INTEGRATION OF IoT WITH MUFF FURNACE IN THE CONTEXT OF INDUSTRY 4.0

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Abstract : The Internet of Things is a trending evolving topic of technical, social and all other branches. This concept is very progressive in all the field of education, the future of the Internet of Things which will transform the real world objects into the intelligent virtual objects. There are number of applications of IOT that makes the humans life more simpler. In this paper we discussed the new topic that is development of the smart furnace by using Internet of thins and optimization of that smart furnace with the help of some advance technique and with help of internet of things. In this project we used the thermocouple and the microcontroller to take the input and for display the out put we are going to use laptop. In this project we make the furnace automatic and we can operate it from remote area or from some distance without the contact of it.

Industry 4.0 is the subset of the fourth industrial revolution that concerns industry the fourth industry encompasses areas which are not normally classified as an industry, such as smart cities, for instance. Industry 4.0 is the trend towards automation and data exchange in manufacturing technologies and processes.

In this paper, we discuss about the progress of the project we are doing in the integration, implementation, programming and all. We are going to use the arduino,furnace, relay, wi-fi Router and other requires instruments in this project, with the help of it we make the project successfully. Basically integration part is most important step in this research paper.

IndexTerms **-** Furnace, Relay, Microcontroller, node MCU(ESP8266), Max6675, Laptop, Jumper wire.

I. INTRODUCTION

The “Internet of Things” (IoT) may sound complex but in actuality, is a fairly simple concept to understand. On a very high level, IOT is the ability for things that contain embedded technologies to sense, communicate, interact and collaborate with other things, thus creating a network of physical objects. Internet of Things applications can be found in every industry with a diversity of applications for smart homes, smart buildings, travel and transportation health and personal care, retails and many more. Increasingly we will see the Internet of Things creating a smarter solution, programmatically adjusted to the human behaviour.

Nowadays, there is continuously grow the demand of automation and intelligent systems so that it leaves us with less intervention and smart decision-making devices. With the growing demand, which introduce the competition in that field and the competitors has force to come out with more intelligent, efficient as well as user friendly models. This is made our life very simple. With the tap of our finger we can control the everything which we connect it to the IOT. This field will be very beneficial to the people for the future point of view and make their life so easy and save their more time that they can spend on another thing.

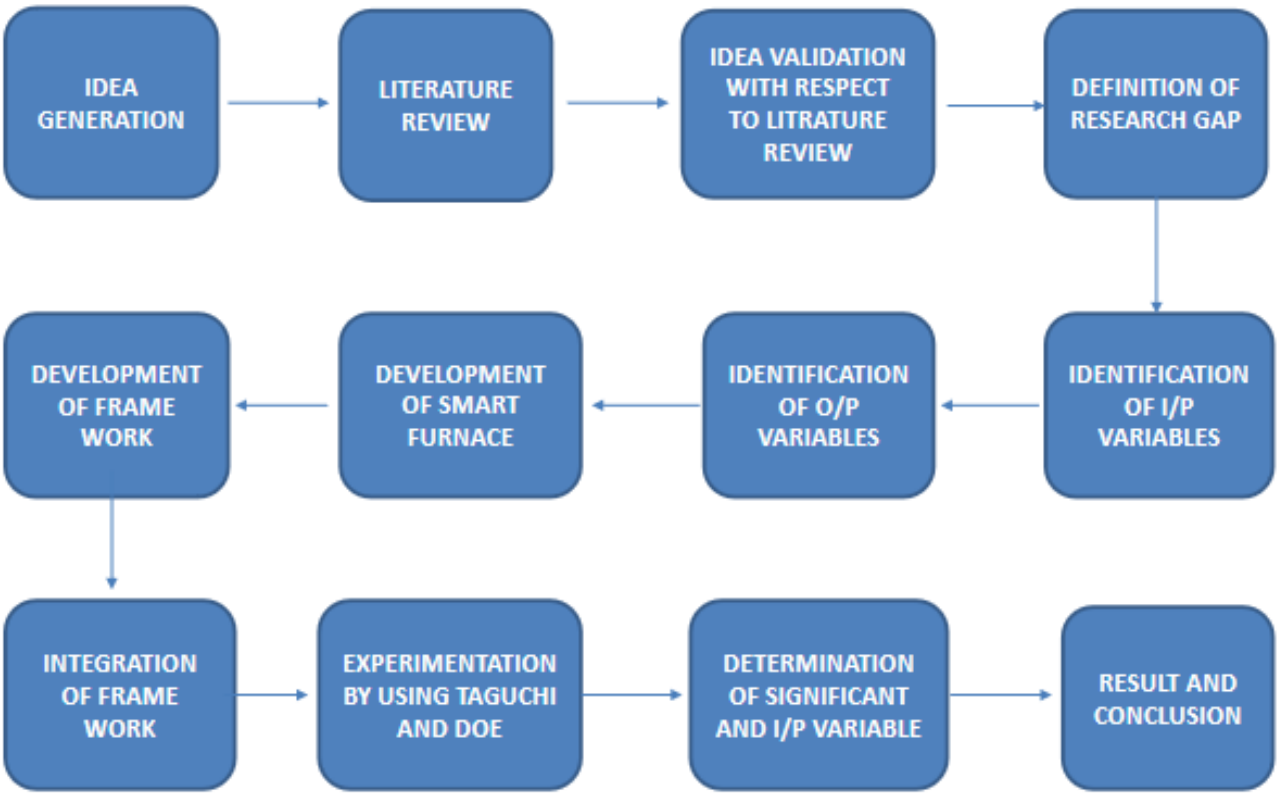
smarter furnace with the help of IOT and we are going to optimize the furnace. In this we can operate it from the distance nearly 20 to 25 meters. We give the signal to the thermocouple by using laptop simply give the values for heating, heating time, socking, socking time and cooling which we can do with the help of other devices or instrument. Due to this smart furnace working will be easy and side effects on the human due to high temperature will be very less. It save the time also and gives the accurate readings due to optimization. We convert the furnace and optimize it which all are going to do with the help of under the observation in the lab.

