

IOT: Detection of Keys, Controlling Machines and Wireless Sensing Via Mesh Networking Through Internet

Md. Nasimuzzaman Chowdhury¹ and Samiul Islam²

¹ American International University-Bangladesh

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Abstract

Internet of things is getting developed rapidly. Each and every day new devices are getting connected with internet. This stream of IOT brings new experience in our daily life. Connecting our wearable devices, gadgets, keys etc can make our own home a new world to us. Every component of our house can communicate with us through IOT. But connecting each device with internet requires costly devices like Wi-Fi modems, GPRS modems etc. This makes connecting each component with internet quite expensive. In this paper we have developed a cost effective way of connecting each component with internet quite expensive. In internet. As most of the household components are stationary and close to each other they can be connected with each other through mesh networking. A central device will receive their information and transmit it to internet. The cheapest way to create a mesh network is to use NRF protocol and a WIFI modem does the rest of the work to upload each and every data of this network to internet. In this project there are several nodes regarding their purpose like sensor nodes to collect temperature, humidity, CO₂ gas quantity and monitor through internet. Control nodes turn on or off AC, fans, lights of house and detection node to find out keys, sun glasses, and small objects.

Index terms— internet of things (IOT), mesh network, Wi-Fi, home automation, sensor monitor. and every day new devices are getting connected with internet. This stream of IOT brings new experience in our daily life. Connecting our wearable devices, gadgets, keys etc can make our own home a new world to us. Every component of our house can communicate with us through IOT. But connecting each device with internet requires costly devices like Wi-Fi modems, GPRS modems etc. This makes connecting each component with internet quite expensive. In this paper we have developed a cost effective way of internet. As most of the household components are stationary and close to each other they can be connected with each other through mesh networking. A central device will receive modem does the rest of the work to upload each and every data of this network to internet. In this project there are several nodes regarding their purpose like sensor nodes to collect temperature, humidity, CO₂ gas quantity and monitor through internet. Control nodes turn on or off AC, fans, lights of house and detection node to find out keys, sun glasses, and small objects.

Keywords : internet of things (IOT), mesh network, Wi-Fi, home automation, sensor monitor.

IOT: Detection of Keys, Controlling Machines and Wireless Sensing Via Mesh Networking Through Internet connecting each component with internet quite expensive. In their information and transmit it to internet. The cheapest way to create a mesh network is to use NRF protocol and a WIFI or centuries researchers are trying to develop home automation systems. But most of the automation system depends on the presence of the user. Some solutions made through voice recognition, some are sound alert systems. Like "A zigbee-based home automation system" by Gill, K. Shuang-Hua Yang; Fang Yao; Xin Lu [1]. But IOT is a breakthrough in the world of home automation. The IOT has the potential to change the entire world into a smarter world. Where automated dictions like when things need replacing, repairing or recalling can be made easily and efficiently by

using IOT. Consequently it would greatly reduce waste, loss and cost of things that we cannot monitor properly. Although, the research into the IOT is quiet in its embryonic stage There are also several projects using IOT but the overall cost for each automation is not effective. But if two nodes do not communicate with each other then they can be placed in any distance while maintaining specific distance from base station. Base station consists of a microcontroller, NRF transceiver, and an R171 wify module. Nodes are largely categorized into three categories. Firstly controlling nodes (e.g Node 1, 3, 5, 6). Any node consists of relays to control ACs, fans, lights and NRF transceiver falls into this category. Secondly, sensing nodes like node 4 consists of temperature and humidity sensor. In this way this network can be used as wireless sensor network (WSN) also. Last but the most interesting node is called detection node. Lots of time we lost our important things like keys, sun glasses, small bags etc.

But we know that these things are somewhere near us. So these nodes contain leds, piezo buzzer and NRF transceiver. Whenever the important little thing is lost an alarm can be generated from internet and leds will start blinking, buzzer will start buzzing.

In this project there are several nodes and one base station. Nodes are required to control, collect information and sense devices. Base station is used to transmit these data to internet. With one base station unlimited number of nodes can be connected. The communication between nodes and base station is through radio frequency. But each node has to be within a circle of around 50meter from the base station. Each node can communicate with each other if necessary. If two nodes communicate with each other then the distance between the nodes also have to be 50meter. The nRF24L01 is a highly integrated, ultra low power (ULP) 2Mbps RF transceiver IC for the 2.4GHz ISM (Industrial, Scientific and Medical) band. With peak RX/TX currents lower than 14mA, a sub μ A power down mode, advanced power management, and a 1.9 to 3.6V supply range [??6]. The nRF24L01 integrates a complete 2.4GHz RF transceiver, RF synthesizer, and baseband logic including the Enhanced Shock Burst hardware protocol accelerator supporting a high-speed SPI interface for the application controller.

