

“Construction Control: The cloud based construction site management system”

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Abstract: Recently the buildings are constructed on large scale on a vast area. The building construction projects should be finished within the planned timeline and budget. However lots of the construction projects are delayed due to the many factors such as bad weather and delayed supply but main factor that affects the delay is the human error. Workers can misplace the equipment or skip the required job. Detecting the work error lately may cause delay and redoing the job. These errors should be detected as soon as possible to reduce the delay. But the monitoring and management and of construction work become difficult because the construction work is done in the very extensive area concurrently by lots of workers.

To monitor the work progress, the construction company sends the project manager to the construction site and the managers recodes the change on to the paper sheet or tablet pc and append the photos. Later the company can view the progress by checking the paper or photo. Some companies these days use computer programs for the progress monitoring and the project manager can recode the change to the program and the program computes the progress. Recording the change in to the paper or computer program can check the work schedule but it is hard to detect the human error such as misplacement of equipment or skipping. In this paper we have proposed a system for construction site management where everything will be managed by this system which will help to manage construction site details systematically and it will save time and efforts.

Keywords: CMS; cloud; templates; reports; media.

I. INTRODUCTION

“Construction Control: The cloud based construction site management system” is a web based application. This application is useful for the Admin and Project Manager. This System is developed for the business organizations to manage their customer’s data effectively and to improve their profit which will helps to increase the organizations business. It will not just to maintain Material details and their data but it also provides some features that helps to business organizations to increase communication with their customers using some facilities of this system.

II .LITERATURE SURVEY

SR NO	PAPER	CONCEPT	ADVANTAGE
1	Development of an on-site Builder’s estimating app for construction waste reduction. Afolabi, Adedeji;	In ThisPaper Builder’s estimating application was developed for the estimation of selected building materials on site in the required quantities. 2. The study recommended that Builders should take advantage	Builders should ensure that correct estimation of materials construction works are done

	<p>Fagbenle, Olabosipo; Tunji-Olayeni, Patience and Abimbola, Olumayowa</p>	<p>of the use of ICT in their construction activities. 3. In addition, Builders should ensure that correct estimation of materials for construction works are done, as the inaccuracy in estimating building materials have dire consequences.</p>	
2	<p>An Investigation On Construction Byproducts And Mixed Ones In Building Construction Process. Institute of Technology, Shimizu Corporation (Nihon University) Echujima 3-4-1 7. Koto- ku. Tokyo, JAPAN. 135-8530, +81 3 3820 5768 pooh@shimz.coj</p>	<p>1. For this study we have continuously investigated the kinds and the amount of construction byproducts in the construction process. As the result various factors at the construction sites revealed the effectiveness of sorting out mixed byproducts of the construction byproducts. 2. We suspect that controlling the amount of byproducts at construction sites would contribute to reducing the burden on nearby environments</p>	<p><i>Construction sites revealed the effectiveness of sorting out mixed byproducts of the construction byproducts.</i></p>
3	<p>Design of Robot based Work Progress Monitoring System for the Building Construction Site. Joa Hyoung Lee, Jeong- Ho Park and Byung-Tae Jang</p>	<p>1. The propeller is used to avoid the obstacle or floor change and the wheel is used to go around on the flat area. 2. The monitoring robot has the VR camera for the video recording and the LiDAR for the laser scanning. 3. The route for the robot is generated based on the timeline and 3D design data such as 3D CAD or BIM. Progress</p>	<p><i>Progress monitoring is done based on the comparison.</i></p>
	<p>Electronics and Telecommunications</p>	<p>monitoring is done based on the comparison.</p>	

	<p>Research Institute Daejeon, Korea</p>		
4	<p>The system of acquisition & application technology for spatial information of construction site .</p>	<p>1. This study breaks down spatial information into location information and shape information and attempts to develop technologies and application system to acquire and process such information.</p> <p>2. Accomplishments made in this study will help provide u-city & construction pertaining to construction safety and accuracy by supporting real-time interface between construction drawings and construction elements including labor, material and equipment.</p>	<p><i>Safety and accuracy by supporting real-time interface between constructions drawings and construction elements including labor, material and equipment.</i></p>
5	<p>Integrating BIM and IoT technology in environmental planning and protection of urban utility tunnel construction .</p>	<p>1. Project site environmental dust monitoring and automatic sprinkler dust falling control system; Based on real-time meteorological data site Environmental and temperature monitoring Based on BIM visual prototype system development. Finally, the application of BIM and IoT technology in urban utility tunnel construction and development environment and application benefits, as well as the follow-up development direction of recommendations.</p> <p>2.</p>	<p><i>Based on real-time meteorological data site Environmental and temperature monitoring Based on BIM visual prototype system</i></p>

III. EXISTING SYSTEM

In many organizations All Department Users in Online Construction Management System data is managed manually and it is very tedious and time consuming task.