Now we are going to implement the project we complete the most important work in this project like integration and implementation of the project.

II. METHODOLOGY

This section represents the methodology of the proposed project.The methodology is given in the figure below.The proposed project is followed by a step-wise process.Firstly, the idea was generated over the topic of Internet of Things, Smart Furnace and gathered the relevant information. Then the Literature Survey was done with the help of prime journals like IEEE and other reputed journals.After analysis, we found that our idea is unique and has not yet been implemented in the real world. It is also evident with the literature review that there is a great definition gap in

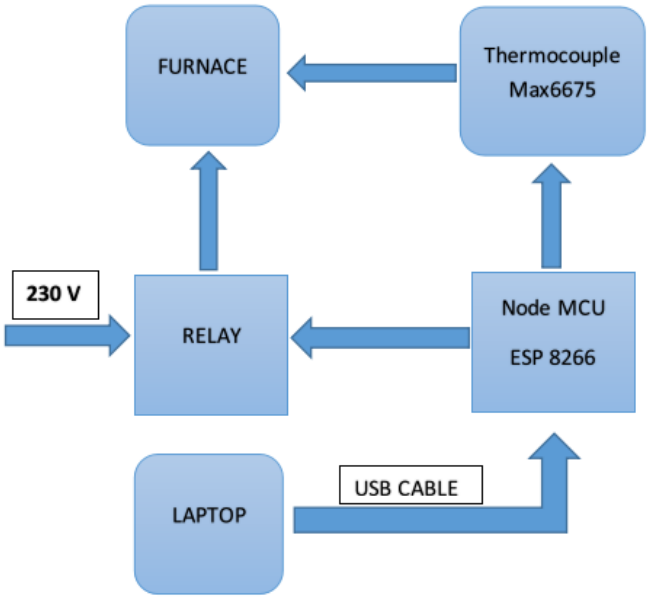
the idea as in present the Ordinary Furnace is used in the Industry but the concept of Smart Furnace is not yet used in the real world.With the clarity of concept of the proposed project, we have determined the input variables and its corresponding output variable. The proposed project is followed by the development of smart furnace with the help of framework. The framework developed will be implemented successfully.After the complete integration, experimentation will be done by Taguchi and Doe Experiment. Finally, the proposed project is successfully executed with the help of following steps explained earlier.



III. FRAMEWORK

In this paper, there is some changes in architecture and framework of the project which ,in these we replace the some devices for convenient and simple use. Modified framework is below and which is final for further process.

The main purpose behind this project is to reduce the efforts of the workers and students. When the furnace ON process start automatically in it. In this furnace there is two main steps that are very important that is heating and soaking After completing the process furnace is off automatically, there is no need to switch off it. And it provides the accurate reading about the material.



IV. COMPONENT USED

1.FURNACE:-

Furnace is mainly use for the heat treatment on any material like heating and soaking. In this furnace is use for the same purpose but the furnace can operate all the things smartly or automatically by using IOT technology. This is use for the heating purpose.

