INDUSTRIAL AUTOMATION USING IOT

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ABSTRACT:

Industrial Automation is the use of control system such as computers, robots or information technologies for handling different processes and machineries in an industry to replace a human being. At the present scenario certain parameters are still manually controlled so in our paper we are trying to make everything automated [1]. By considering all the consequences of the industry we are using some of the basic sensors. It is the second step beyond mechanization is the scope of industrialization. Automation in the industrial workplace provides the advantages of improving productivity and quality while reducing errors and increasing safety and adding flexibility to the manufacturing process. In some emergencies, we can protect the highly expensive machines to some extent by monitoring the sensor values. Our sensors convert the real time parameters like temperature, fire and gas into electrical signals. This data is then transferred to the controller for the purpose of monitoring and to analyse real time parameters. By using Iot, we are implementing a smart model that is helpful to the society [2].

INTRODUCTION:

In recent times internet application development demand is very high. So internet of things is a major technology by which we can produce various useful internet applications [5]. The iot is a network of smart devices that connect and interact via the internet. It is basically a network of physical objects or people called things that are embedded with software, electronics, network and sensors that allow these objects to collect and exchange data. Iot makes virtually everything smart by improving aspects of our life with the power of data collection [7]. The entire iot process starts with the basic devices

like smartphones, smartwatches, electronic appliances like TV, washing machine, which helps to communicate with the iot platform. The four main components of an iot system includes sensors, connectivity, data processing, user interface [4]. Sensors are the devices that helps to collect live data from environment. It could be a simple temperature monitoring sensor, gas sensor or fire sensors. All the collected data is sent to a cloud infrastructure [7]. The sensors should be connected to the cloud using various mediums of communications [3]. User might need an interface which checks iot system.

LITERATURE SURVEY:

Theresa Beyer, Nasser Jazdi, Peter Gohner, Rahim Yousefifar have written a paper on the knowledge based planning and adaptation of industrial automation system and published in the year 2015. Product lifecycles are getting reduced day by day, but the lifecycles of industries remain stable[6]. The aim of this paper is the development of assistance system, which supports the planner and adaptation of industrial automation system by generating and analyzing different alternatives to control the system[5]. The implementation is based on the assistance system to view the activities of the industrial automation and react to the current situations[2].

Wei Liang, Meng Zheng, Yutuo Yang, Shuai Liu have written a paper on a wireless network solution for factory automation and published in the year 2019[6]. This paper presents a comprehensive survey on approved International Electrotechnical Commission standard wireless networks for industrial automation[4]. This approach first introduces the system architecture of WIA-FA including network device, system management and illustrates WIA-FA protocol stack and key technologies. The next application adopts the deployment of WIA-FA as a real time wireless network[6].

Mallikarjun Kande, Nathaniel Taylor have written a paper on automation system generic security key manager and published in the year 2018[5]. This paper gives a research about the interest in industrial automation domain towards the existing and future industrial systems[3]. The keys used for secure communication must be monitored continuously against unauthorized disclosure, misuse, or loss[6]. From the system level perspective a flexible, easy to interact is essential for successful security deployment. This paper works on interoperability using a generic key for industrial automation[7].

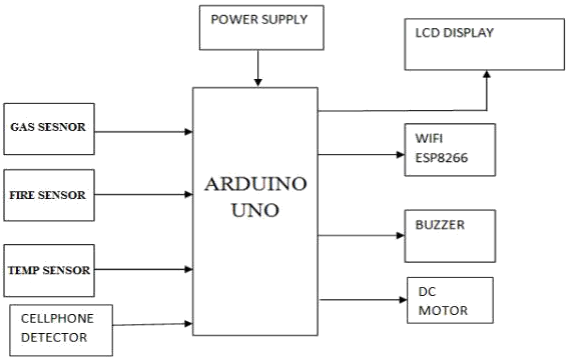
Alexander Faul, Nasser Jazdi, Michael Weyrich have written a paper on approach to interconnect existing industrial automation

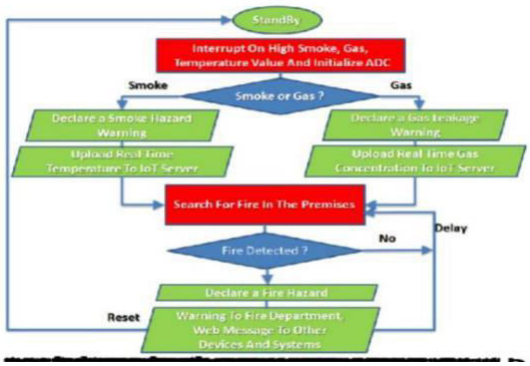
systems with the industrial internet and published in the year 2016[7]. In this document we describe an approach to interconnect existing industrial automation systems with cooperation networks, like the internet of things, even if the industrial automation system uses a different communication protocol.[6] Between these interfaces the messages are processed and translated by services representing industrial automation system[4].

Hao Luo, Qing Li have written a paper on evaluation indicators architecture for industrial automation system integration and published in the year 2014[2]. The evaluation of industrial automation system integration to support decisions is critical for enterprise management. This paper proposes an evaluation , which absorbs the ideology and principles of system. Based on the idea that management process plays a key role on IAS integration[4], a generic evaluation indicators architecture for IAS integration evaluation is derived from the proposed model.

METHODOLOGY:

The automation requires intelligent devices for data collection and ability to transform data into useful information[4]. In industries we can't predict how the disaster happens so all the measures should be taken to overcome it[5]. Some of the basic sensors like temperature, fire, gas are being used. Suddenly if the fire catches the entire industry will burn so we should control it by taking some of the smart steps to prevent it[2]. So in that case the automatic alarms or buzzers should alert us and automatically water pump should on and stop spreading the fire. Hence the highly equipped machines are protected in certain situations[6]. In medical field certain instruments are meant to be stored in some highly restricted temperature[7]. And the temperature should be maintained accurate. If it crosses certain threshold temperature then the sensors will sense the temperature and alert the management to take the sudden action to overcome the situation. Simple and effective steps like automatic fans are operated or windows are opened[8]. Most of the chemical industries provide harmful gases which is dangerous to the society, so we should avoid that to happen by taking some smart steps by automatically open the windows.





The automatic controlling of industrial devices is implemented here[2]. Sensors that are connected in this project reacts to the current situation by taking smart and sudden actions to control the industrial activities[7]. Concept behind the working of this system uses the automatic monitoring which keeps a track of the system and the environment to which the industries are exposed to and automatically the precautions are taken[8]. Fault detection and device safety precaution is considered in the industrial automation, if any sudden blast or chemical reactions occurring the system gets prior the notification about the precautions to be considered[7]. Iot update of data and controlling, the analysing of data present in the system is monitored continuously[3]. Any new data that is fetched is automatically stored in the available system and manages all the activities of the industrial system.

CONCLUSION:

Gas leakages in households and industries cause risk to life and property[3]. A huge loss has to be incurred for the accident occurred by such leakages[7]. A solution to such a problem is to set up a monitoring system which keeps on monitoring the leakage of any kind of flammable gases and protects the consumer from such accidents[1]. The present paper provides a solution to prevent such accidents by monitoring the system but also communicating the same with IoT network to switch off the gas supplies and the main power in case of a leakage[5]. In addition to this, it activates an alarm as well as sends a message to the authorities[4]. A further advancement can be in the form of a skirting color sensor which will be able to sense the location based on color coding.

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