

Co Builders

Nidhilesh P.S^[1], Evin J Manuel^[2], Sachin Benny^[3], Safina K.S^[4], Abeera V.P^[5]

B.Tech Student^{[1][2][3][4]}, Assistant Professor^[5]

Department Computer Science and Engineering, KMEA Engineering College, Ernakulam
Kerala- India

ABSTRACT

The Co-Builders web application aims to create an innovative platform which is aiming to improve the existing platform or interaction between a contractor and customer. The web application suggests a new method that helps customers find the best and most affordable plan that fits their criteria. It also helps the customer find a contractor that is reliable based on previous user rating and feedback thus giving them assurance when choosing a contractor. The web app helps to reduce the complication of the entire process thus making it easier to manage and be up-to date on the entire process. With the implementation of the web application using node.js for the backend and MongoDB as the database for the creation of the platform, the customer can access the details wherever they are and know exactly about what's happening currently through the web app, provided they have a proper internet connection. Additionally, with the implementation of a 3D view of the building plan the customer can get a better understanding of how the building will look like. This also helps to reduce the time that it usually costs a client and also greatly reduces the burden on the contractor as they can easily contact and update the customer through the web app thus making the process simpler. It also provides a method for the customer to design the interior of the building to their liking.

Keywords :— *Node.js, MongoDB*

I. INTRODUCTION

Constructing a building or a house is a time consuming and costly process which normally includes lots of risks. Usually when someone wants to construct a building they would usually have to first find a contractor, then they will have to see if the contractor will build according to their budget or requirement. During the construction phase for the Construction schedule, cost, and quality play a significant role for both parties. The client or the contractor, one party might have more of a vested interest in schedule than in the cost and vice versa. Yet it must be noted that both parties will have obligations that would ultimately involve significant cost, which might not be planned for. Areas of complexities in construction project shows the fact that a particular item within the Construction Phase will affect the overall success of the project. Interestingly, most of these are soft issues relating to either social or cultural backgrounds, and understanding and expectations about when assets are delivered. Also when construction starts they will have to constantly try to be in contact the contractor to be updated about the work and then they will have to efficiently handle finance management while paying them for the work while not knowing how the money is being spent. Most of the time it would take a lot of time for a person to find a suitable contractor. Sometimes the contractor may not be honest and cheat the client by using the money for other purposes other than construction or by buying costly materials while a cheaper solution is available. The current system is far from perfect and has lots of drawback in it that greatly affect the consumers.

This is where the webapp comes that can be used to make the process less complex. With the help of the app/website the client can view nearby contractors and send his criteria to whose requirement matches him. The contractor then would send back their initial estimates and project plan details. The client can then choose from a wide range of choices. Also during the construction phase the client can receive weekly updates from the contractor about the weekly expenditure and how work has been done. The app can also help find nearby stores from where the client can contact to buy materials. The client can also view a 3D model of the building so that he is up to date about how the building looks. The website/app can also make the contractors work easier as they can schedule and maintain contact with client, as well as update them through the website/app. So this method helps to reduce the overall time and complexity of the existing system, also after we implement this it would make it much simpler for people to be up to date with what's happening at the construction site even when they are not on site and thus making this a more efficient system.

II. LITERATURE SURVEY

Lakshmi Prasanna Chitra & Ravikanth [1] propose the advantage of using a node.js based platform for web services. Traditional web servers are slow and are usually not that efficient, traditional web services such as apache servers uses multiple thread request model which when used over a network service usually cause the web service to slow down and thus affecting the end user performance. Node.js uses an improved event based architecture which provides high

performance, efficient and asynchronous event-based server, it uses a non-blocking, event-driven, input/output which help makes the web server more efficient especially for CPU intensive application. This helps in creating a light webs server that usually does not impede the performance of a server and thus improving the user performance.

With the help of a 3D view of the building [2] it helps to clarify and give a better picture of how the building would look after the construction process finishes. This transparent 3D view will help people to understand of what the building plan is trying to show thus making it easier for regular people to understand

Jiang Hui [3] explains an method for designing interior of building using Augmented Reality Technology .This paper analyzes the use of Augmented Reality technology and Augmented Reality 3D interior model for interior design. According to the feature of interior design, the best way to share the concept of an interior design project to customer in the conceptual design stage is to perform it in.

Arshad Javeed [4] suggests performance optimization techniques for ReactJS. React is one of the popular web frameworks that has gained importance over other frameworks such as Angular, Vue, etc. This is because of its implementation of Virtual DOM, whose primary objective is to enhance the overall performance of the application.