Fig: Furnace

2. NODE MCU ESP 8266 :-

Node MCU is ans open source IOT platform.It is the single board microcontroller,its operating system is XTOS. it is included the wifi in this nodeMCU unit. It is the main component in this project by using it we are going to operate the furnace with the help of IOT. NodeMCU has storage capacity of 4Mbytes. Its CPU is ESP 8266 and its port is USB type.

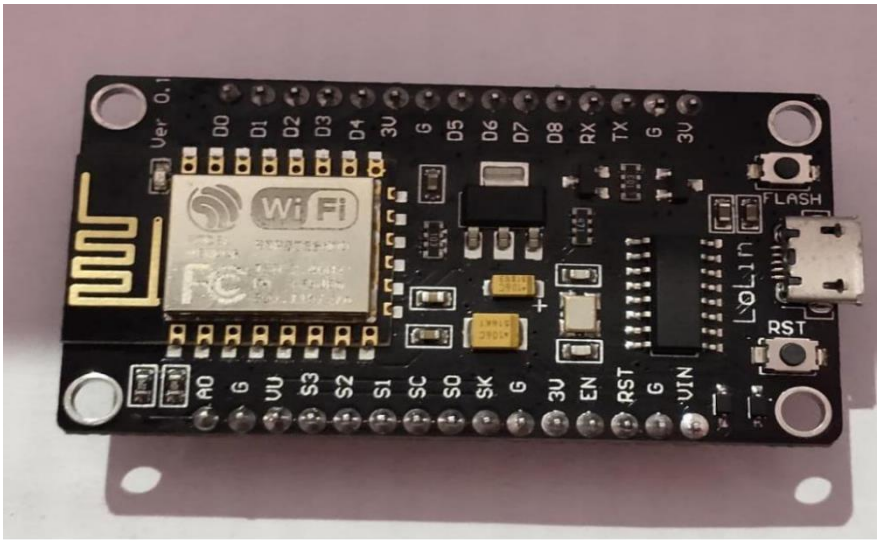


Fig:- NodeMCU

3. MAX 6675 THERMOCOUPLE:-

MAX 6675 Thermocouple is a temperature sensor which can sense the temperature upto 1024 degree celcious. MAX6675 K-Type Thermocouple Temperature Sensor performs cold-junction compensation and digitizes the signal from a type-K thermocouple. Thermocouple has a 5.5 volt and current is 50 MA. There is a inflammable wire which can sense the temperature having the length 36 cm(14.4 inches).

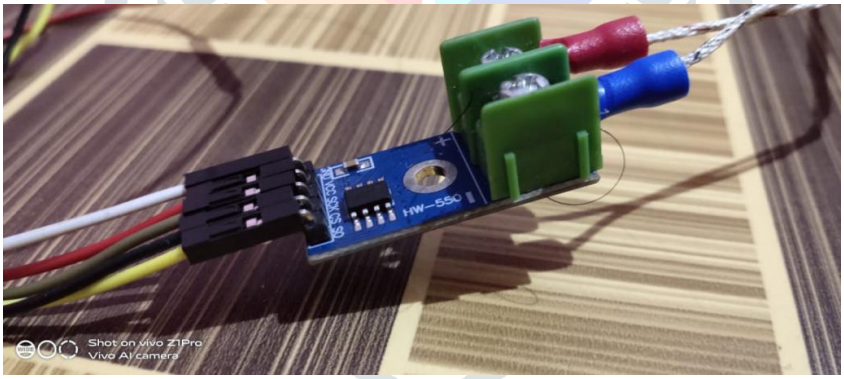


Fig:- MAX 6675 THERMOCOUPLE

4. RELAY :-

Relay is an electro-mechanically operated switch, however other operating principles are also used in relays, such as solids state relay. A relay is generally used when it is required to control the circuit by a separate low –power signal. A type of relay that can handle the high power required to directly control an electric motor or the other loads is called contractor.

A simple electromagnetic relay consist of a coil wire wrapped around a soft iron core (a solenoid), an iron yoke which provide the reluctance path for a magnetic flux, a movable iron armature, and one or more sets of contacts. The armature is hinged to the yoke and mechanically linked to one or more sets of moving contacts.

FIG:- RELAY

V. CONCLUSION

The Internet of things is a fascinating field, which connects everyday devices to the internet, bringing life more closely to the technology.This technology is giving the opportunities in technical field and also other field to people to improve the thinking.In this we will make the normal furnace into smart furnace by using some sensors and IOT technology so that reading of furnace will be easy to take.

This technology will helpful for market purpose and for collages .it is also evident that paradigm of IOT make it own way into the market place over coming year.IOT technology will change the life because of continuous progress in this field.

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