

# Iot Based Industrial Automation

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**Abstract:** All running technologies have been on the verge of getting replaced by a great system that provides very specific, efficient and quick access and controlling for the devices as per user demand. That is nothing but IoT that stands for 'Internet of Things'. It deals with bringing control of devices over internet. The internet of things (IoT) is the network of physical devices, vehicles, buildings & items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. Our project aims at connecting the unconnected, evolving the machine to machine communication. Being at one place user will get access over all the machineries in the industry. It makes the whole system automated. We propose efficient industry automation system that allows user to efficiently control industry appliances/machines over the internet. Filling is a task carried out by a machine that packages liquid products such as cold drinks or water. Traditional methods of bottle filling involved placing bottles onto a conveyor and filling only one bottle at a time. This method is time consuming and expensive.. In industries to reduce manual overhead we have implemented Internet of Things (IoT) in Industry to monitor as well as to inform the responsible person to take appropriate measures partially fulfilling our requirements. Artificial Intelligence could be used to control and monitor the industry. IoT is not a technology basically it is an "Ecosystem with Industry Specific Implication".

**Keywords:** Artificial Intelligence, IoT, Sensors, embedded electronics

## I.INTRODUCTION:

The field of automation has had a notable impact in a wide range of industries beyond manufacturing. Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provides human operators with machinery to assist them with the muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements as well. Automation plays an increasingly important role in the world economy. One of the important applications of automation is in the soft drink and other beverage industries, where a particular liquid has to be filled continuously. For these kind of applications the trend is moving away from the individual device or machine toward continuous automation solutions. Totally Integrated Automation puts this continuity into consistent practice. Totally Integrated Automation covers the complete production line, from receipt of goods, the

production process, filling and packaging, to shipment of goods. Our project is also an application of automation wherein we have developed a bottle filling. Our project aims at filling and capping bottles simultaneously. The filling and Capping operation takes place in a synchronized manner. It also includes a user-defined volume selection menu through which the user can input the desired volume to be filled in the bottles. The entire system is more flexible and time saving.

## II. LITERATURE SURVEY

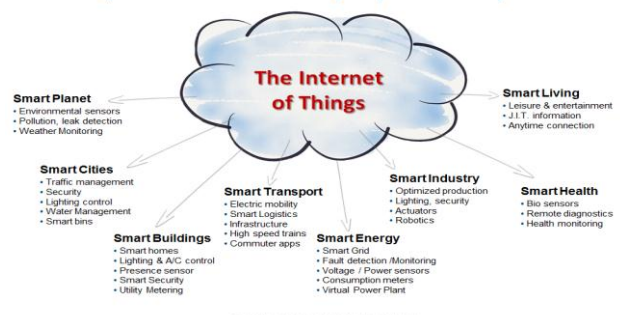
The concept of the internet of things was introduced by the members of the radio frequency identification development community in 1999. This concept is very popular because of growth of mobile devices, embedded and real time communication, cloud computing and data analytics. The internet of things is a network of physical objects are embedded with electronics, software and sensors having the ability to collect data from the world around us and share data across the internet.[1] The future M2M market will be fuelled by the wide variety of applications that this technology enables. In the proposed system the communication between monitor and industrial plant is achieved using GPRS, the distance barrier is eliminated and automation is achieved from any part of the world. [2]

## III. GOALS AND OBJECTIVES

To develop a system which will automatically monitor the industrial applications and generate Alerts/Alarms or take intelligent Decision using concept of IoT and also design the system to Take Intelligent Decision and Control Devices[3].

## IV. INTERNET OF THINGS (IOT)

**IoT is Not a Technology – It's a Complex Ecosystem with Industry-Specific Implications**



The internet of things (IoT) is the network of physical devices, vehicles, buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. The IoT allows Objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure [9]

V. PROPOSED ARCHITECTURE

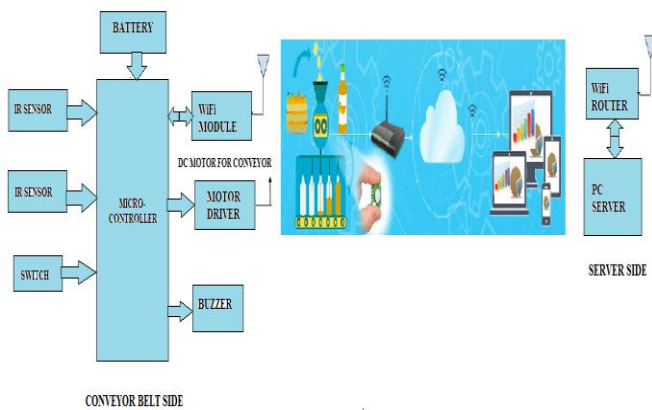


Fig: PROPOSED SYSTEM ARCHITECTURE

The main part of the project is the industrial automation, which makes the industry to run through internet. To control this action we create a web page where we give the input that is click on the button sitting at one place on your web page and getting your machinery start in your industry. The web page appears on users PC and internet is connected to the machines through Wi-Fi modem. There at the receiver side motors are connected to the application to drive them. The motors are controlled with the help of a Microcontroller.[4]

The Board we are using are free scale Arm Embed Board KL25Z which controls the robotic arm. The user interface which is used to control the robotic arm is made on a web page or an app. The control is given via the internet to the Wi-Fi module. This acts as the receiver and gives the received signal to the microcontroller (KL25Z).