In the paper by Jitendar Kumar and Varsha Garg [5] they explains the help of using mongoDB for the database operation it helps in the fast retrieval of data from the memory as MongoDB uses a NoSQL database which does not rely on a relational database schema such as what’s being used in a traditional web server but instead stores data in an unstructured data based schema. This is especially useful in the case of multimedia, email, social apps. Also additionally, with the usage of sharding in a NoSQL database helps in improving the performance of the server.

TaoZhong Liu [6] suggests smart cloud-based platform for construction sites. This paper discusses the concept of smart construction site, summarizes the smart construction site’s content and its core technology, and cloud computing platform’s architecture is proposed in order to realize the construction site’s smart management and control, and intelligence services.

Shubham Mittal [7] suggests a optimized task scheduling algorithm in cloud. In this paper, we have introduced an Optimized Task Scheduling Algorithm which adapts the advantages of various other existing algorithms according to the situation while considering the distribution and scalability characteristics of cloud resources.

In the paper by Mayur M Patil [8] he specifies the difference between performance of MongoDB and MySQL Database on a web/android application and also the features of Sharding in MongoDB and its advantages . This paper intends to ascertain the need for NoSQL databases in the present situation and

emphasize advancement of document-oriented database - MongoDB in particular by describing with a quantitative example that SQL databases are prone to deterioration when data is over loaded and MongoDB comes with inbuilt load balancer which makes it a better solution in applications with high data load. We describe the technology of sharding – auto load balancing feature of MongoDB and hope to provide a comprehensive insight of the process.

III. PROPOSED DESIGN

The proposed structure for the construction management app is represented in fig 1. Which include the components user, contractor, server and database. The figure shows the overall structure of the system. The system provides a service by which a client and contractor can communicate through the internet with each other and get or provide the corresponding reply or service. All the information and their updates are linked with the database so that all the data can be stored and retrieved when necessary.

Through the app a client/contractor can both login into the app/website where in their respective profile they can state their criteria/requirements which can be viewed by the other, which is then used as the condition for finding a match. After finding a match the project plan is given and agreed upon by both parties from there the project is registered. Additionally, the user can also view the 3D model of the building once uploaded by the contractor. The contractor also gives weekly updates and cost updates to the client by sending the data via the server. All this information is also stored in the database from the server so that they can be accessed by both the parties whenever they want to. After the construction phase is over the user can then use the website/app to design how the interior of the building should look like so that it is their liking. The contractor can view this detail and then plan the interior design accordingly.

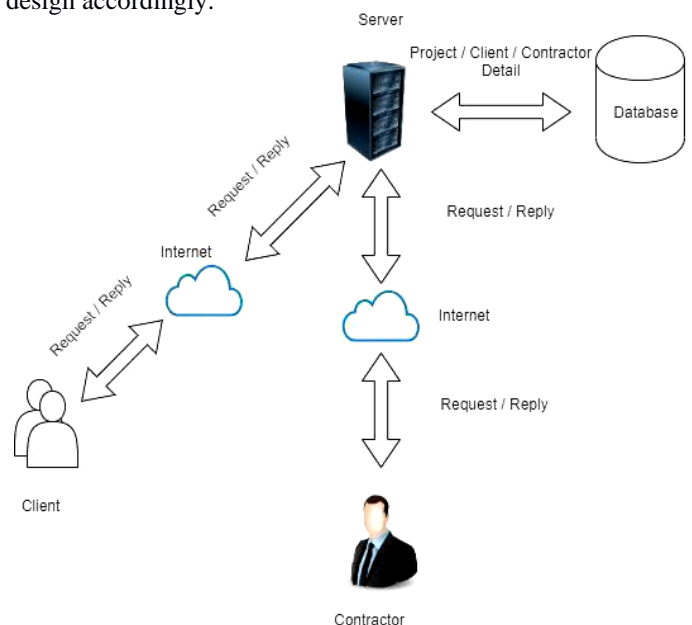


Fig. 1. Proposed Design

Our project is divided into modules:

A. Registration Phase

In this phase new users can create their accounts in the app/website and then they can login to this accounts. Both the contractor and customer can view and make changes to their account details whenever they want. The customer can search for a contractor and select a contractor from a list. The customer can view the selected contractor's criteria and then if it suits his needs then the customer can contact him and states his requirements to him. If the contractor agrees to this, then the project registration process is start where it creates a project id for it.

