

Smart Adaptive System for Construction Management Using IoT

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Abstract – Dales Connect is an android application which is capable of managing employee from remote location. This system makes the process of scheduling much easier and computerized. By this system the manager or top level designated employee can fix the schedule of any employee working under him by assigning task online. Thus the top level management can easily fix the process of scheduling, and even can change the appointment which is reflected immediately to the related employee avoiding direct contact of the employee resulting in saving lot of time and work overhead. The system even has the option for only viewing the employees activities. This system has many functionality which provide employer ease of handling employee. This systems contains functions like Task assignment and task follow-up, Meetings, Employee Tracker, Internal Planner, Message / Broadcast.

Keywords- Android, IOT, Mobile Computing.

1. INTRODUCTION

Construction managers do a lot in thinking and planning, making every project component organized. By outlining a project schedule, efficiency of time is regulated, making every event of delays, changes and disputes nil. Because construction managers do study existing situation, optimum use of worker skills are achieved, affecting a construction quality. The growth of number and variety of devices that are connected to the internet and are collecting data is incredibly rapid. Today more than two billions consumers worldwide use an internet connection in order to browse content send and receive information in the form of emails and instant messages, access various multimedia resources and among others make social networking. Task management is the most tedious task to do. Managing of task, assigning of task and reporting of task are very critical thing to do. So by using the task manager it will be easy to manage all the task. In this proposed system we are using the tracker system for the tracking of employee. As the allowance is given to the employee so it is very necessary to track employee through GPS and find their current location.

In Todays world informing all the employees about meetings or any other important work is became easier by using the messaging and broadcasting. Either we can send a message to a particular employee or broadcast to a bunch of employee. This all is depend upon a employer. This is dynamic in working both the employee or an employer can use this. Image case capturing became the

need of the construction site. It is important to every employee to capture their everyday work status. It shows the work status of the construction site and the day by day progress of it. Meetings are the most essential part of any organization. In construction system every employer have to take meetings for gathering the information and spreading the knowledge. In the proposed system the meetings will help us to hold the record of the meetings that are taken in the past, and meetings which are have to be taken.

Nowadays, many companies offer IoT Platforms and all of them offer some level of analytic reports but the similarities end there as they are entirely different software applications. For someone new in this field it may not be easy to understand that this term refers to a complete and mature IoT cloud platform. More so, there are some software applications that have been stretched to the point of being called IoT platforms even when they describe just an element of a platform or even something completely different. Managing data and documents is a tedious task especially when handling large amount of data. The institution itself must have no room for mistake when it comes to managing important documents.

In this modern world the IoT is useful for embedding the appliances, machines with the software's and sensors which enables and object to connect with them and exchange the data. Each things are uniquely define through its implant computing system but is able to inter-operate within the existing Internet infrastructure. No one is unaware of unmatched power of nature and its ever

changing and uncertain persona which leaves us unsure of what turn it may take next. The nature is very unpredictable and has many secrets that are beyond imagination. so the prediction of nature has changed from traditional to modern method that is by using Internet on Things.

All this data will be collected by the sensors that underpin the Internet of Things: Temperature, pressure, moisture and light sensors as well as motion sensors such as accelerates and gyroscopes. Many of these sensors are already in your cell phones, and will soon to be just about everywhere. This means weather measurements will also be everywhere, and this will improve the precision of weather condition reports and forecasting. The IoT permit objects to be sensed or controlled remotely over the existing network infrastructure, and making an opportunities for more direct combining of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human involvement.

II. LITERATURE SURVEY

The Existing system was based on the manual system. The administration fails of controlling the employees activity in analyzing employees strength and weaknesses. Employees does not provide the detailed project information to the employer. Thus the existing system required more manual efforts. Most of the organization contains the many documents and papers of the persons such as contracts, change orders, material orders, receipts, invoices, certificate of insurance and employment applications and wants to keep them safe and organize. The manual submission of papers may lead to the misplaced of the important papers. As the existing system is standalone system thus the employees cannot track their employment status. Sometimes employer cannot be able to provide the detailed information to the employee.