1. There are many organizations that use CMS applications but many of the organizations uses Desktop CMS applications and it has a many restrictions as compare to web based CMS applications.
2. There are many CMS systems available in market but many of them not provide the facility of Mailing and SMS notifier.
3. Many CMS systems just provide the facility of managing customer details.
4. Many CMS applications don't provide the facility of document management.
5. Many of the applications don't provide the facilities to manage inventory related tasks.
6. The existing applications don't provide the facility of application customization.
7. Many of the existing CRM systems don't provide the functionality planning, material management, employee & labour management and hence the overall project management.

Thus there are many drawbacks for the existing systems. This ConstructionControl can overcome these drawbacks and helps with improved functionalities.

IV. PROPOSED SYSTEM APPROACH

1.1. Description in Details

In many Construction organizations all department's data is managed manually so it is very tedious and crucial task to manage huge data manually. Some organizations uses CMS but they don't provide much functionalities and it is not convenient most of the times.

In this proposed system we overcome many drawbacks of existing system by improved functionalities. This System is developed for the construction business organizations to manage their data effectively and to improve their profit which will helps to increase the organizations business. It will maintain details planning, material management, employee labour management, etc.

In this system there will be admin that is owner of the site. This application will maintain all the data regarding constructions. Also admin can do project management, billing and report management. Business organizations can manage their contractor and labour management through this system. Business organizations can also generate reports in various formats and these reports help business organizations for various types of analysis like date wise report and all.

They can use these reports in decision making processes and also for customer satisfaction by analyzing their needs and problems.

Admin/owner will manage all the crude operations like addition/deletion of new sites, assigning site managers to a site, have access to the media related to every site. He will have access to details of every site. Site manager will have access to all details of a particular site to which he is assigned to, also he can perform crude operations like addition and deletion of employees, employee details, uploading the media, etc. Also there is a timeline of a particular site which will contain media. There will be comment option, sms notifier, messaging, etc. There will be automatic report generation.

.Details of every site will be maintained separately in a documented format. Here the admin can maintain the data regarding All User Profile and The Project Management. Here admin can see all the details regarding respective Project Engineer. There is the separate panel for the admin, builder and project Manager. By using this application the efficiency of the business is increased. This application is developed as per the requirement of the client. Also all the data will be stored to the cloud so there will be no concern of data loss.

Thus it will become easy to maintain all the documents and to track the progress of site very easily. Also the system is user friendly. Due to additional functionalities it will be easy to maintain, to track progress and update all the details related to the site.

1.2 Proposed system Advantages

1. Capture photos of physical work progress
2. Seamless Integration with MIS
3. Work-wise/ Project wise surveyor allocation
4. Dashboard with snapshot of overall progress
5. Web interface for data management
6. User Management
7. Survey Reports
8. User friendly, Secure Access to the application and MIS data
9. Field reporting is no longer an extra burden at the end of day's work

1.3 Proposed system Limitations

The limitations of this system are as follows:

1. This system requires the high-speed internet without internet it can't work.
2. Currently it is not integrated with any other plug-ins.
3. This system is applicable only registered Users.