B. Preconstruction Phase

The contractor creates a project plan stating the overall plan for the building construction where he states the initial estimates, schedules, time needed. This details are then passed on to the customer so that they can view and be aware of the plans made by the contractor and then states their opinions about it, so that any changes needed can be stated by the contractor. Finally, when both parties agree with the plan the project planning is done and the final project plan is completed. The constructor can then upload the 3D model. Both the contractor and customer can view this plans/3D.

C. Construction Phase

In this the contractor can use the website/app to give the weekly updates about the construction where he can plan out what all needs to be done each week, how much work has been completed, give a cost expenditure about the amount of money being spent. He can also provide proof for this by showing proof for this by showing images. The customer can then view all of this data from the website/ app so that they can be aware of what's being done and have an understanding of the progress that's being made in the construction process. In this phase the customer can also see the nearby area in which material needed for the construction.

D. Post construction phase

In this phase, customer can use the website to design the interior of the room however they want to. The customer can also use an AR feature so that they can view how the interior design they made will look in the building by using this feature to project the details in to the building. The customer can be then view these details and update it as they want to so that they can create something that fits to their liking. These details are then passed to the contractor so that they can view the details and suggest whatever changes that they want to make to this plan. The customer can also give a feedback.

IV. RELATED TECHNOLOGY

A. MongoDB

MongoDB is the database used for online storage. It is a document oriented cross platform database program. In NoSQL classification database program, MongoDB uses JSON-like documents with schema MongoDB is an open source database management system (DBMS) that uses a document-oriented database model which supports various forms of data. MongoDB have a document called record which is a data structure composed of field and value pairs. Even though they are much similar to JavaScript Object Notation objects it uses a variant called Binary JSON (BSON) that accommodates more data types. It has an interactive JavaScript interface to MongoDB called mongo shell, which allows users to query and update data, and conduct administrative operations.

B. Node.JS

Node.js is used as the backend environment. Node.js is a platform built on Chrome's JavaScript runtime for simply developing scalable network applications very fast. Node.js uses a non-blocking and event driven input output model, that makes it flexible, lightweight and efficient. This make it perfect for data-intensive real-time applications that run across distributed devices. Node.js is an open source and cross-platform runtime environment for developing server-side and networking applications. Node.js applications are usually written in JavaScript language.

V.WORK FLOW

The main goal of the proposed project is to make the construction process management more simple. The customer can find best contractor online for his requirements. The requirements and criteria can be communicated. After project registration different login will created for user and contractor. Project plan and estimation are accessible in website and app for user.

3-D model of the project will give the user clearer output detail about nearby shops for buying construction materials are provided. Along with that there is an online website for purchasing materials. Task management option will help the coordinator to coordinate the work and notify about the task completion time. Contractor can update the progress of the project and expenditure cost. All the work is coordinated with the webapp. It also helps in interior designing. From the beginning to completion of construction our website and app will be useful.

