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RASPBERRY PI BASED INDUSTRIAL PROCESS MONITORING OVER ANDROID AND CONTROLLING THROUGH ZIGBEE

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Abstract - *This system proposes advance system for industrial parameter monitoring using Raspberry Pi. The parameters that are track are light intensity, temperature, level of any fluid. In this project we can use two modules that are called master module and slave module. Master module includes the Raspberry pi module which is heart of the system and slave module includes PIC controller (Peripheral Interface Controller) as a main part. ZigBee is using both sides of the project as a transceiver. The design of the embedded board includes the interfacing of different sensors to slave board and connecting that slave to a master board through ZigBee module. All the monitoring parameters we can observe on our android mobile phone which is one type of human machine interface (HMI) display. The main objective of this project is to maintain all the parameters values in order to produce good quality of the products.*

Key Words: Raspberry Pi, ZigBee, Android, Human Machine Interface (HMI), Peripheral Interface Controller (PIC), Master Module, Slave Module, Sensors.

1. INTRODUCTION

This system is a embedded base system. The design of the embedded board includes the interfacing of different sensors to slave and connecting those slaves to a master board through ZigBee. The hardware design is done with the surface mount devices (SMD) on a double layer printed circuit board (PCB) to reduced the size and improve the power efficiency. The master and slave boards use PIC 16F4877A Microcontroller, LM35 and LDR Sensors, Float level sensor, ZigBee, Bluetooth Model, Buzzer, Relay, LCD display etc. all these are the components which we are use in this project. This system uses a one master module and one or more than one slave module. That is you can control number of plants in your industries while sitting in your server station. This feature increases more scope to this project because only one master module can control the many of the slave modules at the reliable cost and less power consumption. Also this project can help to increase the productivity of the industry by accurately controlling and monitoring of all the parameters in the industries with low power consumption.

2. THE SYSTEM

As shown in the figures 1 and 2 the block diagram of master module and slave module connects the various types of components. In order to reduce man power and saving of money, here the system provides easy automation solution using embedded board. The proposed system gets all the information of setting parameters like temperature, liquid level, and light intensity through the data base of Raspberry Pi. All the sensors in the system are connected to the PIC microcontroller. The PIC stored all the set values in its memory and continuously compares these values with the output values of the sensors and send this information towards the BT- module which shows all the live parameters on our android mobile phone. If the values which we are set are continuously increasing then PIC sends a signal to the Driver and driver provides sufficient current and voltage to the relay to turn ON and this relay OFF the System.

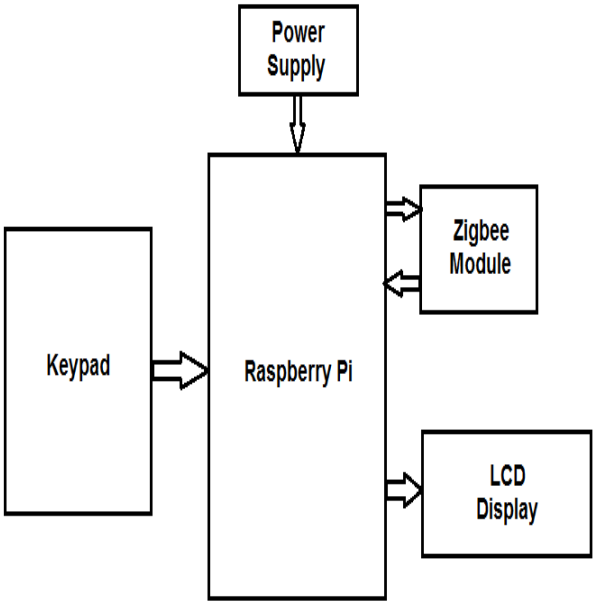

Fig 1: Block diagram of Master Module

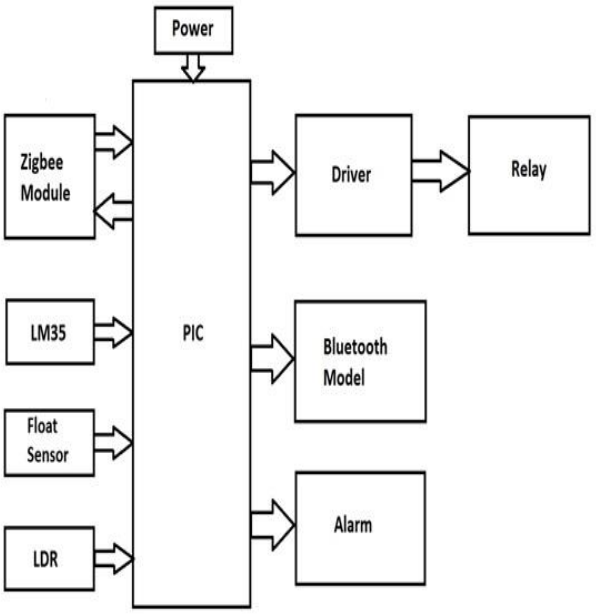

Fig 2: Block diagram of Slave Module

3. HARDWARE OF THE SYSTEM

Figure 3 and 4 shows the hardware of the system which includes master board and slave board.