It's a 2.4GHz IEEE 802.11b/g transceiver. High throughput -921Kbps TX, 500Kbps RX data rate with TCP/IP and WPA2 over UART, up to 2Mbps over SPI slave. The RN-171 module is a standalone complete TCP/IP wireless networking module. [??8] The Circuit diagram of this system consists the following equipments: In this node with an Arduino Nano, Led light , buzzer and NRF24L01 protocol is connected. This node PCB device can be connected with any necessary keys that helps to find the keys very quickly. In this node with arduino nano temperature, humidity and gas sensor is connected. With this node device it's possible to sense any places temperature or humidity and the transmitted data can be viewed instantly via internet from anywhere.

For very small distance like 50meter NRF transceiver are reliable but if any movable object go beyond this distance its untraceable. There are other devices like Zigbee can be used for long networking. Here limited number nodes has been used but more than 6nodes are little complex through NRF24L01 transceiver. Overall we can say that through a mesh networking we connect the network with internet and our dream of connecting each component of this world with internet can be achieved very rapidly. It's a perfect present time solution until Wi-Fi modules comes in cheap with IPv6. The base station also tweet the temperature and humidity after an interval period of time. This time interval is selected by the user. By this node the system can give an update of temperature and humidity of anyplace this system is setup Here user is Md. Nasimuzzaman. So user can select a command to turn on or turn off lights, fans, Ac. This base station will accept tweets from @Md.Nasimuzzaman only.

All the outputs are shown in the tweeter. Here are some tweets transmitted from user account and retweet from base station. When connection establish base station tweet of connection establishment.

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Figure 1:

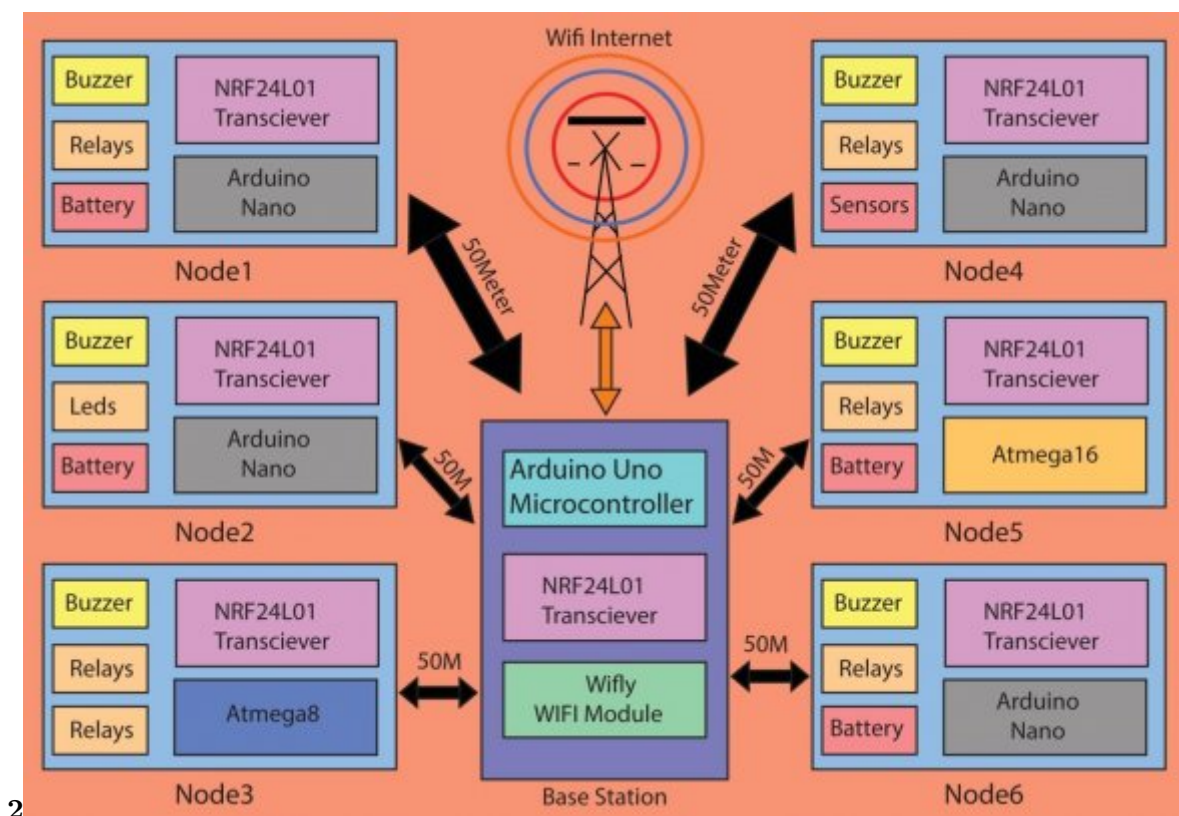
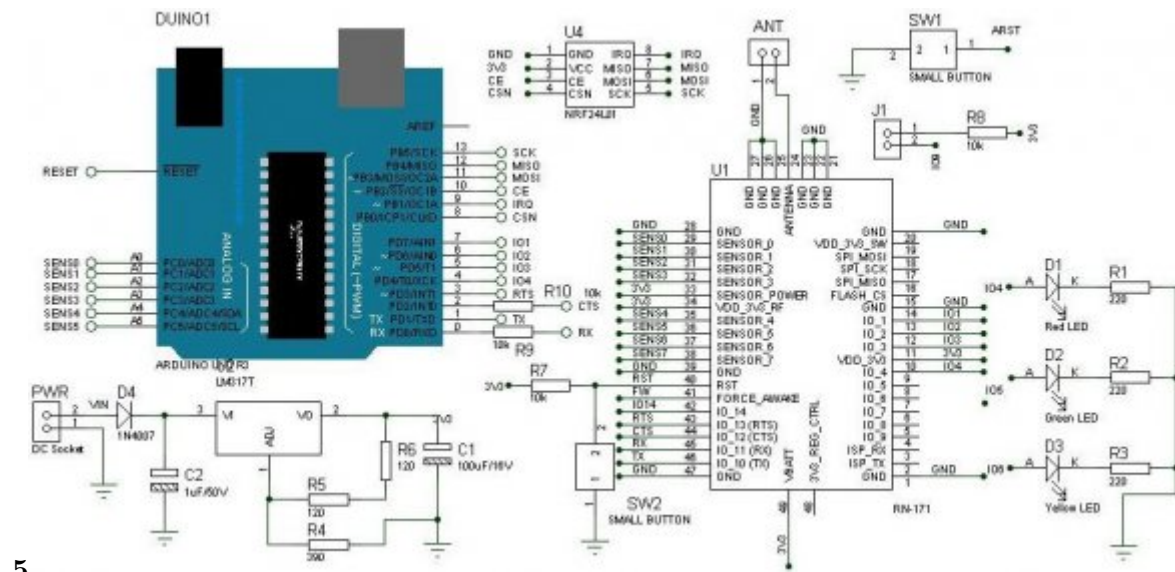


