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Daily Updates on Construction Sites Progress Using Artificial Intelligence

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ABSTRACT: Construction Production Planning embedded application is developed to track the usage of materials and labors from beginning to end. It coordinates the activities such as: Analyzes the materials required to construct the building, predicts the number of days required to manufacture the product, cost, maintenance and quality assurance. The tradition approach leads to inefficient planning and undesirable products. It intended of storing inaccurate data that created high cost expense. This application reduces manual work and stores the customized requirements of materials required, quantity of materials required in every process, and all the updates on the product. This hardware application schedules the processes of requirement gathering, material analysis, and collection of required data, work force required, production rate, and quality assurance. It prepares ultimate schedules for the above data. Every item is given a unique number for identification. This application maintains a record of every product and the specific materials required to manufacture the product. It includes cost efficient and reduces unnecessary delays.

I. INTRODUCTION

In this process, we assure to solve the problems that has been faced by several customers. The land owners may not know the details of the work going on in their land. They might hand over it to engineers. They pay for the necessities been asked by the engineer. To make the owners aware of all the works going on we proposed this idea using AI. Using AI we are going to accumulate the data required for constructing a building. We are going to embed the data we want as a input. The AI changes it into data patterns, analyses and give us the required data. By this all the details can be known by the builders as well as supervised data consistency can be maintained. In existing system the records is being handled manually. Laborers enter into the company, log in their entry time in notebooks. These entries may also be entered wrongly. Regarding materials, inventory is being maintained by keeping books and accounts. The material manager and labor manager has no idea about what happens in the company. Any process that occurs in order to assemble the product had no means to be monitored. It makes the laborers inefficient. They have started slacking off which increased wastage of materials asap. In order to resolve such issues, production planning is computed. To solve all these problems we have proposed this system.

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II. LITERATURE REVIEW

MU-EN WU 1 AND WEI-HO CHUNG 2^[1] did survey on A Novel approach of option portfolio construction using the Kelly criterion. He proposed that Money management is one of the most important issues in financial trading. Many skills of money managements are based on the Kelly criterion, which is a theoretical optimization of bidding an optimal fraction for position sizing. However, there is still a large gap between the theory and the real trading for money management. In this paper, we design an option trading strategy via Kelly criterion. While the price movements of options are highly volatile, various options' portfolio can be formed by long or short at different strike prices to pre-lock the losses and profits; then we have a fixed profit and loss distribution via holding an option portfolio. Consequently, the Kelly criterion can be applied to the options' trading for calculating the optimal bidding fraction. We propose a method for option trading, in finding the profitable option portfolio by bidding optimal fraction. Compared with prior works, our proposed model is a novel approach for options' trading with the money management of position sizing. Experiments are conducted to show the feasibility and profitability of our method in practical scenarios.

Zhao Yan-long^[2] Railway, as one of the most essential infrastructures of China, has endured extremely high difficulty level due to huge investment scale and high quality requirements. The traditional management method of technical-economic indexes and simulation are not perfect, so simulating technical indexes catering to the features of railway construction project is an accurate and efficient management method. First, the function model is produced by referring to activities of railway construction, then, the information processing general framework of model is constructed combining with the Intelligent Agent theory, and the information model is built through the analysis of the information flows between activity subjects, and the calculation model of every functional subject is modeled by utilizing different Artificial Neural Network model, the technical-economic indexes simulation model will be completed by connecting many functional subjects according to the information flow, and the data is simulated by the model. This model has been tested and verified practical through example calculation.

