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The Example of Cope with the Unexpected Accidents using by Vision System in Automation Facility

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Abstract

Background/Objectives: This study is presented a method for making the SMART EMS to complement the disadvantages over the conventional chain and phase of the EMS. **Methods/Statistical analysis:** Conventional methods are intended to be laid as the material and the product on the conveyor and the processing assembly carried continuously. Moving from higher place to lower place and vise verse becomes a major accident occurs where the discovery of the administrator cannot be achieved thereby a loss in this process is enormous, and its causes are also took considerable time to find out a cause. **Findings:** This study is the Industrial Estate Authority of on-site customized technology development. The production history of sudden crashes and crash load of automobile production plant will be within the automated system. The development of wireless transmission to the manager in real time could be assessed immediately the automatic conveyor to the situation. Sound possible with the conveyor and the impact sensor and the real-time image recording apparatus. **Improvements/Applications:** For the research purpose, the development of a radio transmitter to send an image to install and to solve the various problems is described. The system is referred Smarrol.

Keywords: Automatic, Conveyor, Electronic Mono Rail System (EMS), Manufacturing, Recording, Video

1. Introduction

The Electrical Mono rail System (EMS) is a kind of conveyor system. The conveyor system is a conveyor or elevator installation according to the flow if it is determined that the flow of production in a continuous production. This approach is the material on the conveyor, put the product assembly / processing as will be subsequently transported. For example, while the semi-finished product assembly rests on top of the main conveyor line that flows from this process as fair. On the other hand the individual components required for assembly is laid on the conveyor transport system is taken in the sub-line to be supplied to fit the time of the assembly to a predetermined location of the main line. Conveyor system is not only mass production. Its coverage in small quantity batch production can be applied to was very spacious Moreover, even cheaper transportation costs. EMS[1] is mainly among manufacturers of electronic products and automobile manufacturing plant manufacturing plants, and says the unmanned Automated Material Handling Equipment used in the production plants, such as food factories. It is advantage to the interval control and flexible over the batch control system using a variety of belts and chains in the system operational as it is operates as a self-controlled manner. 100 years ago from now, Ford is developing a conveyor system, factory automation system goes through the industrial revolution evolved according to the needs of the industry were derived by the current factory automation systems (EMS)[2]. The use of this EMS will improve productivity, excellence in environmentally-friendly province, Noise Reduction, and incident response castle flexibility somewhat expensive, but the way in the modern automotive industry, which are widely used to replace existing automation chain. It is presented the results of efforts to build a smarter (SMART) by EMS for the definition of these weaknesses EMS one step beyond in this research paper.

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2. Main Topic

2.1 Development Objectives of the Study

If transferring a number of products has been produced within the car manufacturing plant has been manning the production line can also check the area as possible with the naked eye. On the other hand, it is also impossible to confirm the area. In the former case, if the accident happened in the incident is relatively easy, whereas the naked eye cannot confirm place, it was not until the state line was stopped after the accident is confirmed that it is possible and probable cause analysis. For example, the conveyor carrying the load for the between the various production lines such as vertical rise to the second and third floors, unmanned automated line of descent when visual confirmation is impossible, and in particular, conflict between the conveyor and loading in this section the crash of the goods occurs frequently. But it does not have to buy a certain point, immediately correspondence is not easy. In addition, it is difficult to know the cause of the accident has not been written. The next point is difficult to measure because the accident occurred after an accident caused by a short analysis and mechanical information. The burden of enterprises for labor costs per person placing the cursor in the local car manufacturing plant accident, it is impossible. This study is the Industrial Estate Authority of on-site customized technology development. The production history of sudden crashes and crash load of automobile production plant within the automated system would be. The development of wireless transmission to the manager in real time, the automatic conveyor could be able to assess the situation immediately. Sound possible with the conveyor and the impact sensor and the real-time image recording apparatus for this purpose, the development of a radio transmitter to send an image to install and to solve the various problems described.