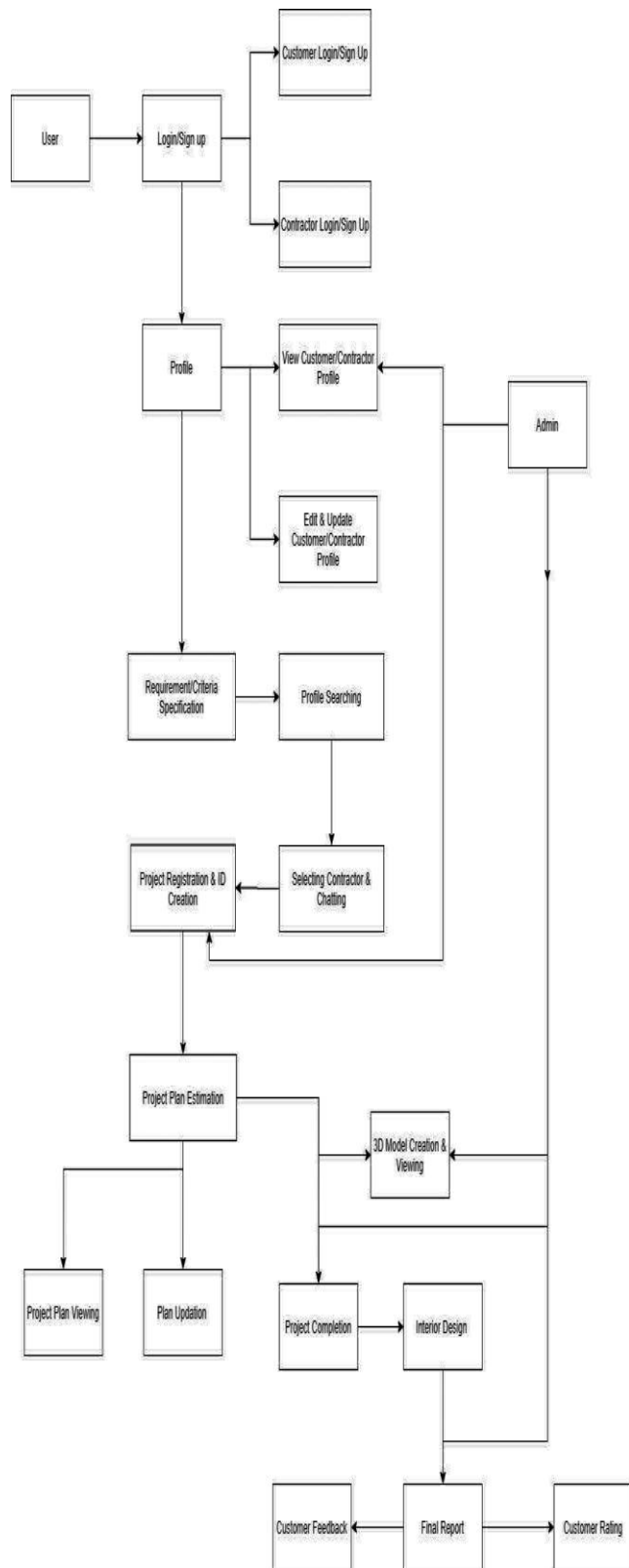


Fig. 2 Workflow diagram

VI. EXPECTED RESULT

Proposed web application will make it easier for any person to find a good contractor by searching through the web app and finding a contractor that fits their suitable needs. Also with the help of seeing the other users review and rating of the contractor, along with some examples of their previous work in the contractor’s profile, the customer can make a smart and safe decision on which contractor to choose. Also by using the web app the contractor can make his work easier as it helps in keeping in contact with the customer and helps to keep the customer up-to date about what’s happening with the construction. This web app is aimed at helping improve the current system so that it can catch up with the modern era. We are expecting 90% accuracy in the output.

VII. CONCLUSION

The Co-Builders web app creates an innovative platform which is aimed to help improve the existing platform or interaction between a contractor and customer. The website/app suggest a new method that helps customer find the best and most affordable plan that fits their criteria. It also helps the customer find a contractor that is reliable based on previous user rating and feedback thus giving them assurance when choosing a contractor. It also helps reduce the complication of the entire process thus making it easier to manage and be up to data on the entire process. With the implementation of the web app customer can access the details wherever they are and know exactly about what’s happening currently, provided they have a proper internet connection. This also helps to reduce the time that it usually cost a client and also greatly reduces the burden on the contractor as they can easily contact and update the customer through the website/app thus making the process simpler. It also provides a method for the customer to design the interior of the building to their liking.

REFERENCES

- [1] Lakshmi Prasanna, Chitra , Ravikanth Satapathy “Performance comparison and evaluation of Node.JS and traditional web server (IIS)”, 2017 IEEE International Conference on Web service
- [2] Jitender Kumar , Varsha Gar “Security analysis of unstructured data in NOSQL MONGODB database”, 978-1-5386-0627-8/17\$31.00©2017 IEEE
- [3] Jiang Hui “Approach to the interior design using augmented reality tehnology” 2015 6th International Conference on Intelligent System Design and Engineering Applications

- [4] Arshad Javeed “Performance optimization technology” 978-1-5386-8158-9/19/\$31.00 ©2019 IEEE
- [5] Hong Dai, Jingnong Weng , Xue Yang “3D city building model sharing service on the web” 2010 Journal of Beijing University of Aeronautics ,vol.30
- [6] Tao Zhong Liu , Jiachen Hou , Gang Xiong , Timo .R. Nyberg, Xiaohui Li,”Smart cloud based platform for construction site” 978-1-5090-2927-3/16/\$31.00 ©2016 IEEE
- [7] Shubham Mittal , Avita Katal “An optimized task scheduling algorithm in cloud computing” 2016 IEEE 6th International Conference on Advanced Computing
- [8] Mayur .M. Patil, Akkamahadevi Hanni, CH Tejeshwar , Priyadarshini Patil “A qualitative analysis of the performance of MongoDB vs MySQL database based on insertion and retrieval operation using a web/android application to explore load balancing – sharding in MongoDB and its advatanges” 2017 International Conference on I-SMAC