Figure 2: Figure 2 :

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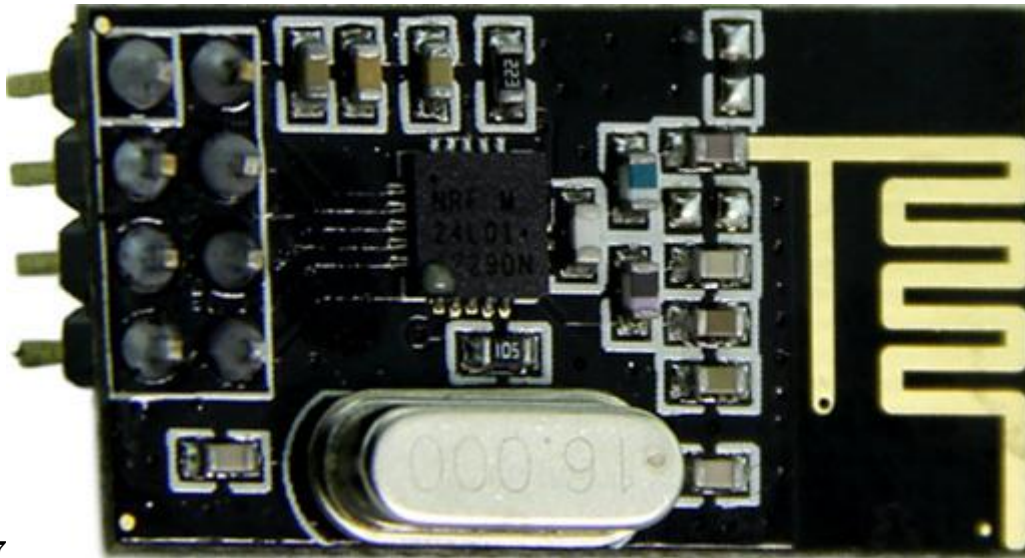
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Figure 3: FigureFigure 5 :