2.2 The Contents of the Development Study

There is its own automation equipment, video recording and wireless transmission capabilities for Computer-Aided Engineering (CAE) analysis and incident response for unforeseen mechanical strength and durability of the main part. It developed a real-time image recording device for unattended and automated production equipment installed conveyor and records the sudden crash course and, in the case of the load falling conveyor stops equipped with recording devices automatically detect the crash and sends a signal to other conveyor nearby also it stops at the same time. And receive the stop signal as described above, collision, crash due to shock or even more than a certain decibel is based on more than sound sense to also stop after an accident process can be operated again send a safety signal. It also allows a user to wirelessly transmit the incident in real-time to determine the production line. Casualties by adjusting the flexibility to produce products in a manufacturing plant in Smartrol technique[3,4] developed in this study and smooth processing of difficult to find the cause catastrophic accident case, This system that reduce accidents may contribute to increased productivity in the following three things with the development objectives and to carry out research. First, the increase in carrying capacity of 1.5 tons and with a 3~4mm precision in unmanned conveyor control automation development, and second, important site CAE analysis for the exact stop control, third, wireless video recording device developed for the outbreak incident response. This study focuses on wireless technology video recording device developed for the most important outbreak incident response.

3. The Wireless Video Recording System Developed for Cope with Unexpected Accidents

3.1 Conveyor Design

In addition to visually check the available work area and high-speed transfer section vertically moving image recording period and auxiliary systems were developed for smart transport systems with automated analysis of causes for the sudden accident that occurred in the loading zone[5]. If the product step by step to ensure the future development of the market after the manner video recording and wireless data processing and other safety conditional on its (sound, position, shock, vibration and other) real-time transmission of various data to the administrator at the same time everything It is expected to develop a system that can be identified. It is generated outside and receives the events from the four-channel video control box in the event of a shock event. This system is transmitting an image of each one minute before-after the computer as an administrator wirelessly previous event time, to analyze the causes of accidents that occur in the sudden vertical movement section and the transfer section and the mounting section for the system so as not to relapse

again. It is referred a flow chart of the image processing system of Figure 1.

The image processing system is a video recording system for image recording unexpected accident. To ensure a smooth power supply DC 24V, it developed the port to continue to supply the 5V power from conveyor. In addition, the development of conveyor and conveyor system board PCB BOARD was developed for PC-type display[6,7]. It has developed a display board for the first conveyor, which is a traditional PLC to a PC-type conveyor. It was developed to shrink the size of existing operations in the region and the transfer region and moves up and down for easy loading zone. A 24V to the wireless video processing device is consumed, 5V power supply was designed to continuously supply. PCB BOARD of pc-type conveyor shows Figure 2.

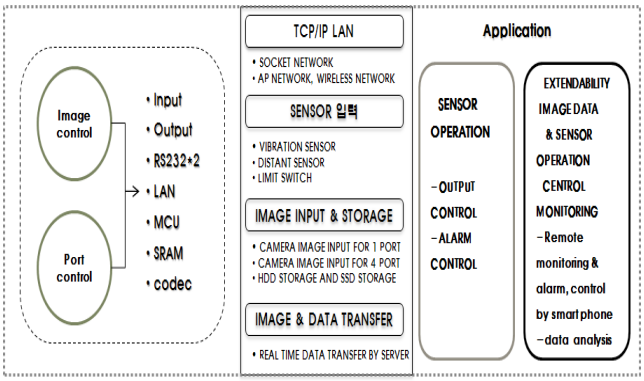

Figure 1. Processing diagram of video recording system

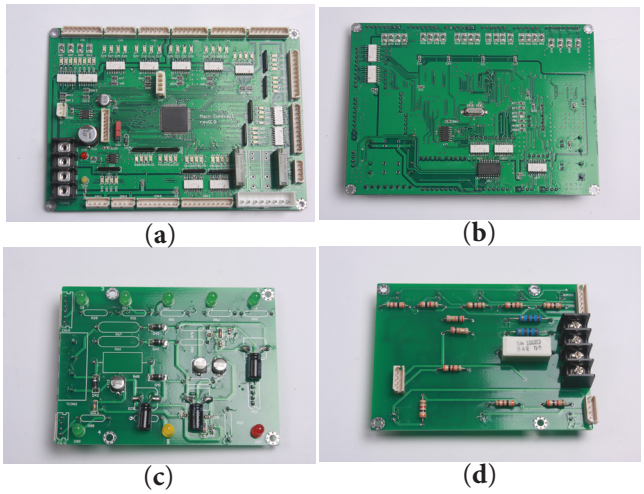

Figure 2. PCB board for PC in 3 point trolley. (**a**) Board front of 3 point trolley main control. (**b**) Board rear of 3 point trolley main control. (**c**) Board front of 3 point trolley for display. (**d**) Board rear of 3 point trolley for display

