CAPITOLIZE

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Abstract:- The startup market in India provides lots of opportunities for startups to flourish and grow, provided that the startups arrange the necessary funds through various capital sources. Capitolize intends to provide any startup or business in India, the platform to crowdfund and gain necessary funds to succeed in the competitive environment.

Keywords:- Fundraising, Fundraising Opportunities, Startups, Business Centric, MERN, JavaScript, Blockchain.

I. INTRODUCTION

For traditional lenders such as banks, extending credit to small businesses is often too costly, given the small loan size and poor credit ratings of the borrower. Due to added regulations, banks have reduced their exposure to smaller businesses in recent years. The success of the 'Make in India' campaign by our Prime Minister in recent years has led to rapid growth in the startup world and encouraged many small businesses to expand their presence in the market. Despite this, there is a lack of opportunities for fundraising for these small businesses and startups and a unified platform for such opportunities under the umbrella of the Government is needed.

The intention of this is to provide a solution for ensuring relevant fundraising opportunities to businesses of a plethora of fields. The proposed platform will allow a user to register his business or startup on the platform and set benchmarks for the same. The raised funds will only be made available for use after a benchmark is reached. In order to raise funds, the user can promote the idea of various social media platforms. The backers can fund the idea by visiting the platform and all transactions will be logged and stored using Blockchain Technology.

II. TECHNOLOGIES USED

A. React

React is an open source JavaScript library for building the front-end of a full-stack application. The front-end framework most accurately fits the application's desires, providing faster load times using Virtual DOM while being lightweight. React also provides Component-based development which reduces the development time. The components being reusable, allows the developers to use the same code again as per requirement. Components are easier to test in isolation using unit testing. Without going into an excessive amount of detail, the front-end framework within the stack ultimately takes the information from the server and presents it in an interactive user interface. Its main goal is to be fast, simple and scalable. With React Js single page application can be made easily. It is commonly used in Enterprise applications.

B. Node.js

Node.js is an open source server environment based on Google Chrome's JavaScript V8 engine. It can further be defined as a cross-platform runtime environment for developing server-side and networking applications. The main highlight about node.js is that it is event-driven and all the node.js libraries are asynchronous in nature. This essentially means that a Node.js based server never waits for an API to return data. It then moves to the other API after calling it. NPM is the default package manager, and it grants access to tons of third-party modules in addition to the ones they create in their own application.

C. Express

Express is a back-end web application framework running on top of the Node.js. It is a framework developed and maintained by the Node.js foundation. Express acts as a layer built on the top of the Node.js that helps in managing the server and routes. It also allows to setup middlewares to respond to HTTP requests (get, post, patch, put, delete requests to a particular route) and defines series of actions to take when that route is hit. Express, just like Node.js is single threaded and fast, it also follows the MVC architecture.

Express merely sits on top of Node to make the routing and request handling easier to write.

D. MongoDB

MongoDB is one of the most popular NoSQL database management systems. It is document-oriented and has a flexible schema. Mongo, a non-relational database is that it doesn't rely on columns and rows. In MongoDB data is stored in the form of JSON style documents. MongoDB also supports Master-Slave replication wherein, the master performs read and write and the slave just copies the data from the master and just backs it up. It has an automatic load balancing configuration due to the data being placed in shards. The way MongoDB stores the data is in the form of BSON (Binary JSON), ruby hashes etc, which helps to store the data in a very rich and convenient way while being capable of holding arrays and other documents. This makes MongoDB easier to work with. The persisted data looks just like it does in any other application and can travel back and forth without really changing the structure. The mLab platform helps to host the MongoDB database on Google Cloud servers.

E. DialogFlow

DialogFlow is an end-to-end development suite for building conversational interfaces for websites, mobile applications, and messaging platforms. It can be used to build chatbots, voice assistants, etc., especially relevant that are capable of having natural and rich interactions with the users. It is also powered by machine learning to recognize the intent and context of what a user says, allowing a conversational interface to provide highly efficient and accurate responses.