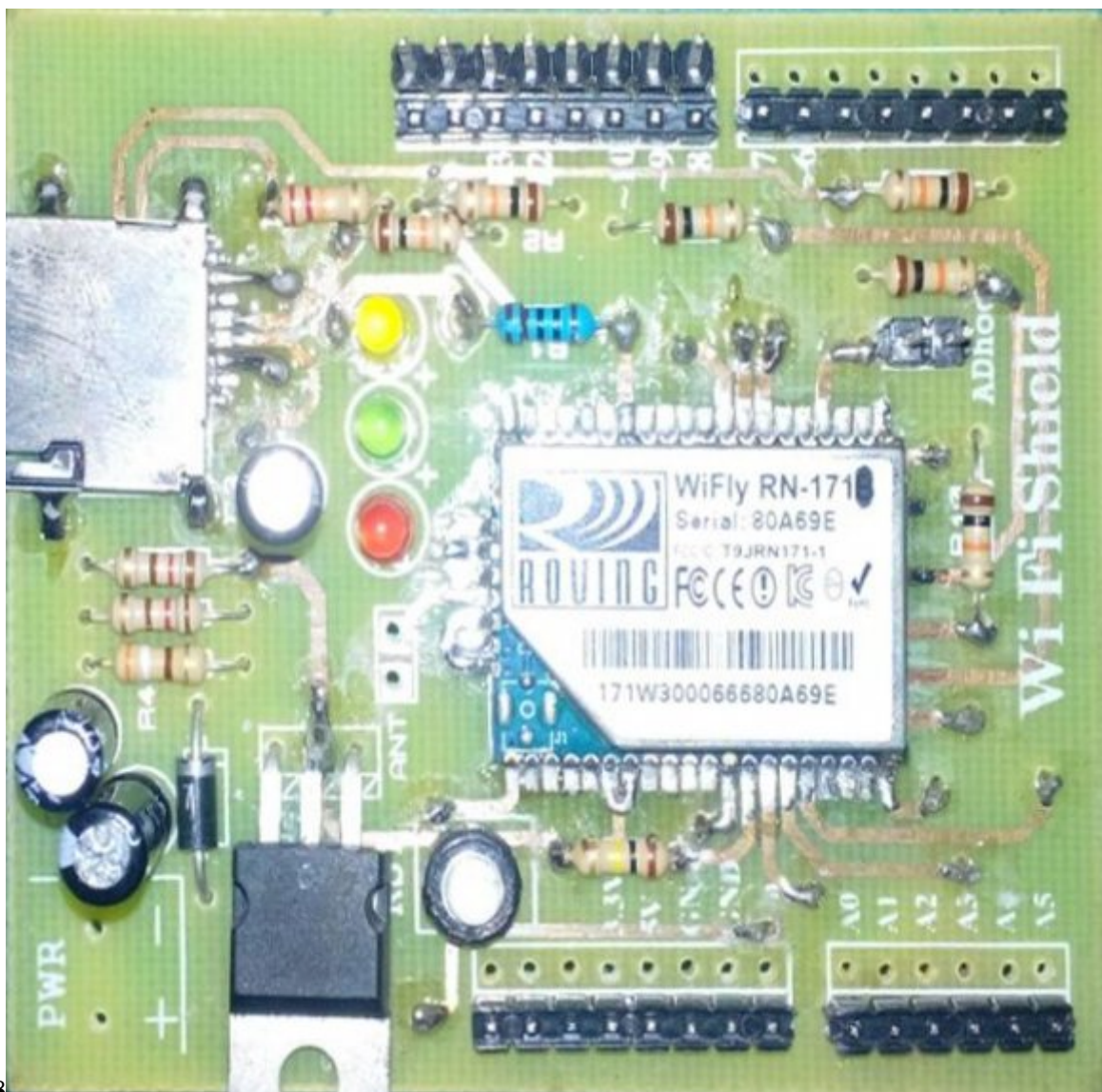
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Figure 4: Figure 6 :



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Figure 5: Figure 7 :



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Figure 6: Figure 8 :