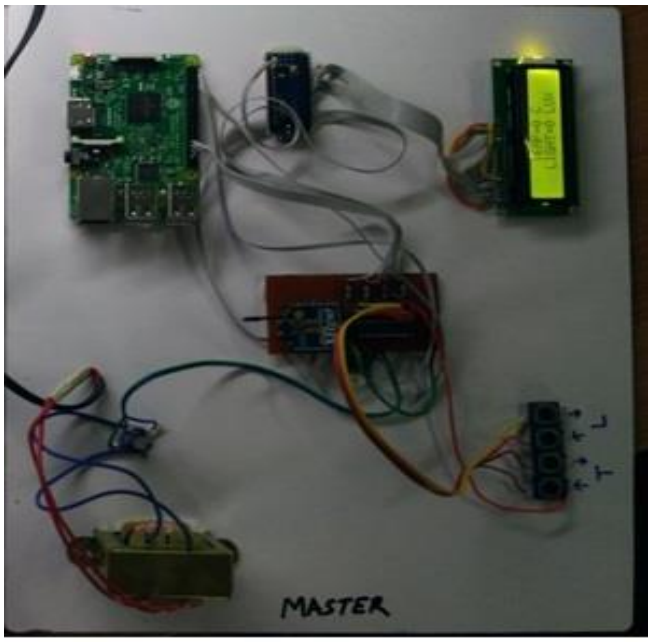

Fig 3: Block diagram of Master Board

Fig 4: Block diagram of Slave Board

4. RESULT

We can observe the following types of results when power is provided to the system. all the below figure shows the different types of output to the system.

Fig 5: Initial Conditions of system

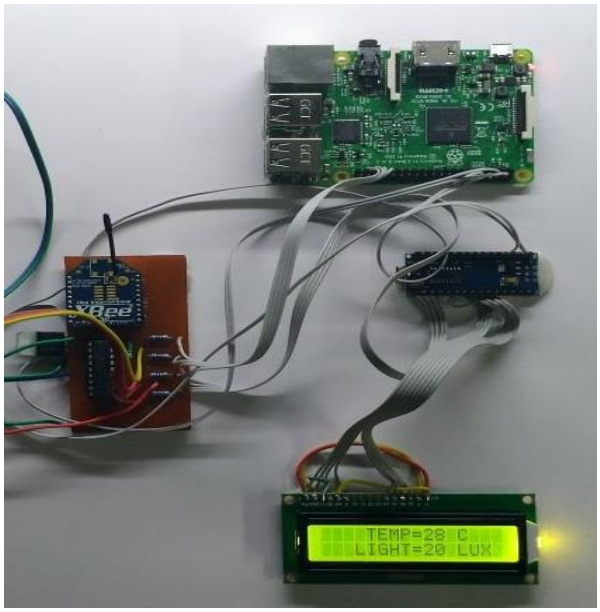

Fig 6: Set the Parameters Values

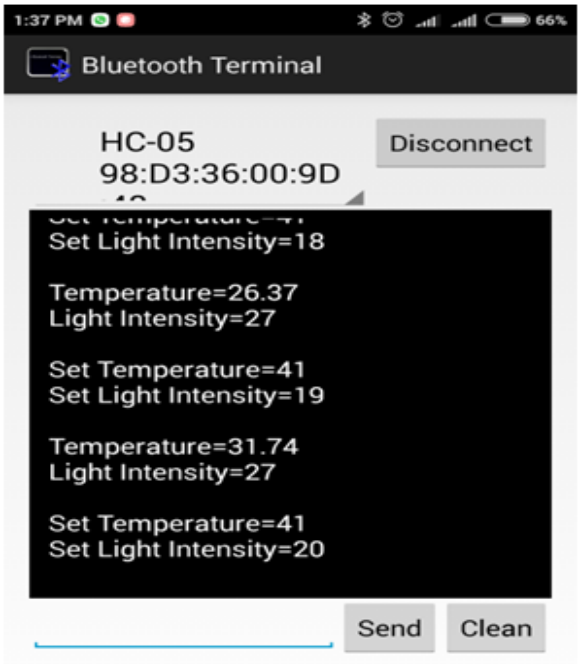

Fig 7: Snap shot Showing Live parameters in industry

Figure 8 shows that the water level is up hence motor relay is OFF and temperature is below set point hence heater is ON.

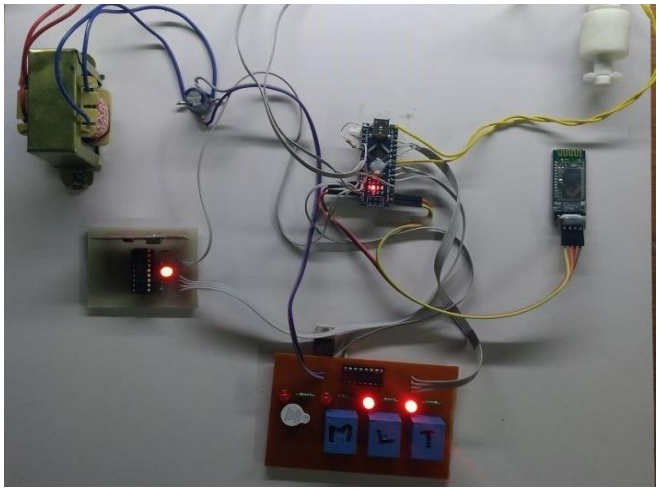

Fig 8: Observation on board

5. CONCLUSION

In this project work we are completed all the work and can able to run the system. Both boards master and slave work properly also can efficiently provides the output of the system. All the parameters are control and monitor using this system. hence this system can provide complete automation with very low power consumption and low cost. This system is acts similar to the SCADA system.

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