

An Implementation of an IoT Based Satellite Dish Controller

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Abstract- In implementing an IoT based satellite dish controller, it is essential to properly position the antennas in the direction of transmitter for effective wireless communication. So here an IoT based antenna positioning system that allows for remotely positioning of antennas based over IoT is implemented. In this system a WIFI module is mounted on the antenna to broadcast signals which can be picked up by WIFI enabled devices. Upon connection using the configured IP address, the dish position can be controlled from the web browser of the WIFI enabled device and its direction will be changed by motors using IoT. This system will help in monitoring antenna direction and transmitting new coordinates to position the antenna. This system appropriately positions the antenna accordingly. So essentially using this system, antennas can be position wirelessly in the desired directions using IoT.

Keywords- IoT, Satellite Dish, WIFI module, Smart, ESP8266 module

I. INTRODUCTION

Antenna (dish) is an essential component of all the equipment's used in satellite communication where it is used in transmission and reception of the signals. These antennas are used in various systems such as radio-broadcasting, cell phones etc

The internet of things (IoT) being an interesting and exciting concept, has one of the major challenging aspects of having a secure ecosystem surrounding all building blocks of IoT architecture. RFID is a promising technology for the propagation of IoT, and it can be used to sense and identify the items [3]. In IoT (Internet of things), "things" refer to a wide range of devices such as heart monitoring implants, remotely handling home appliances, biochip transponders used on farm animals, cameras that are streaming live feeds of wild animals in coastal waters etc. Thus it can be said that "things" are a "mixture of hardware, software, data and services". Along with IoT if sensors and actuators are augmented, the technology becomes as more general class of cyber-physical systems which can also cover the technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. It is well-known that wireless communication systems work on antennas for reception of signals. It is necessary to properly position the antenna in the direction of the transmitters for effective communication .So here a proposition of an IoT based

antenna positioning system that allows for remotely positioning of antenna based over IoT will be achieved. When the direction of a transmitting station changes over time, the antenna direction should also be changed accordingly. The antenna positions are visible over internet to controlling operator on the IoT graphical user interface (GUI). Here an IoT is used to develop the antenna monitoring GUI system. The system allows for monitoring antenna direction as well as transmitting new coordinates to position the antenna and stepper motor appropriately positions the antenna accordingly [9].

The dish must be pointed at a specific angle to get the strongest possible signal. If the dish position is attuned manually, it became too difficult to align it at the best possible position [1]. Therefore, this project is designed with an advanced technology in order to accomplish the best possible position of the dish by remote operation.

II. MATERIALS AND METHODS

Based on the theories of operation of all the components proposed to be used for the actualization of this research work; The concept is getting a stepper motor connected via pipe to a satellite dish to move the dish to any precise position of choice. A stepping motor is chosen because, from its theory of operation, it is capable of precise positioning by its rotor when the pins or its leads are grounded sequentially. But this is to be done remotely via inter-network of things which indicated the need of a web page which will be provided by the microcontroller via the help of the ESP8266 module.

The ESP8266 will respond according to the command sent to it by the controller using the UART module Burt into them with the AT commands. The ESP8266 will respond with a web page which will be accessed through a web address or internet protocol (IP address). When the IP address is accessed it display a controlling webpage that can be used to post information to the controller and the controller GET information for the device accessing.

Briefly, the microcontroller is a based station that can be accessed through IP, which position and display the position of the angle to the device.