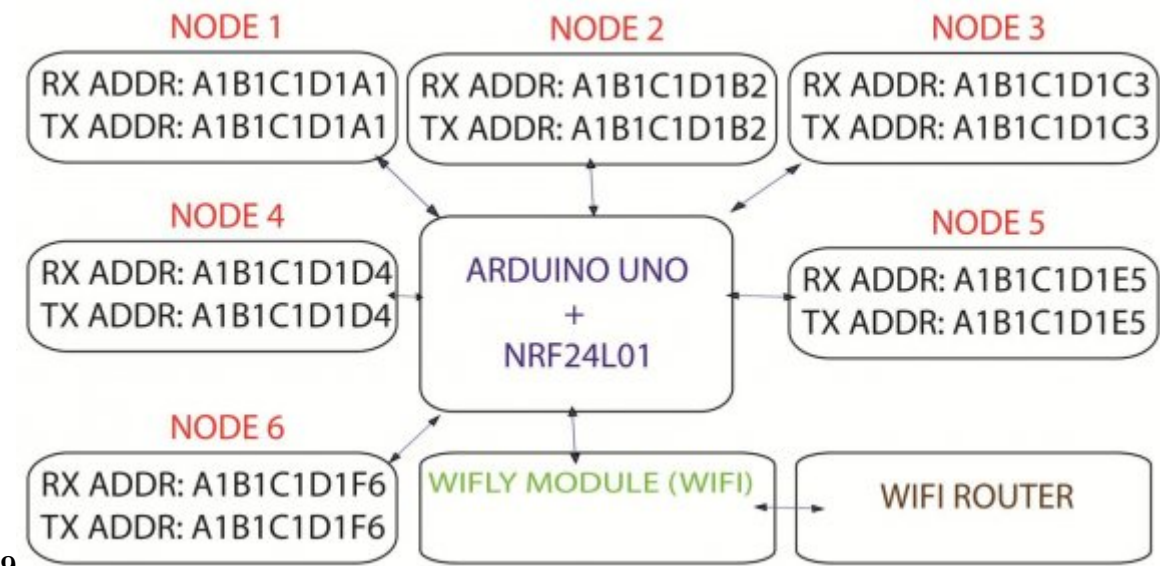


Figure 7: Figure 9 :

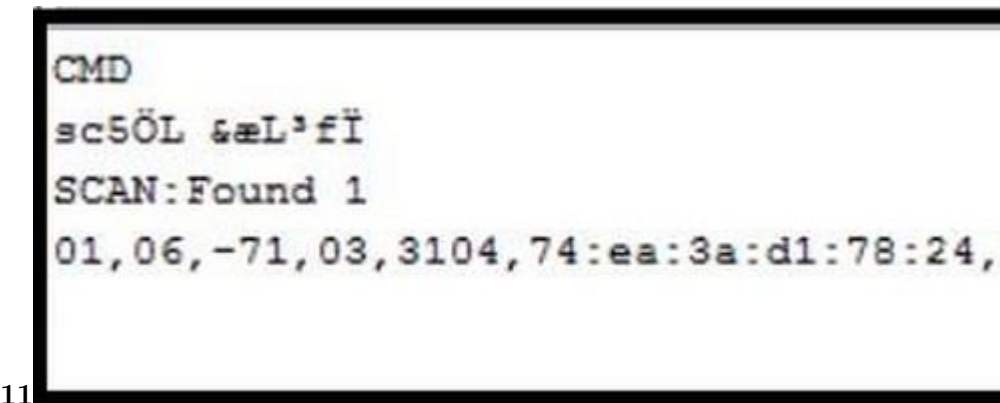


Figure 8: Figure 11 :