1.2. Proposed system Architecture

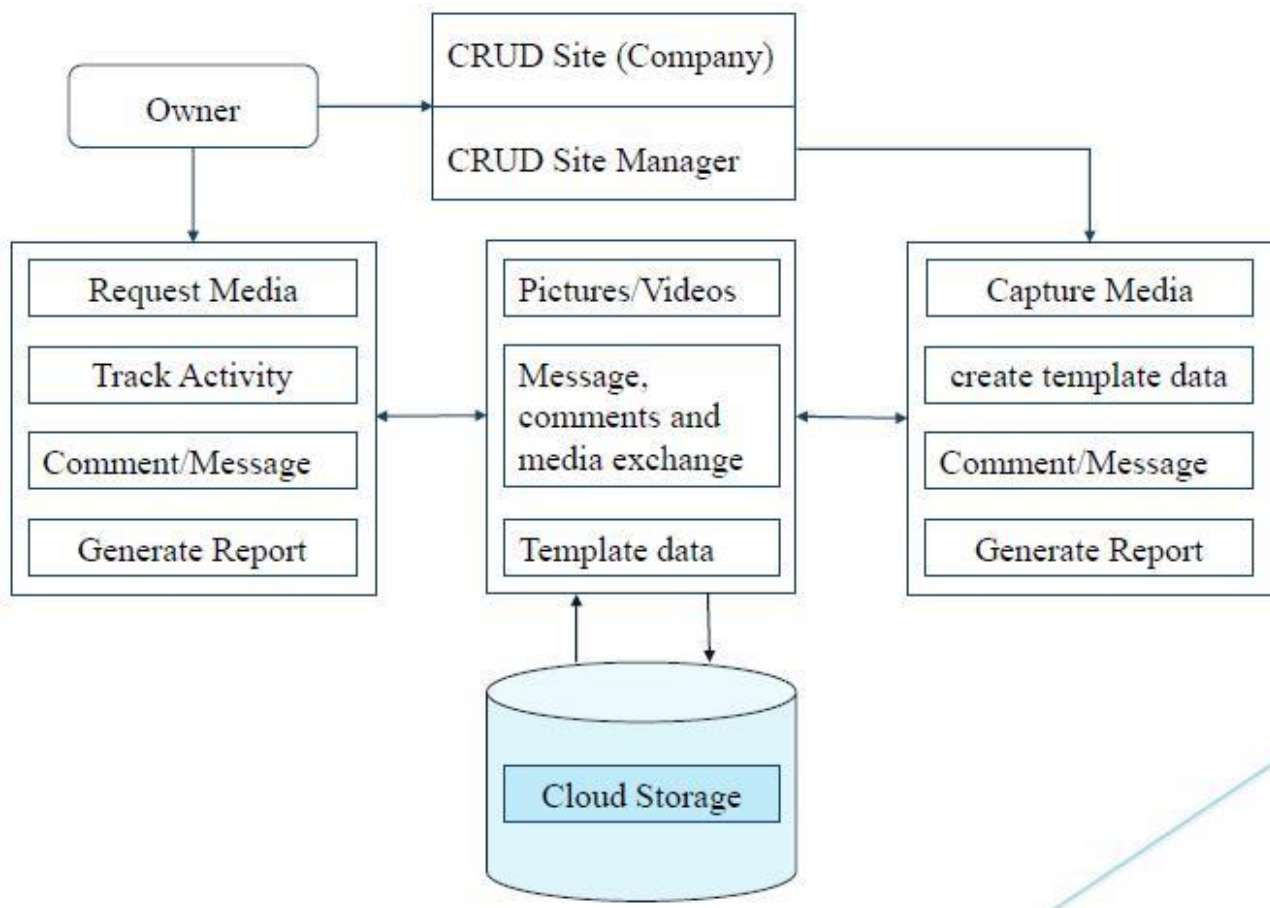


Fig 1: System Architecture

In this system, there will be owner, he can add various sites and can assign site manager to the sites. Owner can request for the media that is he can see all the media uploaded related to the site. Thus he can track activity also he can comment on them or message the site managers. He can also generate the report regarding materials of the construction site. Site managers can also do crude operations like addition and deletion of employees. He can capture media, create templates, also he can comment or message and generate report. Also there will be a timeline where all the media can be uploaded. All the data will be stored to cloud and thus they can access the data conveniently.