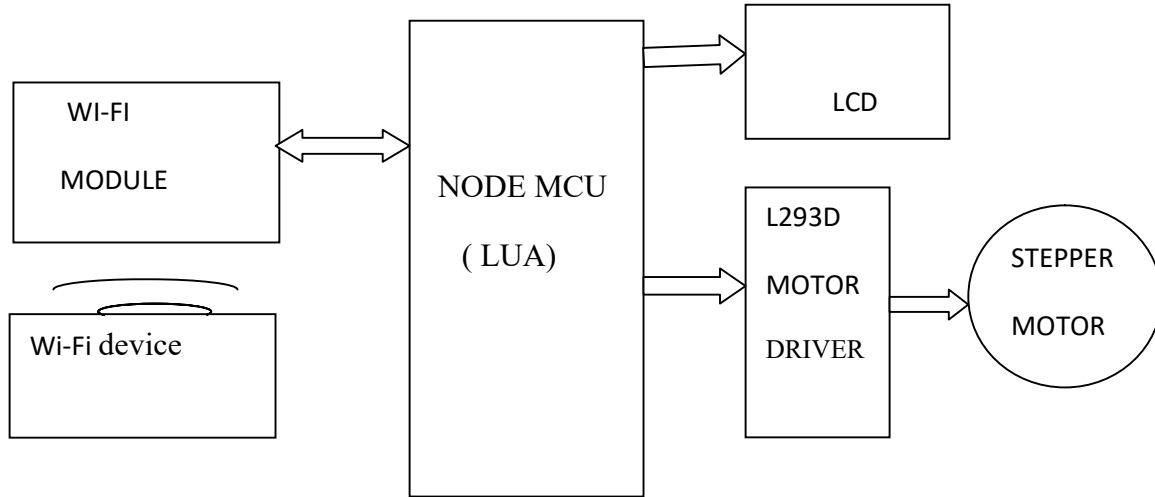


Figure1: block diagram of the proposed system

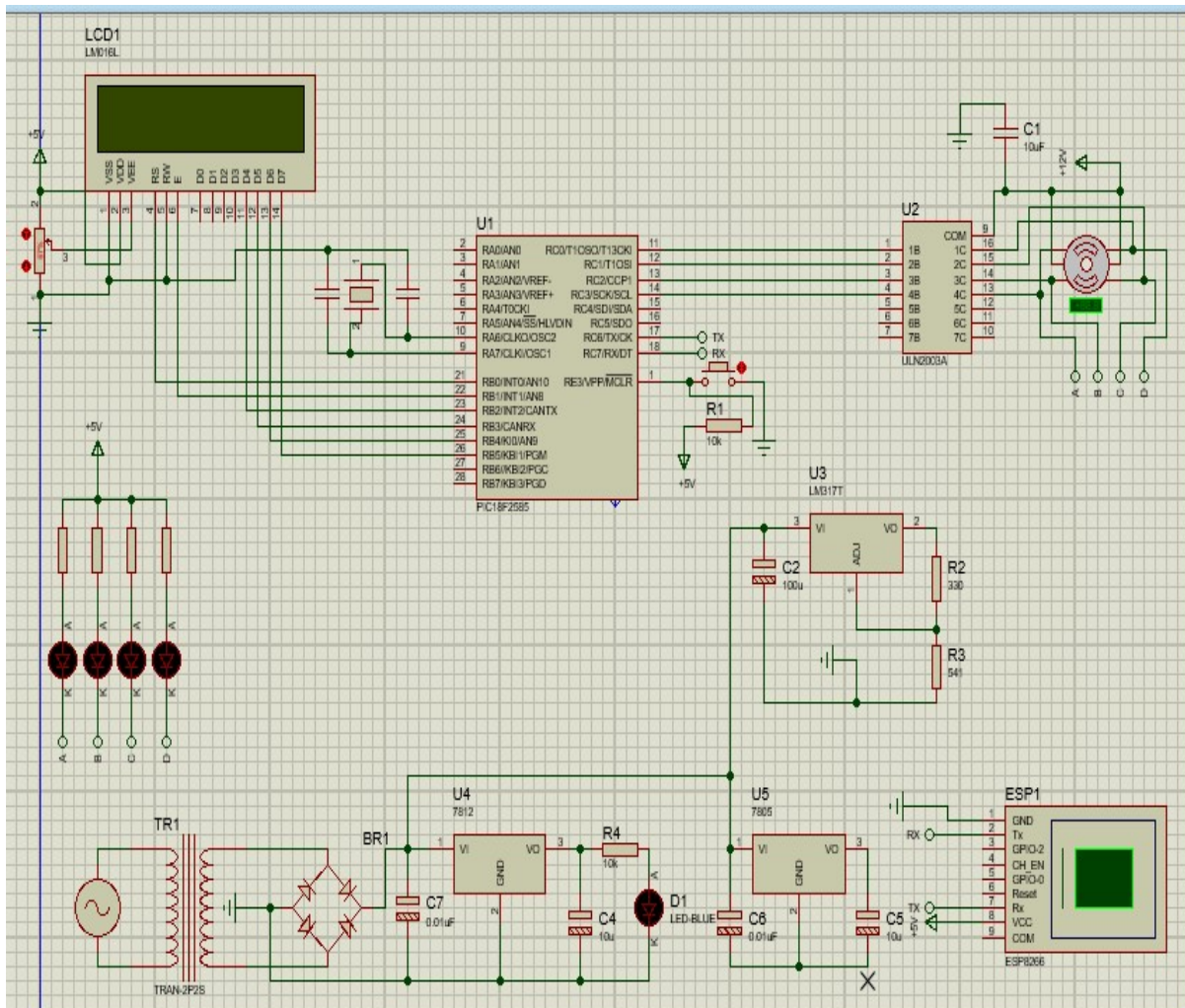


Figure 2: The Main Circuit Diagram

III. RESULTS

After the construction of the various blocks that make up the system, they were tested before the final connection. When all

the blocks were connected to form the final circuit, it produced the expected result as shown in figures 3 to 5 below.