3.2 The Development of Video Recording System

Image processing system for developing a main controller of the image recording device was produced in a 4-channel video processing device. This is similar to the car for a black box system of an existing one-channel, two-channel. However, the unit is two-channel front and rear for at the front of the 4-channel image from the camera to the unexpected event occurrence time of two channels-the device is designed to store before-after one minute. Stored in the image processing apparatus is designed to automatically transfer and storage in the image processing system of the administrator through the wireless IP. The detail is expressed in Figure 3.

It utilizes a wireless IP Figure 3 as shown in the above image processing to be sent to the administrator's computer, this event will be the basis of factory automation and unmanned automation. The purpose of this study is to interpret the purpose of coping with unforeseen incidents commitment to install a vision system to Smartrol unmanned automation system like Figure 4.

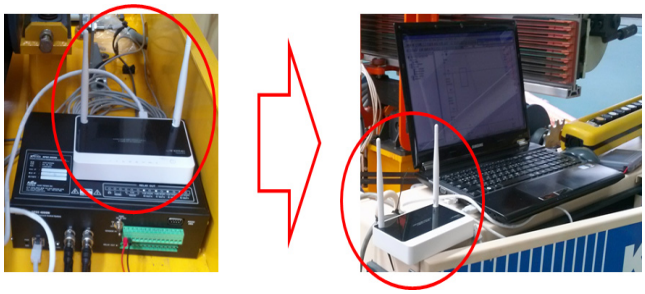

Figure 3. Image transfer of accident processing in administrative PC by wireless IP application

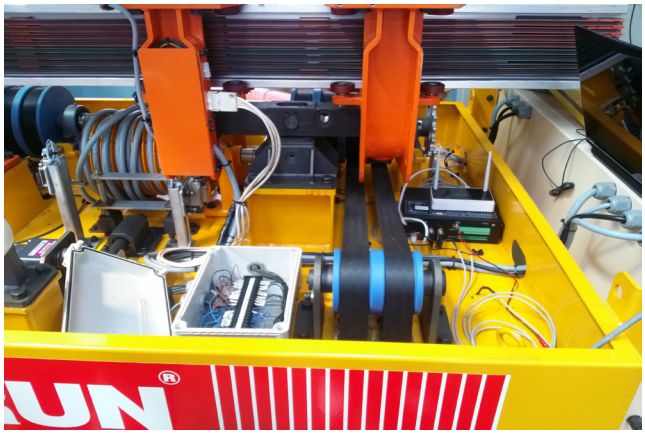

Figure 4. 3 point trolley attached inside video recording system

The following Figure 4 and 5 are the process for their system configuration[8].

Video recording device developed a communication protocol of the Set Sound Device (SSD) recording device with the main controller. This allows to transmit the images were stored on the administrator's computer wirelessly. Setting up a wireless communication IP was designed to take a 4-channel video camera test like Figure 6.

As shown in Figure 6, it has been developed in a way to record the image in front of one minute after the accident in the event of conflict the image. In the screen, you can see a real-time video and developed a system event occurs attribution is possible. Display is lit on your computer's video event occurs when managers to red and it is seen that the image is saved in the bottom right of the screen like Figure 7. In addition, the development of software that can be viewed as compatible with the stored image as a regular player it is possible to watch in real time as a regular player like Figure7. Finally, the block diagram driven for the image processing system is as follows.