V. SYSTEM REQUIREMENT

1. Database Requirement

MYSQL

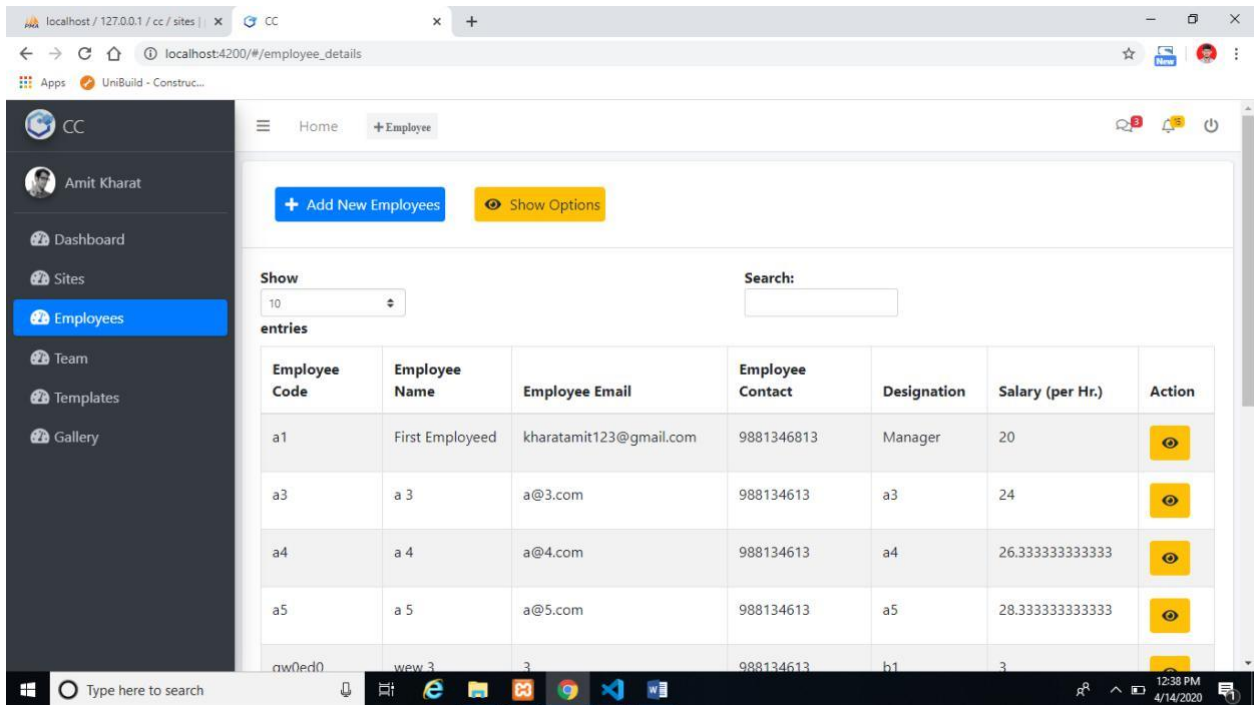
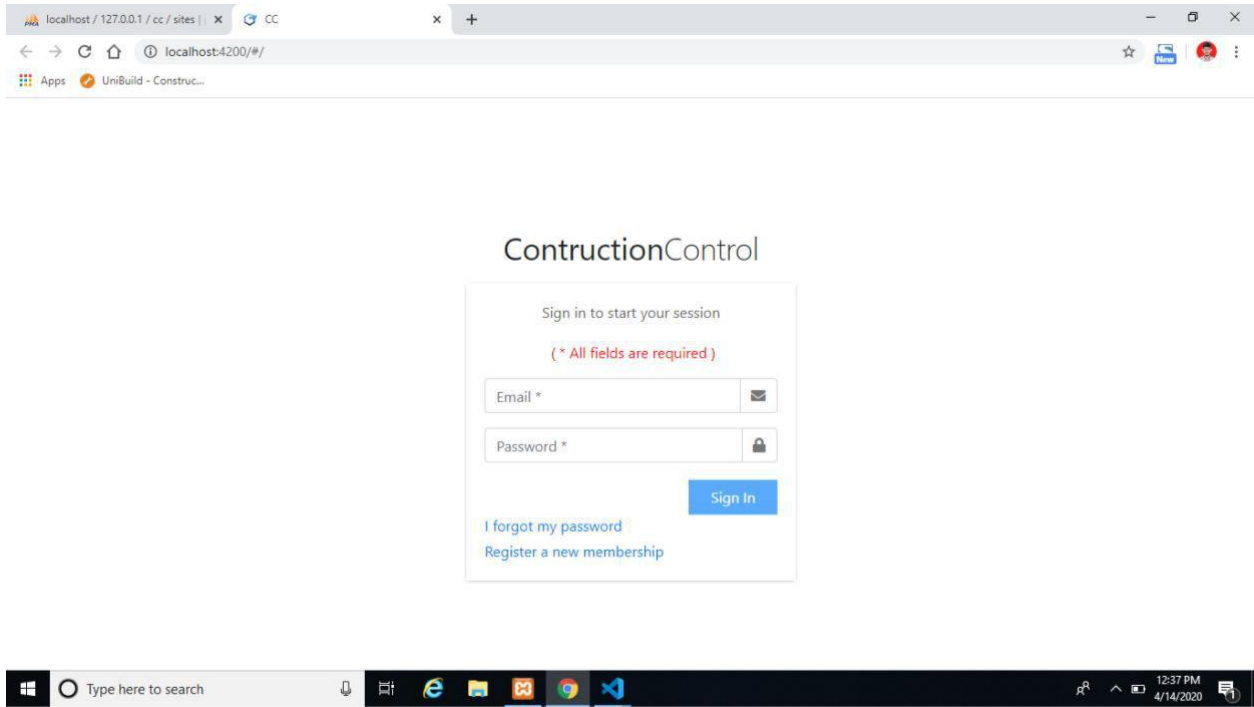
2. Software requirement