Schedule requirements; or the cost of a linear schedule versus the cost to accelerate the schedule, or overlap the project phases. Need for early establishment of the contract for construction cost. Thus the manual system was time consuming and need more efforts and extra manual work. A delay in construction can be frustrating and costly. The longer it takes to complete the project, the more time itll be before the next one can get started. The weather can also play significant role in increasing the chances of an accident or incident occurring or the delaying of the projects and the main reasons of these

accidents are heavy rains, temperature, strong winds or fog. Because of this the the work on the construction site get delays. The lack of communication between the employer and employee is also the biggest problem on construction site. Even the scheduling of the task is also a drawback of existing system.

Some of the issues in existing system :-

- 1]Scheduling.
- 2]Management of task.
- 3]Lack of communication between employee and employer.
- 4]Management of important document.
- 5]Time management.
- 6]unpredictable weather.
- 7]Lack of project organization.
- 8]Managing supplier of raw material.

III. MOTIVATION

As there are many issues in the manual system so by using the proposed system it will be easy to maintain the management between the organization. Proposed system has many functionality which provide employer ease of handling employee. Proposed systems contains functions like Task assignment and task follow-up, Meetings, Employee Tracker, Internal Planner, Message / Broadcast.

IV. PROPOSED SYSTEM

I. The proposed system have login's as per the organization requirement .The employer will have some limited access and the manager will have all the access to the system. In this project the were having some task that are Task assignments and follow-ups, task management, meeting invitation, employee tracking, internal planner. In this the manager can assign the task to the employee by using the app, the follow-ups are taken by the employee.

II.

The employer can track the employee by using GPS to know the actual destination of the employee, to give allowance as per use. By using this application the employer and employee can also take the meeting decisions which is the two way communication. The employer can sent the message individually to the particular employee or he can broadcast the message as per the requirement.

An IoT application platform, is the backbone of any IoT system which is centered on a connectivity. All devices

that are components of an IoT systems and are connected to the internet and each other share a connection with an IoT application platform. No one is unaware of unmatched power of nature and its ever changing and uncertain persona which leaves us unsure of what turn it may take next. The nature is very unpredictable and has many secrets that are beyond imagination. so the prediction of nature has changed from traditional to modern method that is by using Internet of Things. There is also a weather forecasting task in the proposed system in which we are taking the weather forecasting by system and also we are using the raspberry pi for the weather forecasting. In order of transmitting the measured data internet is used as the medium through which the data is sent from the Raspberry pi to the server. Where the user can see the data in the server and download the data and perform some processing. By using this we can get the correct forecast and we'll work according to that. In Internal planner as per the weather forecast the meetings and the task decisions will be taken. This will done by internal planner. All the data of the employee and their work will be store on a Database.

A. Task Assignment and Follow Up :

Task management is the tedious task to do. It is nothing but the process of managing task through its life-cycle. It is the part of process management and project management

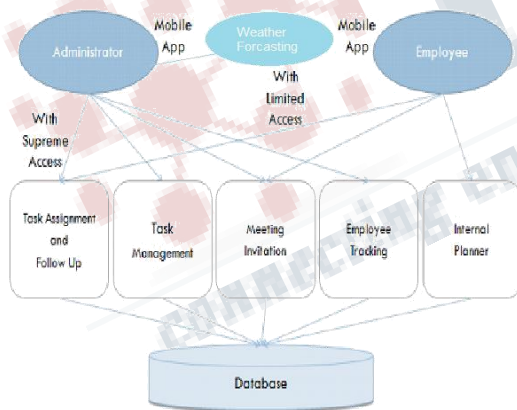


Fig. 1. System Architecture

for the efficient work flow of the project. In this proposed system the User can assign task to the particular person. User can put up for task. This will give interface like

chatting for a particular task. User can send image, PDF, etc in follow ups.

B. Case Image Capture :

Image capture enables user to capture images and directly send through the network which is an intranet. Using this application one can capture image of a site with specific ad-dress attached with it. Image case capturing became the need of the construction site. It is important to every employee to capture their everyday work status

C. Meeting :

The meetings are the most essential part of the any organization or in anywhere. Meeting management is used to ensure the valuable contribution of employee to find out the best solution for the any problem. The proposed system will hold record for all the meeting held. In construction system every employer have to take meetings for gathering the information and spreading the knowledge. In the proposed system the meetings will help us to hold the record of the meetings that are taken in the past, and meetings which are have to be taken. As a leader there are so many things to do in meeting so this phase will store meeting agenda, comment, and start time, end time and date of meeting. All the meetings are arranged here by the employer.

D. Tracker :

Tracking is Location-based services or LBS is a term that is derived from the telematics and telecom world. The combination of A-GPS, newer GPS and cellular locating technology is what has enabled the latest LBS for handsets and PDAs. Line of sight is not necessarily required for a location fix. This is a significant advantage in certain applications since a GPS signal can still be lost indoors. As such, A-GPS enabled cell phones and PDAs can be located indoors and the handset may be tracked more precisely. In this proposed system this is generally introduced for tracking the employee visit to a site, company needs to give allowance for employee visit. So this tracker functionality will keep record of source and destination address of every visit. And give allowance as per that.

E. Internal Planner :

Internal planning is very important in organization to keep track on all employee, their training, meeting planning, task assessment and many more which helps to produce more effective productivity. In this proposed system it allows user to make internal planning for future work like budget, skill level of employee, productivity, compliance.

They can make their planning over here. All the planning regarding to the planning is done by the employer.

F. Message / Broadcast :

The message is nothing but a way of communication. The Broadcasting of message is sending the same message to the entire subscriber and the selected subscriber at once. So the proposed system will allow application user to send message to another user of the application. A user can broadcast message as well. Broadcast message will be shown to every user of application.

G. Vendor :

Vendors are nothing but the supplier who offers something for selling purpose it can be a person or a company. Here in the proposed system the vendors and employer can communicate with each other for the selling and buying purpose. It will take the note of all the sailed raw material which are used in construction. All the data

H. Weather Forecasting :

As no one is aware of the unmatched behaviour of the nature. so the prediction of nature has changed from traditional to modern method that is by using Internet on Things. For weather forecasting we are using internet and raspberry pi which are the open source hardware and which will provide the cost effective and having low power consumption. The sensors which we are using will gather the information of various environmental parameter such as temperature, humidity etc. The gathered data will be sent to the raspberry pi which will act as a base station. After that the raspberry pi will transmit the collected data using the internet and the overall result data will be displayed on our mobile application which is on the server side.

V. ALGORITHM

- Step 1: Administrator assign a task to Employee with using Mobile Application.
- Step 2: Administrator take follow up of task from Employee.
- Step 3: Employee take a task and give follow up to Administrator.
- Step 4: Administrator manages all task through Mobile App.
- Step 5: Administrator arrange meeting and give a invitation to all Employee through Mobile App
- Step 6: Employee take a invitation through Mobile App.

- Step 7: Administrator track the Employee through Mobile App where is Employee and what they work and Administrator got Employees location.
- Step 8: Employee can manage internal planner.
- Step 9: And all this data is stored in database.

VI. MATHEMATICAL MODEL

System = {Q, Σ, δ, q0, qf}

Q = {q0, q1, qf}
 Σ = {a; b; c; d; e; n}
 where,

- q0 = all functionality executed successfully.
- q1 = Internet connection terminated.
- qf = Task completed.
- b = Task management.
- c = Messaging
- d = Employee track.
- e = Internal planner.
- n = Notification.

- (q0, a) = q1
- (q0, d) = q0
- (q0, a) = q1
- (q0, c) = q1
- (q1, e) = q1
- (q1, e) = q2
- (q2, d) = q2

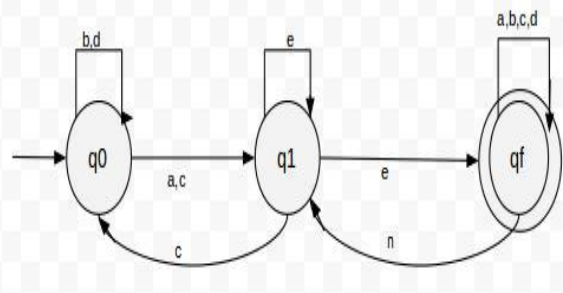


Fig.2. Mathematical model

VII. CONCLUSIONS

The proposed system will provides overall solution for employer to manage its employee and task assignment for each employee. This helps in proper reimbursement for travel allowances. Provides ease of sending message as well as broadcast message for emergency announcements.

This application will help to reduce the efforts of employer and employee, quickly analyze data and share this data when they need. The proposed system is based on the intranet service so by using this the organization will work efficiently, and it will help to manage data under a network.

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