Qiurui Liu, Jiuping Xu^[3] Large construction and infrastructure projects are a billion-dollar business, but few studies have addressed the integrated operations in this unique domain of the construction supply chain (CSC). The comparison between the CSC and a conventional supply chain enables us to examine its framework and establish a quantitative optimization model for the CSC. To introduce the integrated operations concept into the CSC, many uncertainties need to be first dealt with, for which a multiobjective uncertain optimization model is developed. As the optimization of the owner and fabricator's costs and the service level are the main objectives, a hybrid genetic algorithm with fuzzy-random method is developed to solve the optimization model. An integrated multiobjective purchasing and production planning model is then constructed and applied to a hydropower construction project in Southwest China. The results illustrate that efficient integrated operations are critical for the CSC performance. The optimization results also indicate that considering of uncertain rush orders and delay times can be vital for optimum CSC performance. With this proposed method, construction managers can quickly respond to changing uncertain demand.

Amir H. Gandomi^[4] studies the performances of eight recent swarm intelligence techniques, accelerated particle swarm optimization (APSO), firefly algorithm, levy-flight krill herd, whale optimization algorithm (WOA), ant lion optimizer, grey wolf optimizer, moth-flame optimization algorithm and teaching-learning-based optimization algorithm (TLBO), are explored. Particle swarm optimization algorithm is also considered to benchmark the efficiencies. A final cost is considered as an objective function which deals with shallow footing optimization with two attitudes: routine optimization, and sensitivity analysis. Moreover, as a further study, the effect of the location of the column at the top of the foundation is examined by adding two spare design variables. To this end, three numerical case studies are simulated. Based on the final results TLBO showed an acceptable performance because of the lowest mean values and WOA demonstrated the weakest efficiency among the algorithms in this study.

Md Mahbubur Rahman^[5] Collisions between automated moving equipment and human workers in job sites are one of the main sources of fatalities and accidents during the execution of construction projects. In this paper, we present a methodology to identify and assess project plans in terms of hazards before their execution. Our methodology has the following steps: 1) several potential plans are extracted from an initial activity graph; 2) plans are translated from a high-level activity graph to a discrete-event simulation model; 3) trajectories and safety policies are generated that

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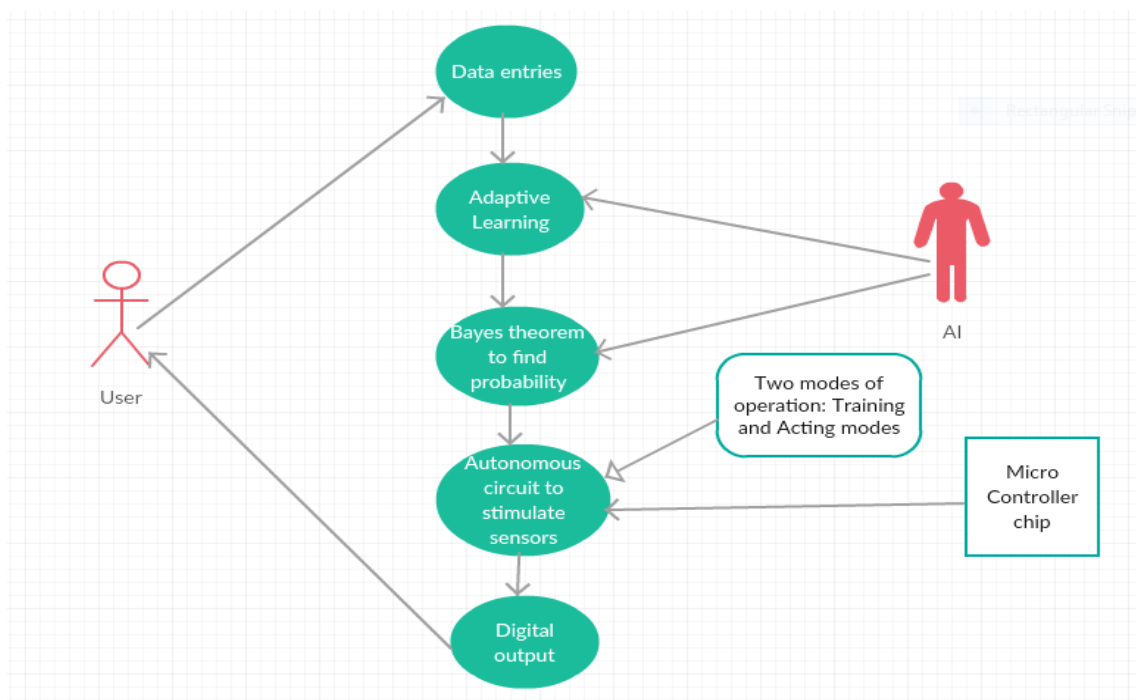
avoid static and moving obstacles using existing motion planning algorithms; 4) safety scores and risk-based heatmaps are calculated based on the trajectories of moving equipment; and 5) managerial implications are provided to select an acceptable plan with the aid of a sensitivity analysis of different factors (cost, resources, and deadlines) that affect the safety of a plan. Finally, we present illustrative case study examples to demonstrate the usefulness of our model.