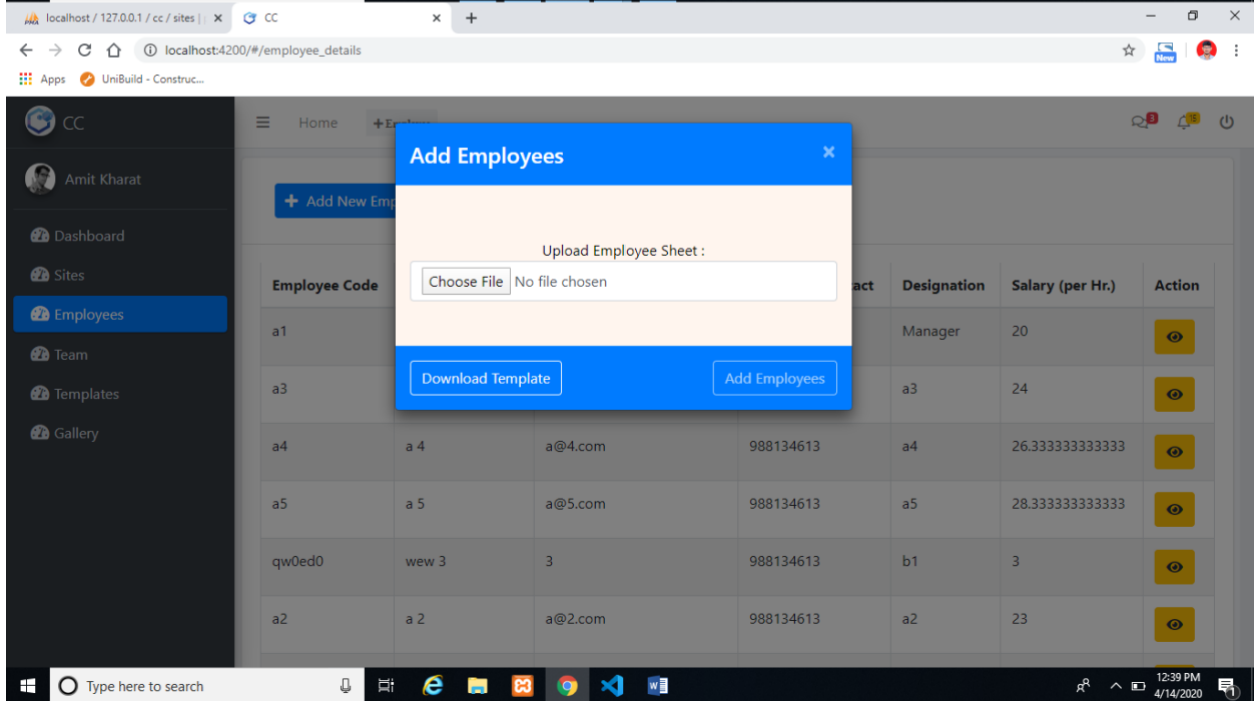
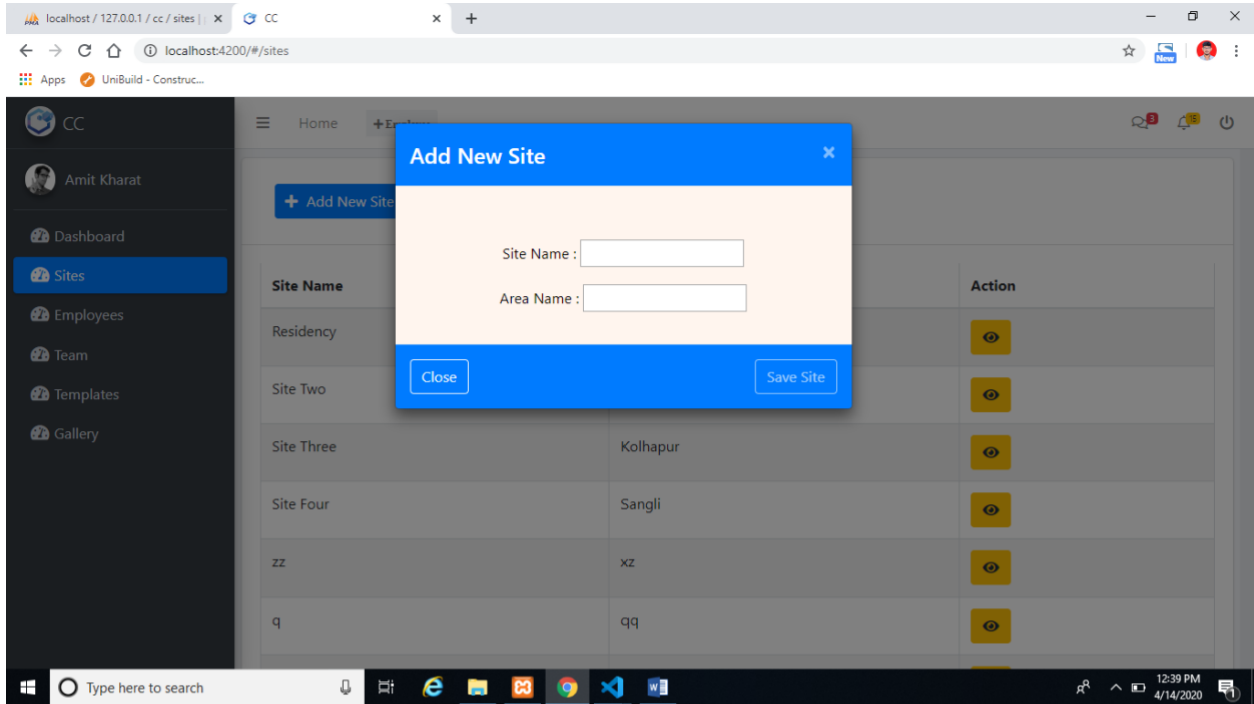
- | | |
|--------------|------------------------|
| 1. Front End | - Bootstrap, Angular 8 |
| 2. Scripts | - JavaScript |
| 3. Database | - Mysql |
| 4. IDE | - Visual Code |
| 5. Lang | - Angular Js |
| 6. Server | - PHP codeignitor |