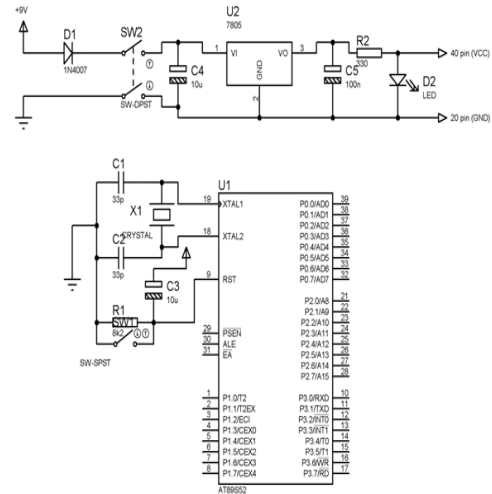
The microcontroller will act as per the given instructions. The controller board is already connected to the server through the Wi-Fi module. The signal which is given to the industrial machine is actually sent through the internet and hence we can access it from any place. However the web page or the app must require a login ID and a password for security reasons, for a person to control the industrial appliance. The happenings in the industry during the absence of manual attention can be seen through a CCTV camera. In this way

the appliance gets the command through a web page by the user and the human or user doesn't has to manually control the machinery in the industry.[5]

VI. HARDWARE AND SOFTWARE REQUIREMENTS:

Hardware Requirements

1) AT89S52



The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

2) IR sensor

An infrared sensor is an electronic device that emits and/or detects infrared radiation in order to sense some aspect of its surroundings. Infrared sensors can measure the heat of an object, as well as detect motion.



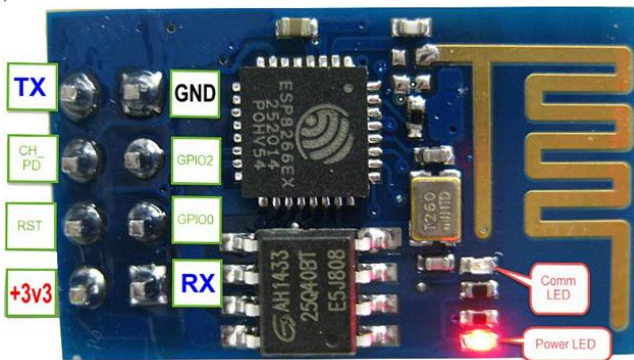
IR Sensors work by using a specific light sensor to detect a select light wavelength in the Infra-Red (IR) spectrum. By using an LED which produces light at the same wavelength as what the sensor is looking for, you can look at the intensity of the received light. When an object is close to the sensor, the light from the LED bounces off the object and into the light sensor. This results in a large jump in the intensity, which we already know can be detected using a threshold.

3) Switch

A switch is a component which controls the openness or closeness of an electric circuit. They allow control over current flow in a circuit (without having to actually get in there and manually cut or splice the wires). Switches are critical components in any circuit which requires user interaction or control



4) MSP2666 :



It provides unsurpassed ability to embed Wi-Fi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.

ESP8266EX offers a complete and self-contained Wi-Fi networking solution; it can be used to host the application or to offload Wi-Fi networking functions from another application processor.

Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any micro controller based design with simple connectivity.ESP8266EX is among the most integrated Wi-Fi chip in the industry; it integrates the antenna switches, RF balloon, power amplifier, low noise receive amplifier, filters, power management modules, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

5) Motor driver IC(L293D)

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16 pin IC which can control set of two DC motors simultaneously in any direction. It means that you can control two DC motor with single L293D IC, Dual H-Bridge Motor Driver Integrated Circuit. The L293D can drive small & quite big motors as well.



Software Requirements

- 1) Keil- Assembly language coding
- 2) VB
- 3) Diptrace- PCB layout
- 4) Uc Flash- Program flash into the IC

VII.APPLICATIONS:

1) Smart Medical:

A connected healthcare environment promotes the quick flow of information and enables easy access to it. Improved home care facilities and regular health updates to clinicians reduce the chances of redundant or inappropriate care, improve patient care and safety, and reduce overall costs of care. Connected health solutions can also be used to track lifestyle diseases such as hypertension, diabetics and asthma which need continuous monitoring. The IoT-MD provides an environment where a patient's vital parameters get transmitted by medical devices via a gateway onto secure cloud based platforms where it is stored, aggregated and analyzed. It helps store data for millions of patients and perform analysis in real time, ultimately promoting an evidence-based medicine system.[6]

2) Machine to Machine:

M2M communication is something that involves a large number of intelligent machines that share information and make collaborative decisions without direct human intervention. This potentially leads to achieving improved cost efficiency. M2M offers the telecommunication industry a great opportunity as it needs a lot of communication systems via various technology families, such as IP, RFID, sensor networks, smart metering, etc.[7]

3) Smart Grid:

The data generated in a smart grid is more than that generated in a traditional grid due to the continuous two way communication between the parent utility and the smart meter at the customer's home or business setup. If the infrastructure isn't ready for such communication, it can be a barrier to smart grid deployment. Here, IoT technology plays an important role. It can help streamline the transfer of high volume data over an internet protocol. The IoT is also needed to establish seamless and effective communication between context aware sensors and the smart meter installed at the user site for automatically switching the devices on or off based on load patterns.[8]

VIII CONCLUSION:

Nowadays we need everything computerized. Earlier we can only monitor the situations with the help of cameras. In industries to reduce manual overhead we have implemented Internet of Things (IoT) in Industry. As sometimes it will be late in this process and it will harm to property as well as life. For this purpose we are developing a system for Automation using IoT with the help of Artificial Intelligence to make system automated

The system developed uses basic conveyor belt mechanism for bottle size detection and counting number of bottles. This system also gives us flexibility for controlling conveyor belt from computer side.

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