Yusheng Xu^[6] proposes a workflow for extracting geometric primitives, including linear, planar, and cylindrical objects, from point clouds of the construction site, using a novel segmentation and recognition-based strategy. The entire point cloud is first organized by an octree-based voxel structure. The proposed voxel- and graph-based segmentation is conducted by aggregating connected adjacent voxels in a fully connected local affinity graph, the weighted edges of which consider their saliencies simultaneously, including the spatial distance, the shape similarity, and the surface connectivity. After the segmentation, an improved efficient RANSAC algorithm is tailored to recognize and extract geometric primitives from segments. The synthetic, laser scanned, and photogrammetric point clouds are tested in our experiments, and qualitative and quantitative results reveal that our method can outperform the representative segmentation algorithms for our application having the precision and recall better than 0.77. It also shows a good performance with a correctness value better than 0.7 in primitive extraction

III. PROPOSED SYSTEM

This system consists of a keypad, controller and IOT. The information regarding the construction of a building is given using keypad. Information will be like no of floors and no of BHK, no of labors required to work, amount of materials required to build the flat. If the input is given, the controller will implement AI technique to find the requirement gathering, material analysis, and collection of required data, work force required, production rate, and quality assurance. The daily construction data will be calculated and uploaded in the cloud using IOT. Required data can be revealed when required.

IV. ARCHITECTURE DIAGRAM



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How Artificial Intelligence predicts

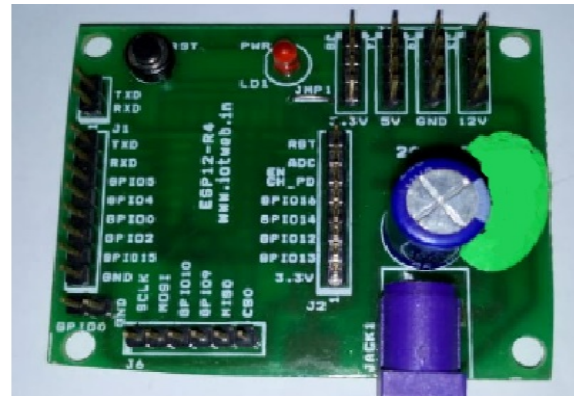
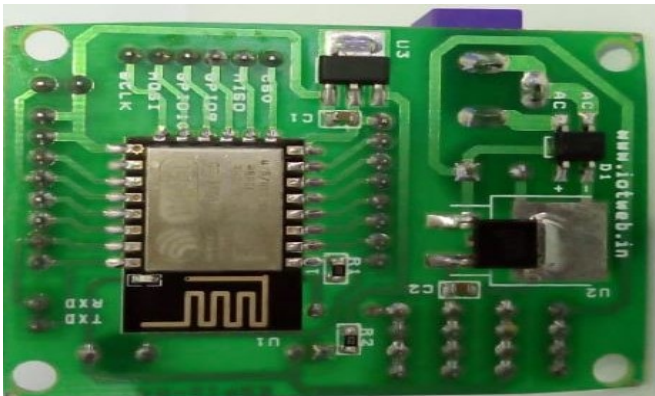
Input data given can be in any order artificial Intelligence predicts the data by using the machine learning algorithms. If the data is in order format it uses supervised learning if not it uses unsupervised learning and convert the data into order format and identifies the patterns from the data after identifying the patterns from input data it uses classification or clustering algorithms for prediction.