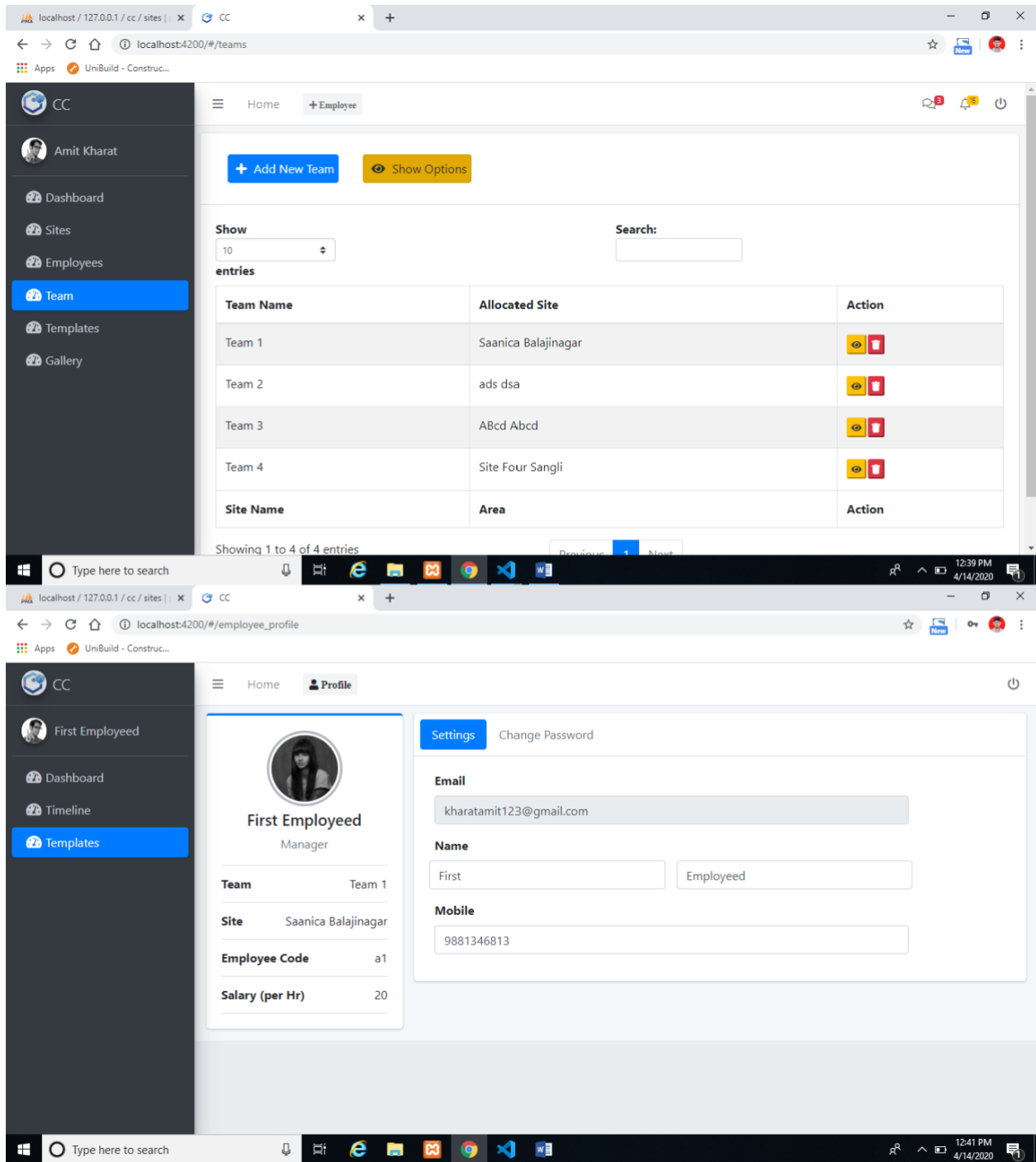
3. Hardware requirement

- | | |
|--------------------|--------------------------------|
| 1. Processor | - I3, I5 |
| 2. Processor speed | - 3. 8 GHz |
| 3. RAM | - 4GB |
| 4. Hard Disk | - 1TB |
| 5. Key Board | - Standard Windows |
| 6. Keyboard Mouse | - Mouse |
| 7. Monitor | - LCD (Liquid Crystal Display) |

VII. RESULTS







The image displays two screenshots of a web application interface. The top screenshot shows the 'Teams' management page, and the bottom screenshot shows the 'Employee Profile' page.