F. Blockchain

A Blockchain is a huge list of chronologically ordered transactions split into blocks that are hard to modify. You could view the blockchain as a huge notebook with each page numbered, each block is a page. Imagine if you are on page 40 and you want to remove something, without any trace, from page 20. You would have to tear page 20 and all the pages after it up to 40, renumber the pages and redo all the pages from 20 to 40 minus the one transaction you wanted to make disappear. This structure helps when you want to have the work distributed and there are computers on the network that you can't trust but you would like to make use of their computing power. For Capitolize, a simple implementation of Blockchain allows the storage of all transaction data corresponding to each fundraiser securely.
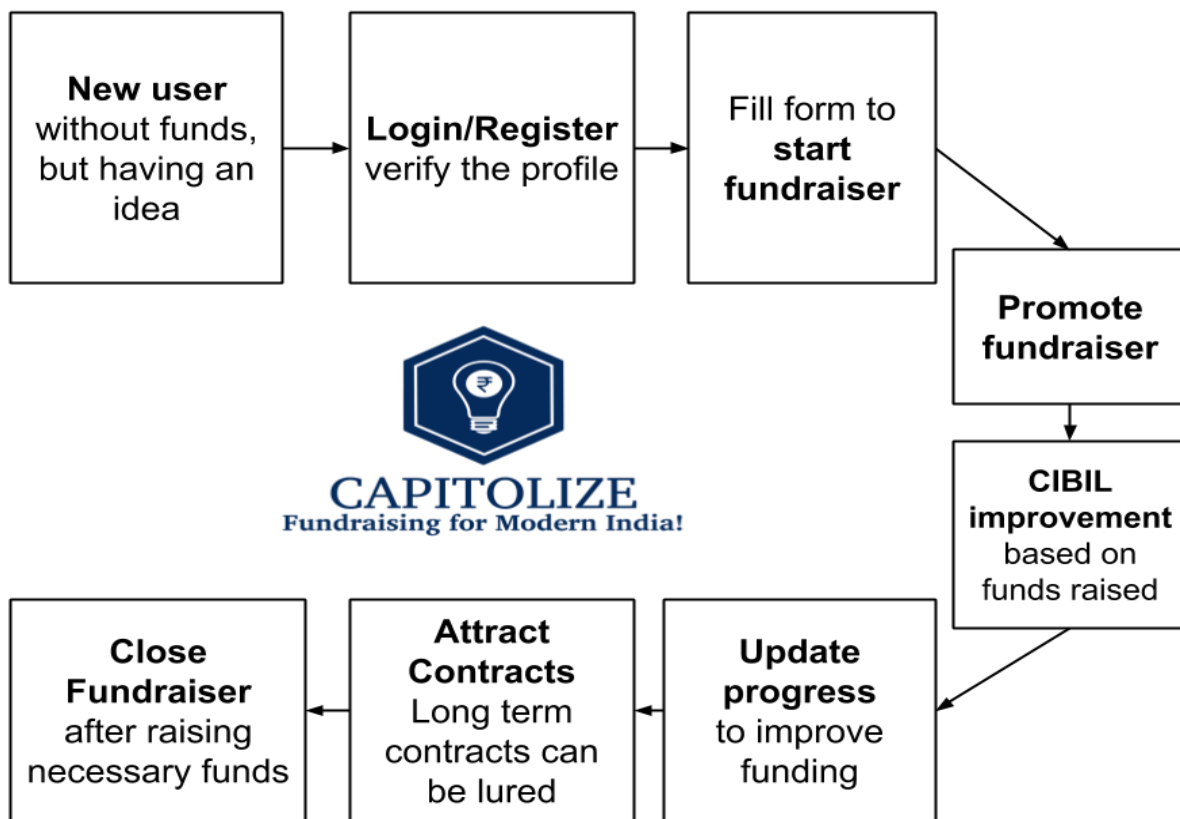
III. WORKFLOW

Fig 1:- System Workflow

The platform encourages new users to create a fundraiser of their own and shows the successful and trustworthy fundraisers on the user dashboard to present an example which they can follow. The users need to register and be logged in on the platform to view sensitive details of fundraisers on the platform. The website also gives help for getting a patent for business or startup if the user is concerned about theft of intellectual property.

The fundraiser link can be used to promote the idea through various social media to gain the necessary traction to generate funds. Capitolize also promotes startups which are performing well on the dashboard page. But as pointed out by Online Fundraising for Environmental Nonprofit Organizations[1], the perception of a fundraiser as honest and trustworthy is necessary for receiving a favourable outcome from the people viewing the fundraiser online. For this, Capitolize prompts the user to add additional updates on the fundraiser page to improve the perception of the idea amongst the users viewing it on the website.

