to freely collect and distribute resources during lockdowns. The traditional method of donation has always been uncomfortable for the disabled and physically challenged.

Our website DonateEazy aims to make the majority of the process online, from creating and running campaigns to supporting social causes. It allows the donors to directly get in touch with the NGOs and the volunteers to the donors. By using existing work forces like NGOs and volunteers to aid, the process gets significantly quicker[11]. Direct contact also allows people with excess resources to reach out to the organisations and deliver it thereby avoiding wastage [2], [3], [4].

The overall website not only makes donations easy and accessible for everyone but also aims to increase the number of people donating by its user-friendly interface, simple stepped processes and secure payment functionalities. Donations can save lives and make some better and it's increasingly important to encourage the masses to do so. Our website acts as a reliable mediator in the proceeding and when used effectively, it can be the most powerful medium to combat social issues and maintain balance within communities [9].

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