Figure 3: The Dish at 0°

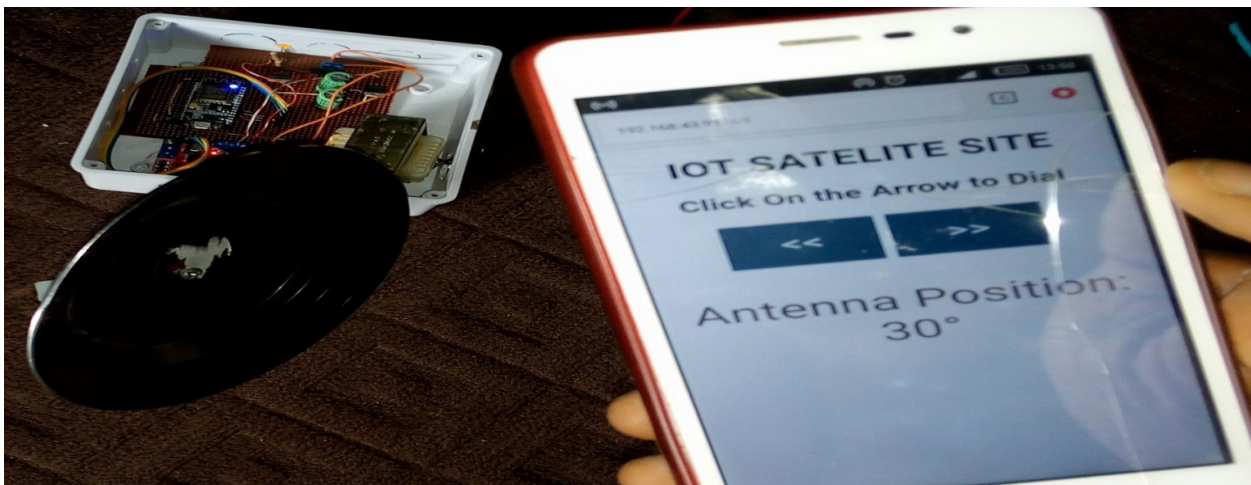


Figure 4: The Dish at 30°

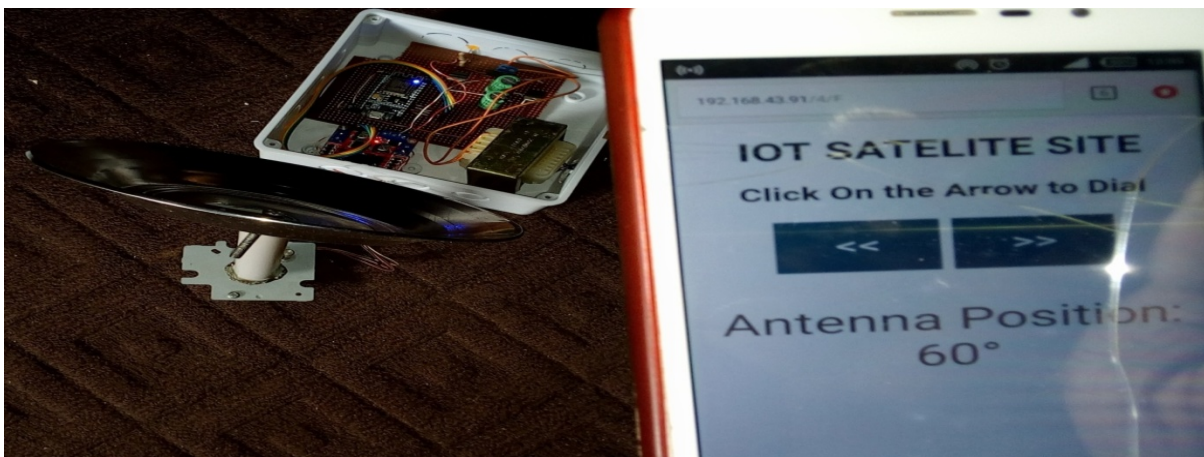


Figure 5: The Dish at 60°

IV. DISCUSSION

During the process of turning the dish, it was turned at different intervals to ascertain the distance at which the network fades; and it is observed that at longer distances above 15 meters the network starts fluctuating. Hence it cannot be operated above the range of 15 meter for efficiency.

V. CONCLUSION

Looking at the components selected and the simulation created before the actual implementation of the system, everything was built in mind for the purpose of efficiency and reducing the difficulty in manual adjustment of parabolic dish. Hence going by the results obtained above, it is evident that, the aim of the project is achieved.

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