Teams Management Page

Navigation: Home | + Employee

Buttons: + Add New Team, Show Options

Search:

Showing 1 to 4 of 4 entries

Team Name	Allocated Site	Action
Team 1	Saanica Balajinagar	 
Team 2	ads dsa	 
Team 3	ABcd Abcd	 
Team 4	Site Four Sangli	 

Employee Profile Page

Navigation: Home | Profile

Buttons: Settings, Change Password

First Employeed
Manager

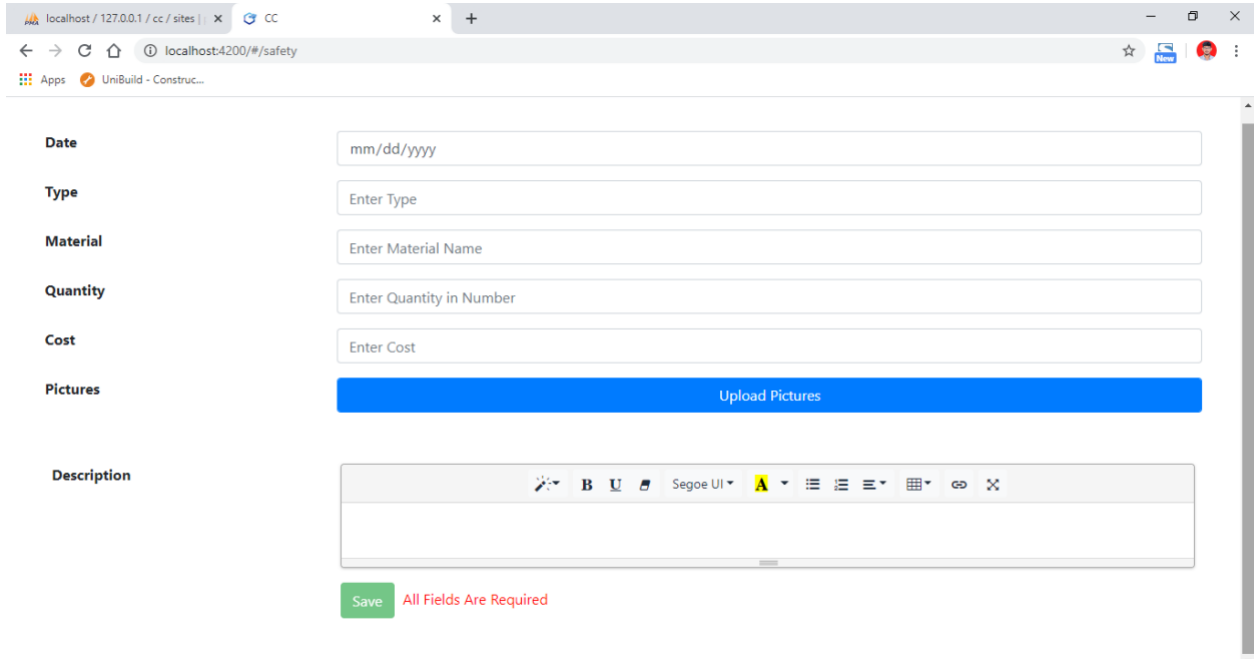
Team: Team 1
Site: Saanica Balajinagar
Employee Code: a1
Salary (per Hr): 20

Settings | Change Password

Email:

Name:

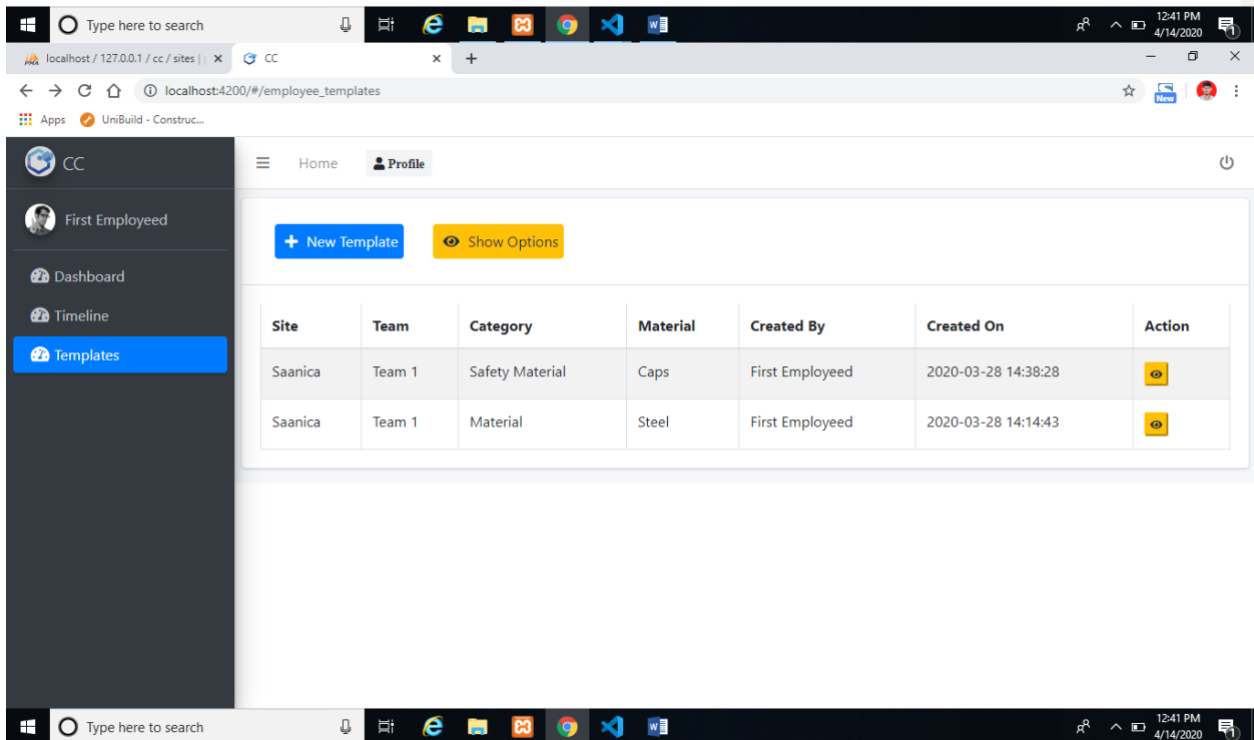
Mobile:





The screenshot shows a web browser window with the URL localhost:4200/#/safety. The form contains the following fields:

- Date:** Input field with placeholder text "mm/dd/yyyy".
- Type:** Input field with placeholder text "Enter Type".
- Material:** Input field with placeholder text "Enter Material Name".
- Quantity:** Input field with placeholder text "Enter Quantity in Number".
- Cost:** Input field with placeholder text "Enter Cost".
- Pictures:** A blue button labeled "Upload Pictures".
- Description:** A rich text editor with a toolbar containing icons for bold, italic, underline, font color, background color, bulleted list, numbered list, link, and unlink.

At the bottom of the form, there is a green "Save" button and a red error message: "All Fields Are Required".



The screenshot shows a web browser window with the URL localhost:4200/#/employee_templates. The dashboard includes a sidebar with navigation options: Home, Profile, First Employeeed, Dashboard, Timeline, and Templates (highlighted). The main content area features a "New Template" button and a "Show Options" button. Below these is a table with the following data:

Site	Team	Category	Material	Created By	Created On	Action
Saanica	Team 1	Safety Material	Caps	First Employeeed	2020-03-28 14:38:28	
Saanica	Team 1	Material	Steel	First Employeeed	2020-03-28 14:14:43	



V. CONCLUSION

This application is useful for the builder and Project Manager. This System is developed for the Construction Business organizations to manage their data effectively and to improve their profit which will help to increase the organizations business. It will maintain details planning, material management, employee & labor management, employee daily reporting management etc. This application is maintain all the data regarding constructions. It also provides the customization facility to Admin so that Admin can customize this system as per his/her organizational needs like User Management, Project Management, Billing and Reports management and Notifications. Business organizations can manage their Contractor and labour management through this system.

REFERENCES

- [1] Abd.Majid M.Z., Memon Z. A., and Mustaffar M., "Conceptual digital monitoring model for evaluating the progress of work.", Proceedings of 4th conference of construction applications of virtual reality, 13-15 September 2004, pp.161.-166.
- [2] Bayrak T, and A. Kaka, "Evaluation of digital photogrammetry and 3D CAD modelling applications in construction mangement", 20th Annual ARCOM conference
- [3] Bohn J, and Teizer J, "Benefits and barriers of constuction project monitoring using high resolution automated cameras", Journal of Construction Engineering Management, 136(6), pp.632-640.
- [4] Brilakis I, Soibelman L., and Shinagawa Y, "Progressive 3D reconstruction of infrastructure with videogrammetry", Automation in Construction, 20(7), pp. 14-20
- [5] Y. Ham, K. Han, J. Lin and M. Golparval-Fard, "visaul monitoring of civil insfrastructure systems via camera equipped unmanned aerial vehicles: a review of related works", visualization in engineering, 4(1).