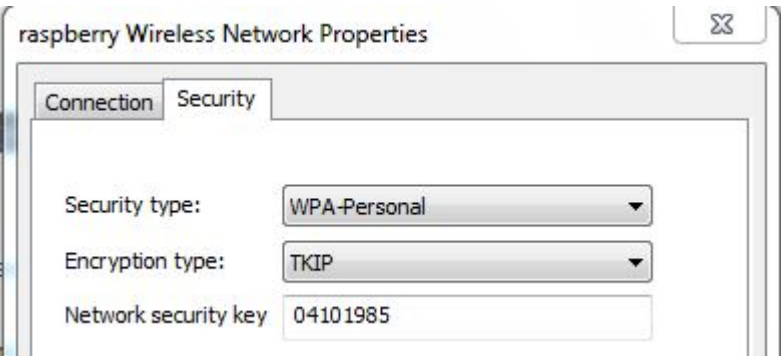
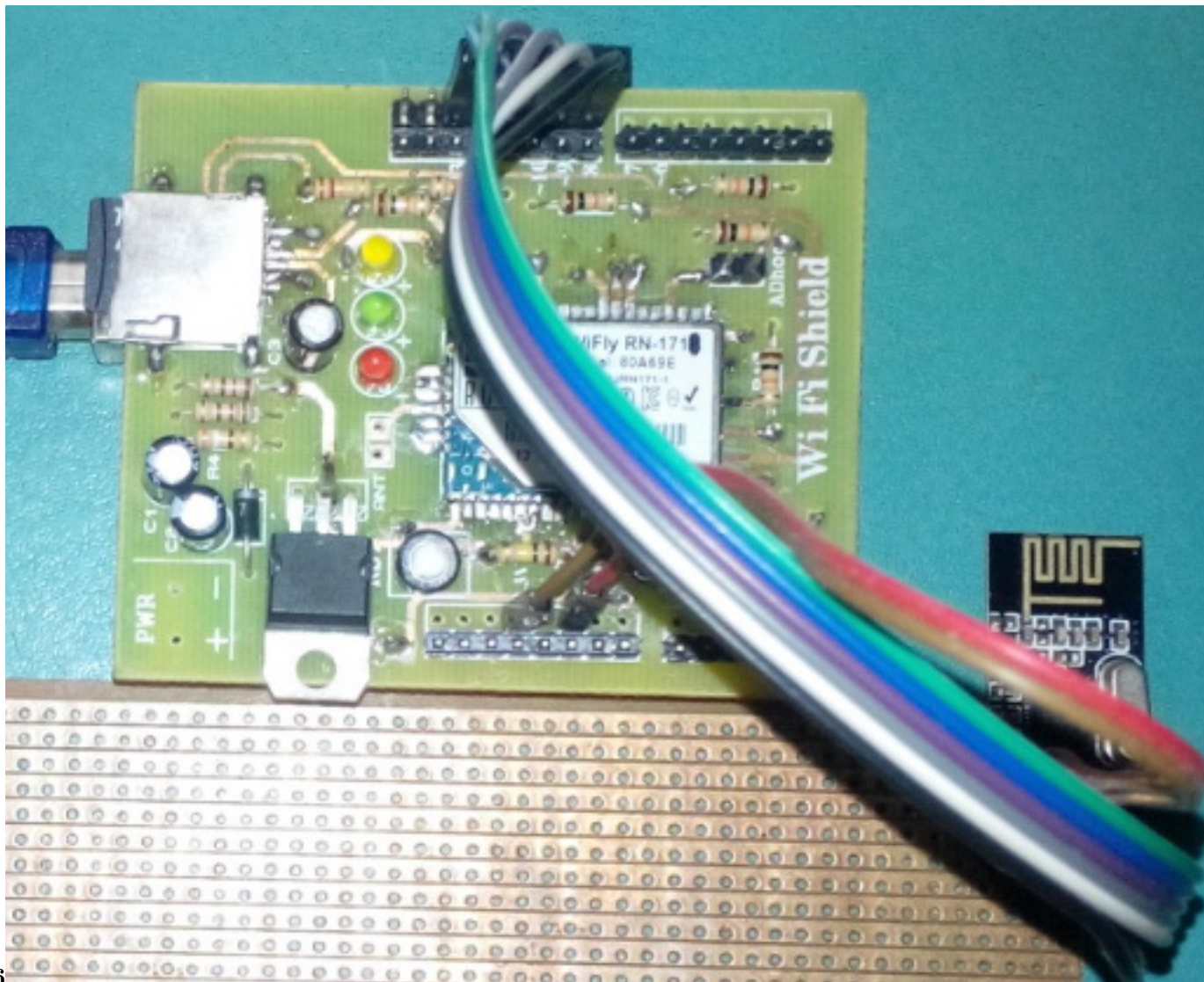


Figure 9: Figure



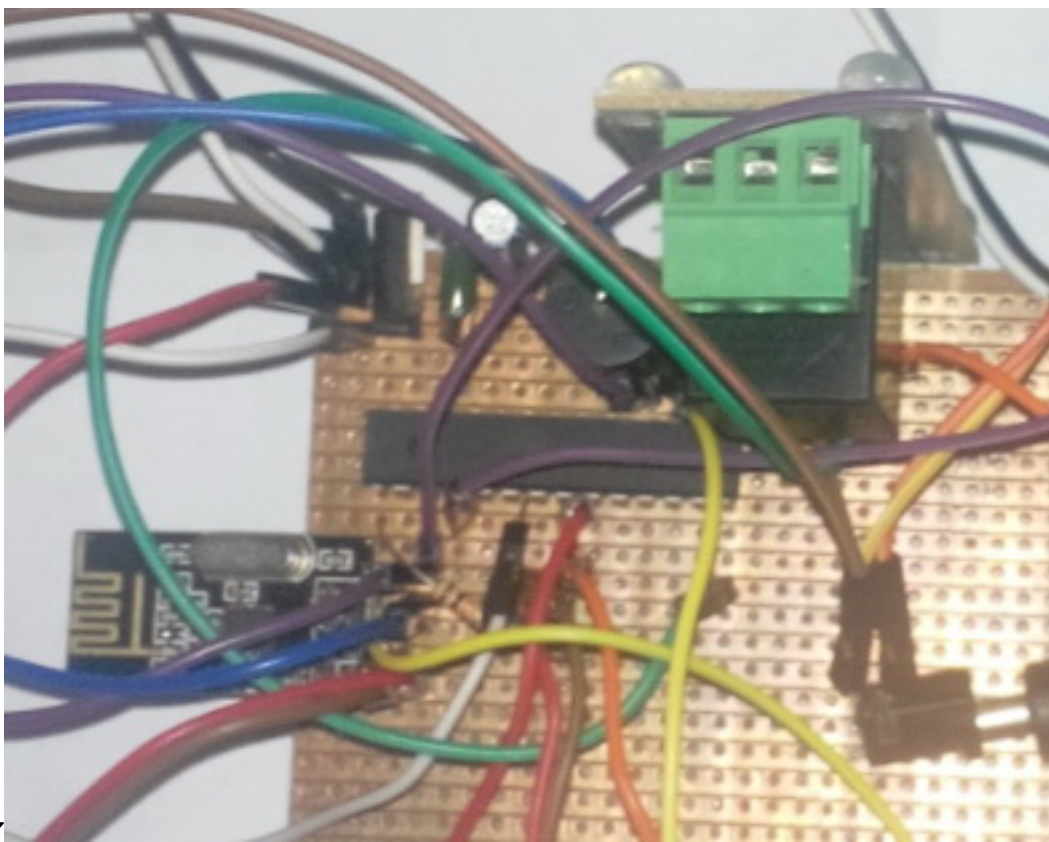
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Figure 10: Figure 15 :