The fundraisers can also be boosted through a contract from third-party firms who provide funds in return for services later from the business established through the fundraiser. For the example, a sugarcane businessman who adds his idea for a new factory in his locale, on Capitolize, can get funded by online grocers like Big Basket or the Future Group, for the sugar that he produces in future by signing an official contract. A fundraiser can be officially closed from the platform once the desired amount of funds are reached. This entire cycle is illustrated in Figure 1.

Lasrado and Lugmayr[4] pointed out that there was a minor difference in the success of fundraisers in local languages compared to the ones in English. This coupled with the inaccuracies of translators like Google Translate, for the many languages in India, led to the decision of opting out of allowing multiple languages on the platform.

IV. IMPLEMENTATION

The client interacts with the front end of the application which presents a responsive webpage made in React for the user to work on and publish his idea or startup. The virtual DOM helps to load the page faster while uploading large files on the platform to post a new idea.

The middleware, written in Express, provides the request and response data to REST APIs. A middleware function for logging a user out of a session is shown in Figure 2.

```
function logout (req, res, next){
    const { query } = req;
    const { token } = query;

    UserSession.findOneAndUpdate({
        _id: token,
        isDeleted: false
    }, {
        $set: {
            isDeleted : true}
    }, null, (err , sessions) => {
        if(err){
            return res.send({
                success: false,
                message: "Error: server error"
            });
        }
        else{
            return res.send({
                success: true,
                message: "logged out"
            });
        }
    });
}
```

Fig 2:- Logout function in Express

The RESTful APIs(example in Figure 3) fetch the data from the mLab Google Cloud server in JSON format which is sent to the front-end of the system. The database of the application is stored on the Google Cloud Server via Mlab. The MongoDB database is unstructured and works well with REST APIs.

```
const Fundraiser = require('../../models/FundraiserSchema');

router.post('/addFundraiser', type, (req,res) => {
    const newFundraiser = new Fundraiser({
        title: req.body.title,
        description: req.body.description,
        sector: req.body.sector,
        uploaded_image: req.file.path,
        createdAt: req.body.createdAt,
        updatedAt: req.body.updatedAt,
        accountType: req.body.accountType
    });
    newFundraiser.save()
    .then(fundraiser => console.log(res.json(fundraiser)));
}); // that slash represents the api/fundraiser
```

Fig 3:- API to add a new fundraiser

The transaction data on Capitolize gets logged in a JSON file, which uses BlockChain logic to store the logs of each transaction in a SHA-256 hash, corresponding to each particular fundraiser. The hash function combines various parameters along with transaction data in a single hash value as shown in figure 4.

```
calculateHash() {
    return SHA256(
        this.index +
        this.previousHash +
        this.timestamp +
        JSON.stringify(this.data) +
        this.nonce).toString();
}
```

Fig 4:- Hash function

The DialogFlow chatbot helps to guide the user at any point by providing a sitemap and answering more than 100 different queries related to 16 keywords along with small talk, which the user might have pertaining to the system.

V. CONCLUSION

Most businesses or startups, especially those in rural areas are unable to flourish only because of lack of loans for such causes due to poor credit ratings of the people who venture forward for such a cause. Capitolize, once deployed and starts getting used practically, will help provide all the necessary assistance to encourage small businesses to flourish with a primary focus on the rural areas of India. It will ensure there are no loopholes to be exploited by each transaction being logged in an immutable blockchain. The platform would help raise funds for all businesses through social media marketing and provide APIs for social media posts to load images and relevant text to attract more potential backers for the fundraiser. The platform would support mobile use with browser support due to the responsive nature of the website. An alternate credit rating, based on the funds raised through the system, will help get loans to help the startup or business begin its operations.

Our future plans for this system include optimisation using data mining and AI to make the form filling procedures easy for fund seekers on our platform. The transaction data can also be put on a Blockchain network which includes various entities such as Government Bodies, Banks, Payment Subsystems and third-party applications. The Illinois Blockchain Initiative[4] is a good example of such an execution. The application can also be integrated with government portals for easier access to startups and regulating approvals on the application itself.

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