Bayes Theorem in AI:

Bayes Rule is a prominent principle used in artificial intelligence to calculate the probability of a machine's next step, and gives the steps the machine has already executed. The machine finds the probabilities if the user gives it a list of instructions to follow. The machine's uniqueness lies in its ability to operate autonomously using the same intuitive extrapolation skills that a human would use. An average person has a lot of appliances in their house that they have been used to operating such as a stove, toilet, or door knob, so that even if they encounter an unfamiliar appliance, they can generalize how to use it based on their familiarity with similar appliances. Similarly, in this process the machine transfers trajectories from things it has experienced to unfamiliar territory. Using this technique the microprocessor predicts the probabilities in calculating the construction works. The Bayes formula is,

$$P(A|B) = \frac{P(B|A) P(A)}{P(B)}$$

Internet Of Things



The Internet of things (IoT) is the network of everyday objects physical things embedded with electronics, software, sensors, and connectivity enabling data exchange. Basically, a little networked computer is attached to a thing, allowing information exchange to and from that thing. Be it lightbulbs, toasters, refrigerators, flower pots, watches, fans, planes, trains, automobiles, or anything else around you, a little networked computer can be combined with it to accept input (especially object control) or to gather and generate informational output (typically object status or other sensory data). This means computers will be permeating everything around us ubiquitous embedded computing devices, uniquely identifiable, interconnected across the Internet. Because of low-cost, networkable microcontroller modules, the Internet of things is really starting to take off.

Embedded C

Embedded C is designed to bridge the performance mismatch between Standard C and the embedded hardware and application architecture. It extends the C language with the primitives that are needed by signal-processing applications and that are commonly provided by DSP processors. The design of the support for fixed-point data types and named address spaces in Embedded C is based on DSP-C. DSP-C [1] is an industry-designed extension of C with which experience was gained since 1998 by various DSP manufacturers in their compilers. For the development of DSP-C by

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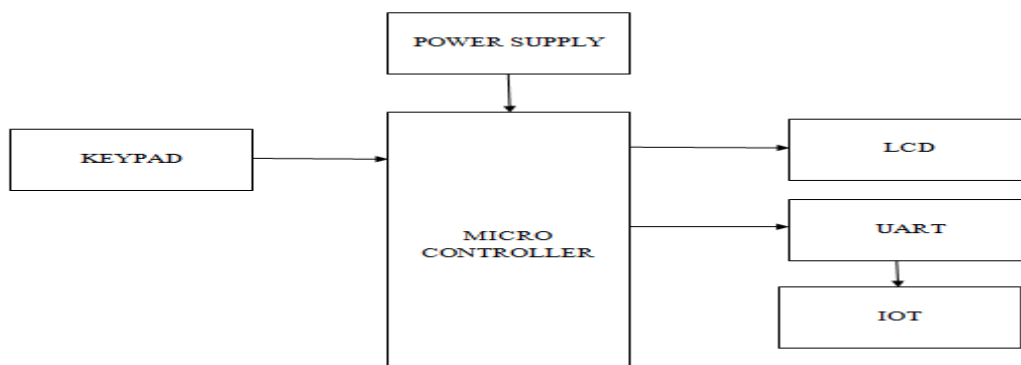
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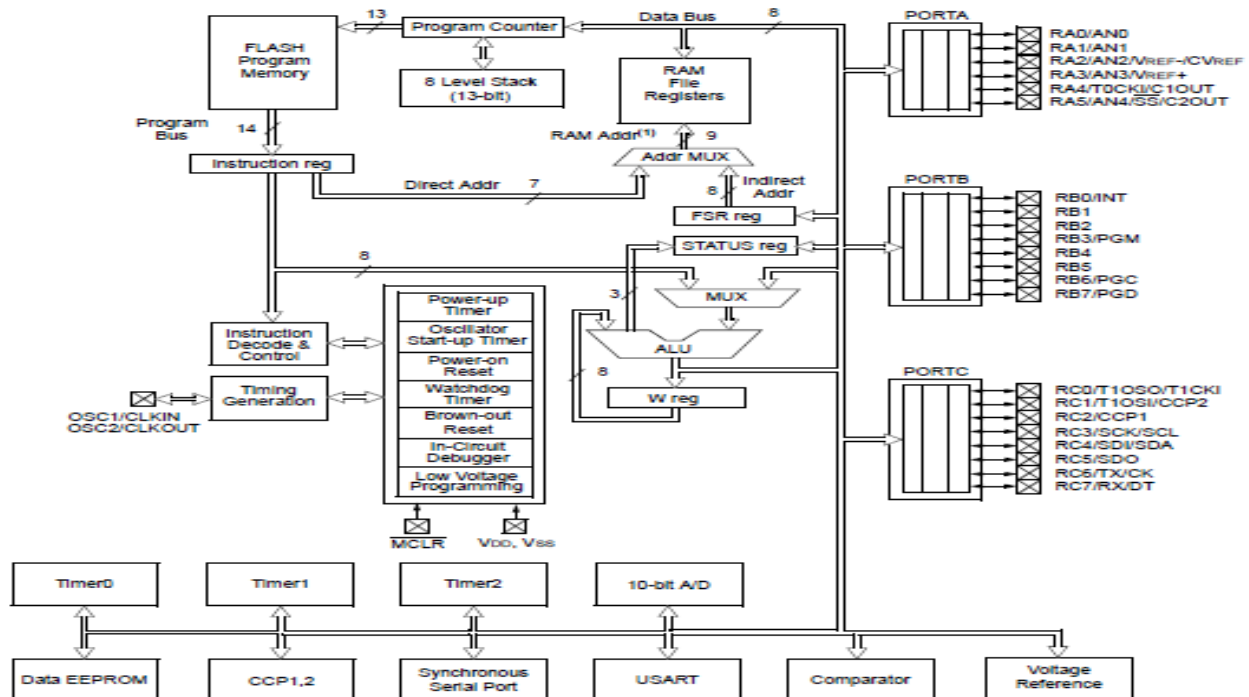
ACE (the company three of us work for), cooperation was sought with embedded-application designers and DSP manufacturers.

BLOCK DIAGRAM:



PIC16F877A

The term PIC, or Peripheral Interface Controller, is the name given by Microchip Technologies to its single – chip microcontrollers. PIC micros have grown to become the most widely used microcontrollers in the 8- bit microcontroller segment.



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V. CONCLUSION

To solve all the existing problems we have revised this idea. By maintaining all the data necessary to construct building, we assure quality in construct, cost maintenance and comfort. Thus resolving of all these problems is the basement for this AI process. The advantage brought out here is automatic data analysis using AI based learning. Hence automatic predictions is done in order to get clear vision of data.

HARDWARE KIT



V. RESULT

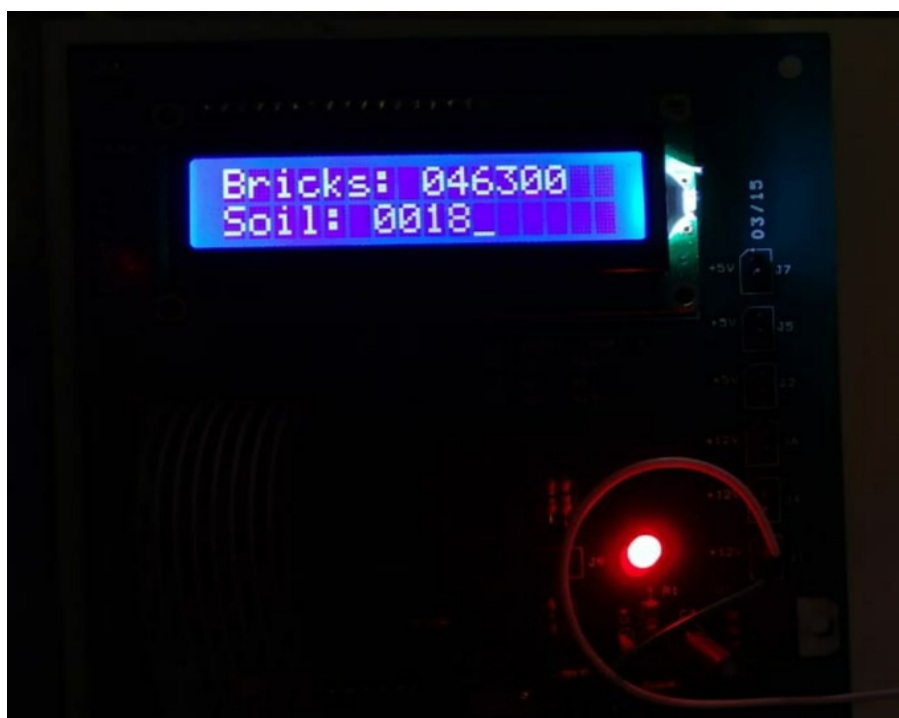
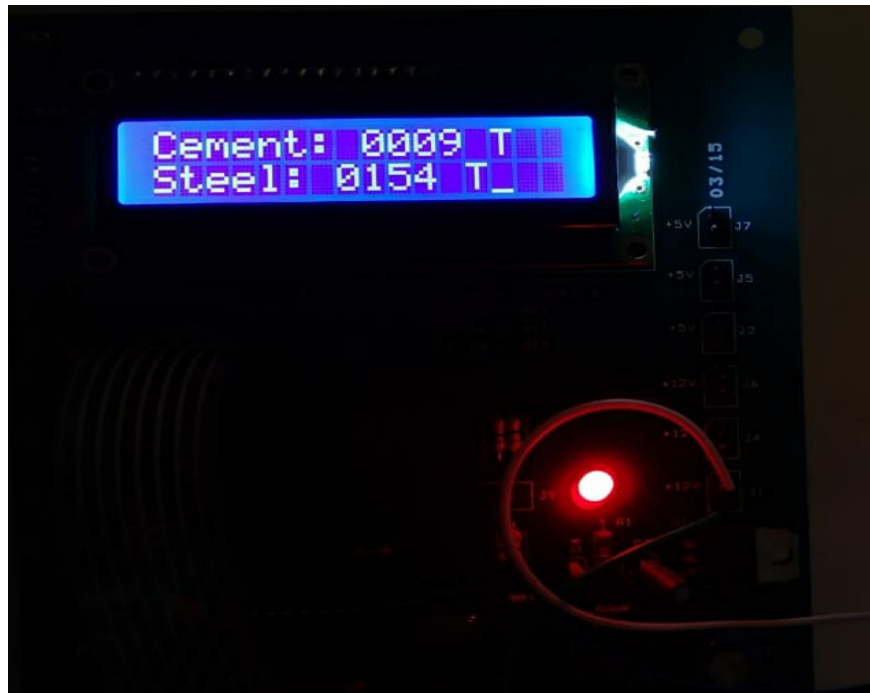
The height, weight and the width is given to find the square feet of the area. Once square feet is calculated it uses AI algorithms for prediction to find the approximate amount of materials required for construction. Using these studies the output is received as below,

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VI. FUTURE ENHANCEMENTS

All the construction site data which was predicted can be maintained in the cloud.so that it will be very useful for future reference.

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