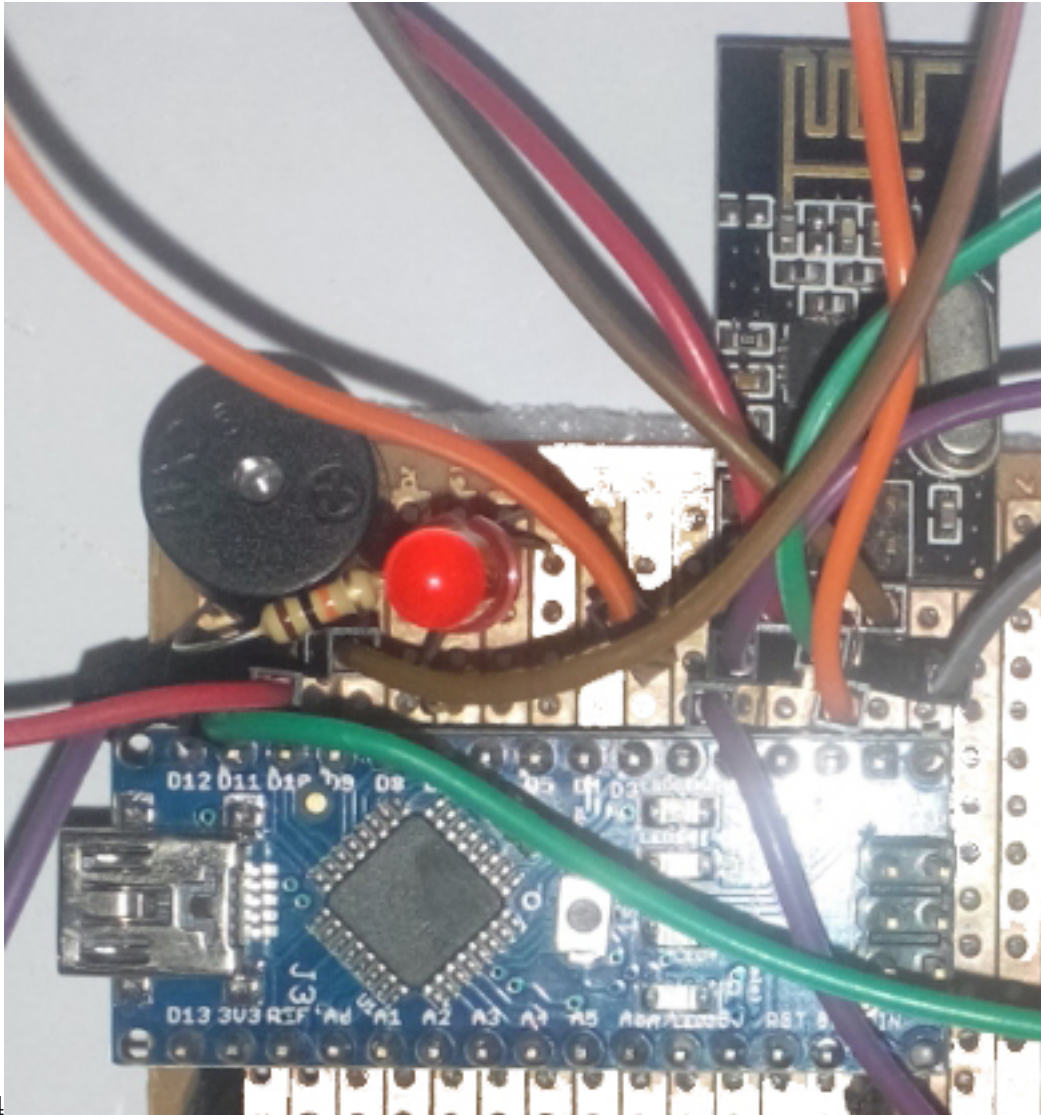
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Figure 11: Figure 16 :