Figure 5. Prototype of 3 point trolley with attached 4 video recording cameras

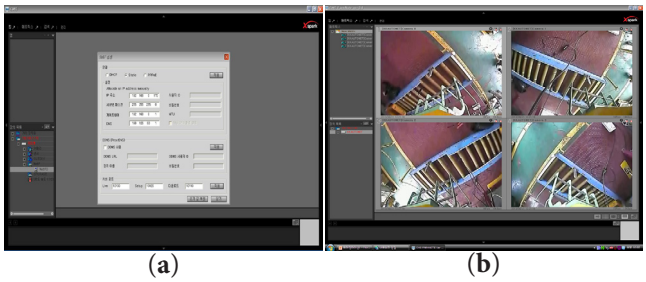

Figure 6. Test image for video recording system. (**a**) IP set-up for wireless telecommunication. (**b**) TEST Image by 4 channel cameras

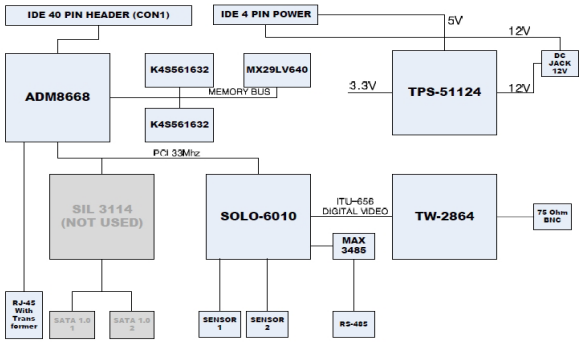

Figure 7. Block diagram for video processing system

4. Conclusions

EMS currently used in the automotive manufacturing process is hard to build the accident causes and countermeasures in case of the eyes of the people cannot assure because of unmanned and automation. To this end, First, the appropriate amount of loading of the large size of the vehicle are to be designed with larger control the conveyor while the right precision. Second, there is a need for a significant parts CAE analysis for accurate stop control. Finally, it requires a wireless video recording system developed for cope with the unexpected accidents. For this, results of present study carried out a wireless video recording system developed for the unexpected accidents are as follows:

1. It is developed a wireless video recording system for unexpected accidents. For the development of the study, design flow chart for a video recorder, the redesign of the PCB board, four channel camera were mounted in this system.
2. Each accident is one minutes video, etc. they are automatically saved after they occur. It is stored into the pc to a small file. It is sent to the user in real time. The user controls the entire line in the video storage device to identify it.
3. EMS system obtained through an automated line application system as described above can be supplied to other similar industrials and can apply to competitive systems requiring automation on the same principle.

Through this system, automation and unmanned of industrialization are possible.

5. References

1. Yao Y, Fang Y, G. Hu, The Dynamic Performance Analysis Model of EMS-MAGLEV System Utilizing Coupled

Field-Circuit-Movement Finite Element Method, *Progress in Electromagnetics Research Symposium*, Hangzhou, China, 2005, p.22-26.
2. Cho D, Kato Y, Spilman D. Experimental comparison of sliding mode and classical controllers in magnetic levitation systems. *IEEE Control Systems Magazine*, 2003; 13(1):42-48.
3. Ahn K, Sung W. Hwang W. Dynamic Stress Analysis of Cranktrain Using Flexible Multi-Body Dynamic Model. *Journal of Korean Society of Mechanical Technology*. 2010; 12(4):67-74.
4. Kim K. The Numerical Method for Quasi-Static Analysis of Mechanical System, *Journal of Korean Society of Mechanical Technology*. 2013; 15(6):973-79.
5. Ryu H, Lee M. The Strength of Materials, Won-Hwa Press, 2003, p.203-374.
6. Kalaivani R. Sudhagar K. Lakshmi P. Neural Network based Vibration Control for Vehicle Active Suspension System. *Indian Journal of Science and Technology.* 2016 Jan; 9(1):1-8.
7. Thamaraiselvan A. Thanesh A. Suresh K. Palani S. Design and Development of Reliable Integral Shaft Bearing for Water Pump in Automotive Engine to Reduce Assemble Time and Increase Production. *Indian Journal of Science and Technology.* 2016 Jan; 9(1):1-7.
8. Daya Priyanka D. Jayaprabha T, Daya Florance D, Jayanthi A, Ajitha E. A Survey on Applications of RFID Technology. *Indian Journal of Science and Technology.* 2016 Jan; 9(2):1-5.