A REVIEW PAPER ON IMAGE PROCESSING TECHNIQUE FOR OBSERVING REAL TIME WORK PROCESS BY CONSTRUCTION EQUIPMENT

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ABSTRACT

Analysis of real time of construction equipment is an efficient utilization of equipment in mega or large project .If equipment has least idle time then higher productivity in construction can achieve. However it is not possible practically to observe the idle time of equipment by human observation. structures. Field monitoring includes the development record of various construction activities. This paper explores the review of methodologies to calculate real time of construction equipment using image processing Construction processes usually adjusted according to the field monitoring, induced ground movements in.

Keywords*: *Image processing, idle time, Real time, Segmentation, Tracking, HSV, RGB.

I. INTRODUCTION

In construction projects 5M i.e. men, machine, money, material and management are required and success of project is totally depend on appropriate use of these five things. In large construction project machinery or construction equipment are essential part for progressive work. Appropriate allocation, utilization, efficiency shows the success of project. To understand the efficiency of utilization on a site is to measure the idle time of particular equipment. For example, equipment's engine is started but the equipment is not doing its allotted task or didn't add any value for particular site then it is calculated as idle time of that equipment. By minimizing the idle time of equipment, contractor can significantly reduce rental fees and labor cost required for operation of particular operation. Real time analysis, good planning will results in greater productivity which can lead cost and time savings.

Engineers are mostly depend on hand written field records to develop or line up the activities of construction. These records often be inaccurate or incomplete due to lack of sufficient data and details. Recently new image technologies are being implemented on construction site to develop a record in digital format. This paper focuses on implementation and development of new image technologies to record the construction sequences of an excavation.

II. RESEARCH BACKGROUND

a) Jorge Abeid Nete and David Arditi describe a method of the presence of structural component from digital picture taken on construction site. The purpose was to introduce image recognisation into the management process to enhance the performance at a site The system developed by them can detect a component in a picture through its position and color. Objects were collected using edge detectors. This results search an algorithm which can detect a structural component in a photograph of construction site. It is significantly enhance the performance of system with a tool that facilitates the integration of time laps digital photography and a dynamic scheduling tool. The algorithm has been coded into software called CMR (Customer Relationship Management).This represents opportunities for an atomic progress control system such as Photo-Net that can be used in construction.[1].

b) Y.Wu and H.Kim presents digital imaging in assessment of construction project process. This paper focuses on image segmentation method designed to distil object of interest structural members from images. The segmentation method combines edge segmentation method with human knowledge of construction scene presented by image morphological operations. The objective of significantly enhance the performance of an image processing method and minimize the need to manually separate objects of interest in an image and achieve dynamic control on process. The edge detector firstly outline the object with thresholds values based on grayscale images. This method is effective to segment a structural components in digital images taken on a site however different kind of structural components need to be identified at a same time or components are too small then this algorithm needs further modification, algorithm has given very promising results and give opportunity for automatic progress control.[2]

c) C.Lukins and Emanuale Trucco presents current assessment of progress in construction project is manual task is often difficult and error occurring. Images of construction site are extremely cluttered and occlusion, people, equipment and shadows making them extremely hard to analyze and distinguish. They give first prototype system capable of detecting the changes on construction site recorded cameras, and classify such images as either actual task or as unrelated. They Propose a system which is capable of automatically detect changes on building site observed with cameras, and to identify changes as parts of the construction plan also they demonstrated how this approach can produce reasonable and reliable detection of key events during construction. The prospect of automated assessment presents high potential for large scale construction projects. Approach an emerging paradigm for integration in the construction industry, and highlight the benefits .[3]

d) Hongjo Kim, Sungjae Park, Jihoon Kim et all. describes an interactive progress monitoring system using image processing in mobile computing environment to enhance progress of monitoring system and process. Their system utilizes different features of computers to collaborate the image processing and mobile computing, that system provide a list of attributes and object of interest, when a user selects an object from the construction site image in mobile computing environment. The user can easily match the attributes and object such as location, material type, etc. according to them this method can increase accuracy of image processing and significantly reduce effort to do monitoring wd manual dependency. As a result two technologies combined together and increase the level of automation of construction progress monitoring and accuracy of image processing simultaneously as well as additionally site information through mobile device allowed users to have right decision making process.[4]

e) Changyoon Kim, Hyoung Kim et.al did Bridge construction progress monitoring using image analysis in which the hardware architecture of the system and its application results are presented with promising outputs. They presents whole process of monitoring of bridge construction from the data collection to data analysis with the help of CCTV camera, and WLAN. Final model were made with the 3D CAD and planned data & collected data were compared. [5].

f) Junhao Zou & Hyoungkwan Kim describes Digital image reasoning for tracking excavation activities using HSV (Hues, Saturation, and Values) color space for image segmentation and object tracking process. HSV color space have advantages over RGB color space to identify and track the construction equipment from noisy background. They briefly explain the methodologies for automatic idle time calculation of an equipment using image processing with the promising outcome which can help project managers to understand exact use of equipment.[6]

III. IMAGING TECHNOLOGIES IN CONSTRUCTION

The use of image processing technique in construction industry has increased with using of digital cameras and scanners. Use of these producers categorized into two groups.

i.Engineering activity monitoring:

Application in this category has been associated with high-rise buildings, tunnels bridges and other big projects. This study widely used for the proper visualization and documentation.

ii. Diagnosis and Characterizations:

In this category digital image processing used in blasting and mining operations for characterized rock mass, geometry and grain distribution. New development in this area includes crack detection, bridge coating, painting defects and inspection of water and sewer pipeline.

IV. SYSTEM ARCHITECTURE FOR DATA ACQUISITION

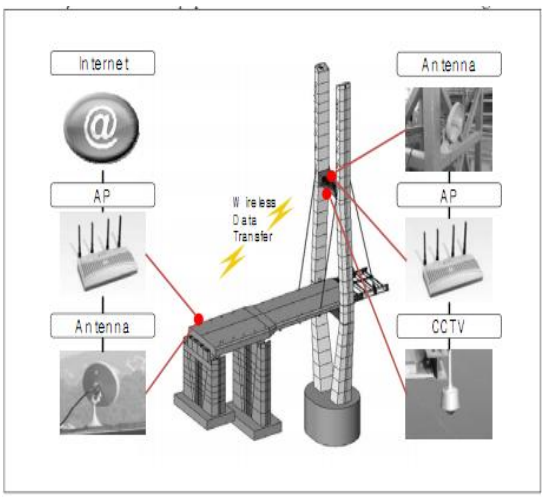

Fig. 1 Architecture for data acquisition [5]

The images from construction site to head office can transferred fig. 1 shows the system architecture for collection of data. CCTV camera installed on site or on adjacent building which is more convenient and gives

proper visual area. These CCTV cameras are connected with the internet, so acquired data will be easily transferred to users. The device that allow wireless communication i.e. access point are used first for data transformation and second for data reception. First

access point will connected to camera and other to the internet. Image data collected through CCTV camera can successfully transferred through WLAN system. Managers can monitor the equipment progress from office itself.

4.1 Object Segmentation

This is most challenging task from whole process. The process of partitioning a digital images into various segments to simplify the image into more meaningful and easier to analyze. It sets the object and its boundaries from image. RGB color information is used to equipment detection and later object of interest detected by canny edge detector.

Fig.2 Original Image[6] Fig.3 Grayscale image of original image [6]

4.2 object tracking

After image segmentation, we have to trace the exavator. Generrally object tracking some features like color range, sharp feature, size feature are identified. One site equipment with similar color may couse confusion so object tracking is essential.

performing the proper intensities of three primary color red, blue and green. Range of intensities varies between 0 to 255 called pixels.

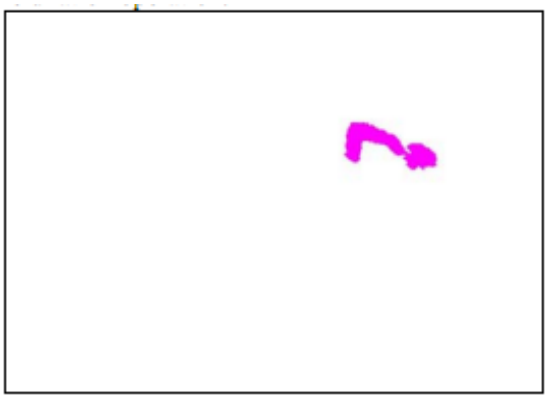

Fig.5 Object tracking[6]

4.3 Programme Architecture

A programme developed using MATLAB do automatically estimate the real time of equipment.Some other functions are also added in programme like resizing the original image which avoids the unwanted interference

from other objects in image and reduce the processing time and other function is object selection fuction which allows to user to select the object of interest fro original image.

V. CONCLUSION

In this paper, I have discussed the whole process of monitoring and excavtion from the automated data acquisition to the data analysis first accest paint will connected to camera and other to the internet. Image data which were collected through CCTV camera can successfully transferred through WLAN system. Managers can monitor the equipments progress real time office itself with the use of camera, WLAN, image data of the construction site automatically transfered from site to the office. To analyse the construction precess and excavation activity, image processing technique along with the MATLAB model are used which can help project engineers better understands their equipment usage. Image processing and proposed methodology are able to effectively measure the real time of any construction equipment.

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