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Figure 12: Figure 17 :



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Figure 13: Figure 14 :

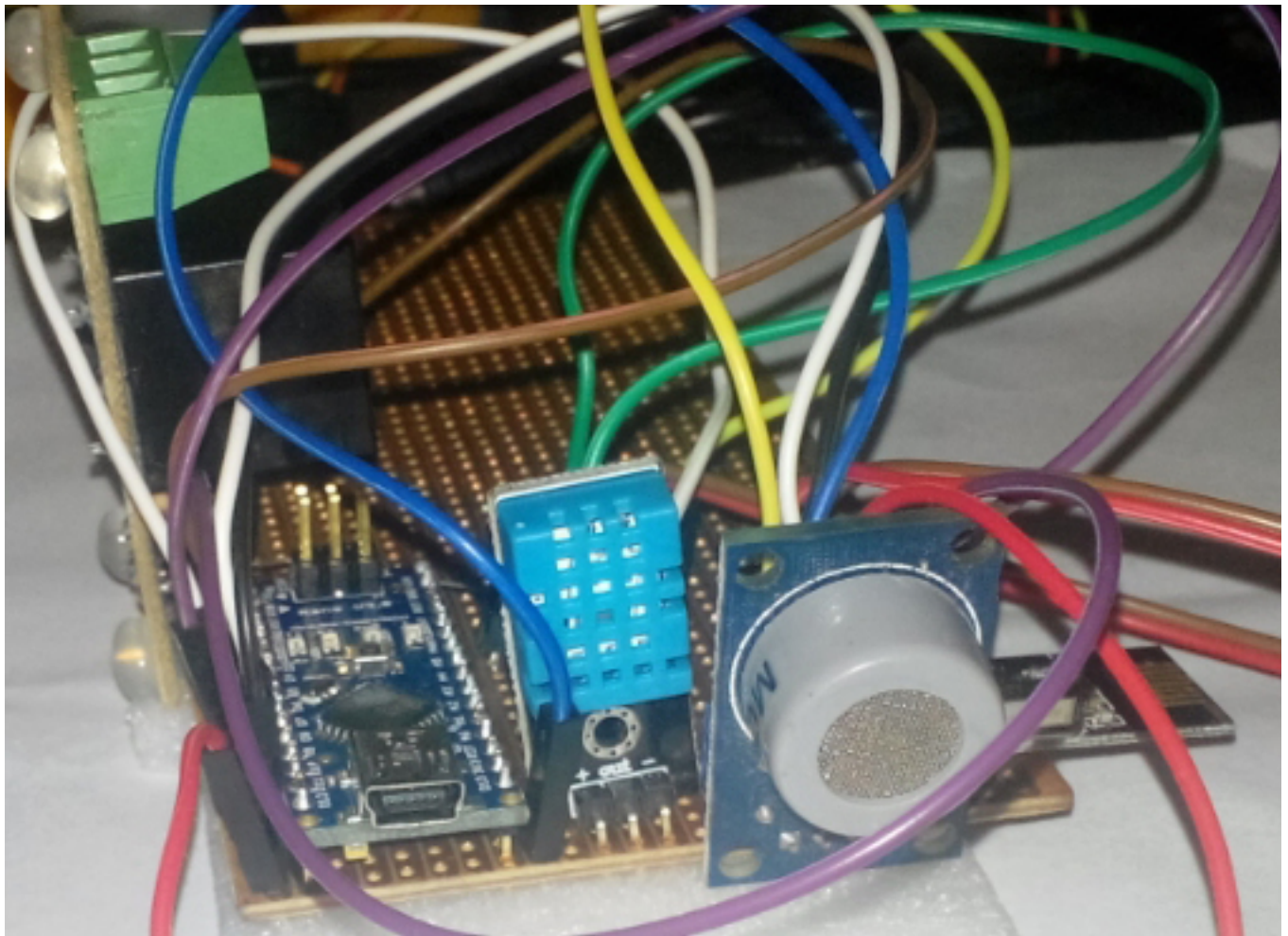


Figure 14:

Author ?	Dept. of Electrical & Electronic Engineering, AIUB,
American International University, Bangladesh.	
E-mail : satubmh@gmail.com	
Author ?	Dept. of Electrical & Electronic Engineering, AIUB,
American International University, Bangladesh.	
E-mail :	sami.aiub.edu@hotmail.com

Figure 15:

Figure 16: