International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 08 | Aug 2020 www.irjet.net p-ISSN: 2395-0072

Long-Range Wireless Tethering Selfie Camera System using Wireless Sensor Networks

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Abstract - *The project proposes a Wireless Sensor (WSN) based Wireless Tethering Device (WSN-SELFIE) introducing the GIGA-SELFIE novel device which will take long distance Photographs. A low-power WSN, using wireless modules, is used in WSN-SELFIE to maintain long-term contact between a camera and a module system. The experimental findings reveal that WSN-SELFIE effectively works as for the network size, end-to-end network latency and transmission time. This also over performs industrial imaging GIGA-SELFIE and the robots in both expense and running time. Being one of the main innovations to keep track of Manufacturing Specifications, the sensor network is attracting significant attention. Wireless Sensor (WSN) networks combine Embedded Sensor Engineering technologies, remote processing of information, and connectivity of networks. The main factor here is power consumption. Wireless ZIGBEE communication via Arduino NodeMCU and Raspberry PI 3B+ is used in this project. Blynk App is been used which operates with both hardware and smartphone, which takes very long range photos and sends it to the E-mail. These methods and ultralow power hardware reduce the consumption of power by WSN. Response shows that despite the other models, this approach is flexible, feasible.*

Key Words: **Long-range wireless tethering systems, wireless sensor network, Aurduino Node MCU, Raspberry pi 3B+, Blynk app etc.**

1. INTRODUCTION

Wireless networking functions best for wirelessly conducting data transmission. This creation involves the method of connecting two or more devices using cellular networks that use wireless signals and technologies. Wireless communication typically operates with transmitting electromagnetic signals by allowing the system to communicate via air, atmosphere or environment. The device that delivers the signal can be a transmitter, and the device that receives the signal can be said as receiver. Communication takes place as each system listens to the signals, forming a connection among transmitter and receiver where Wireless networking involves many transmission mechanisms and technology.

1.2 WIRELESS SENSOR

Standard wireless sensors are measuring devices that are fitted with transmitters that translate signals from process control to radio transmission tools. A receiver interprets the radio signal, and then transforms the wireless signaling to a desired basic contribution such as an analog current or data processing using Computer machine.

1.2.1 The Benefits of Using Wireless Sensors

- **Safety**
  In the area where the temperature, heat, humidity, etc. is high, the wired instruments cannot be set and controlled, and we can reach these remote areas through the wireless network where the wireless sensor is used by constantly gathering data from wireless sensors that can be helpful for tracking remote locations.
- **Convenience**
  The key benefit of wireless sensors is to take advantage of an operator to track the other station from the one base station that decreases time and reliability and improves work speed. It is a core part of a control factory where the wireless sensor will create a web page and change data such as time, value and the approximate purpose.
- **Economically**
  Owing to the use of wireless technologies, it eliminates the expense of effective usage of wire or other costly devices for the endpoints industry.

1.3 WIRELESS SENSOR NETWORK (WSN)

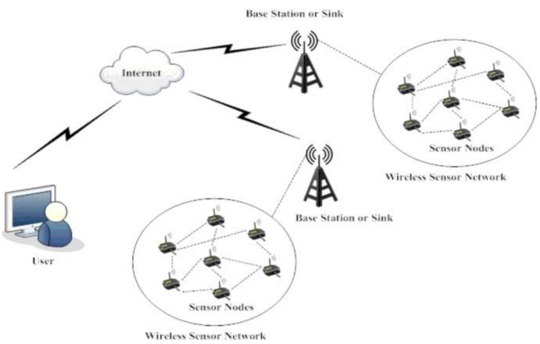

Fig: 1.1 wireless sensor network

Network of integrated sensors consists of a collection of dedicated, even in vacuum divided sensors to track and Take in the atmosphere surrounding physical conditions and organize the data at various locations. The key inspiration for creating the wireless sensor is military force which gives battlefield surveillance military applications. Such networks are increasingly being used in industrial applications handling control such as safety, climate, etc.

The wireless sensor networks consist of nodes ranging from hundreds to several thousand where, for the sensor, each node is linked together with multiple parts such as the radio transmitter and the radio receiver, the internal antenna and the external antenna microcontroller, and the sensor and energy supply with the battery are used similarly to the interface. The scale of the sensor nodes can vary, but with large size and minute size the work is going on building a node of microscopic size and existence. The cost of this sensor varies along with its functionality and its implementations, therefore the size and cost depend on the resources it requires, as well as the power, speed and bandwidth it requires. This uses various kinds of network topology from the star network to the wireless mesh network in this it uses the routing strategy of the hop wireless mesh network.

2. HARDWARE IMPLEMENTATION

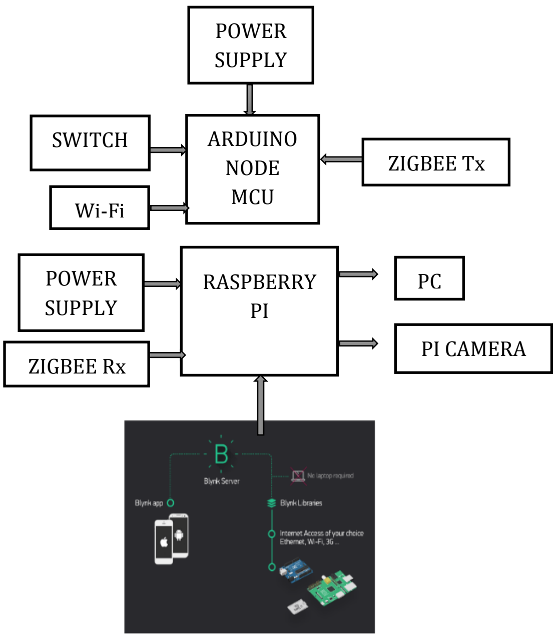

Fig: 2.1 Block Diagram

As shown in the figure there are two modules such as the first module is Aurduino NodeMCU with the switch and Zigbee which transmits the signal to second module. The NodeMCU is connected with the power supply above 2Amphs. The second module is Raspberry pi 3B+ with Zigbee receiver which receives the signal from first module and pi camera to capture the pictures save and sends to the mail id, this module is connected to the laptop to check the result. At the transmitting end the code is run on to node MCU, The Wi-Fi connection should be strong for the modules to work. When programme is executed and no errors found, Then Switch button should be pressed which acts as an input to transfer the signal to the receiving module through the Transmitter Zigbee. At the receiving point the Raspberry pi receives the signal through the Zigbee receiver and pi camera captures the pictures, which stores and send it to the registered Mail ID. The switch is used for short distance upto 100meters. But for the long range Blynk App is used which works with both hardware and software. When button is pressed Blynk communicates with the wifi ESP8266 and Raspberry pi through the Blynk server and the pi Camera takes up the pictures, stores and send it to the registered Mail ID. This Blynk operates at a very long range.

3. SOFTWARE IMPLEMENTATION

3.1 What do I need to Blynk?

1. Hardware.

An Arduino, with an accompanying Raspberry Pi software package. The Internet is running Blynk. Which means that you can connect with the equipment that you want to the Internet. Some devices, like Arduino Uno, require an Ethernet or Wi-Fi shield, and some already have internet access: like the ESP8266, Raspberri Pi, Particular Photon and SparkFun Blynk board for Wi-Fi access. Some have Internet connections. Yet you can still attach it to your laptop or desktop via USB, even if you do not have a shield.

2. A Smartphone.

The Blynk Team is a well-established app builder. It works on iOS as well as Android. For Content Twitter, Blynk was founded. The apps will track the hardware remotely, display sensor information, store data, view it and do many other useful things.

• **Blynk App-**helps you to build excellent interfaces with different widgets for your designs.

• **Blynk Server** – Phone and computer messaging obligation. You can either use our Blynk Server and localize the Blynk Server. It is open source that can be easily installed on tens of thousands of devices.

• **Blynk Libraries-**Allow the coordination and delivery of incoming and incoming orders for all the growing hardware platforms.

The message flies to the Blynk Cloud every time you click a Button in the Blynk app where it makes its way to your device. On the other way it functions the same and everything happens in a look.

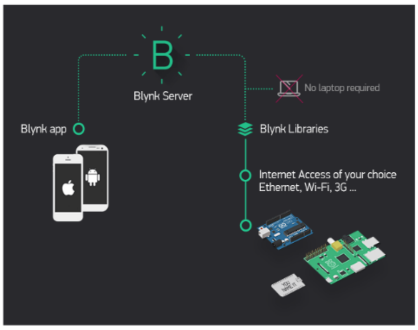

Fig: 3.1 Operation of Blynk app

Features

- Similar API and UI to all hardware and software supported
- Cloud link by:
  - Wireless internet.
  - BLE Bluetooth
  - Ethernet
  - USB (Round)
  - GSM
- Collection of Widgets easy to use
- No code writing direct pin manipulation.
- Super Map History info tracking
- Correspondence from device to device using Bridge Widget
- Sending out e-mails, tweets, drive posts, etc.
- Constant introduction of new apps

4. RESULTS

4.1 PROJECT SETUP

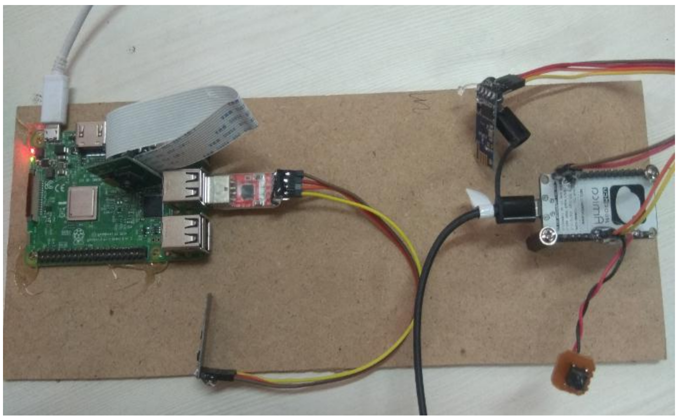

Fig: 4.1.Project Setup

As shown in the figure there are two modules such as the first module is Aurduino NodeMCU with the switch and Zigbee which transmits the signal to second module. The NodeMCU is connected with the power supply above 2Amphs. The second module is Raspberry pi 3B+ with Zigbee receiver which receives the signal from first module and pi camera to capture the pictures save and sends to the mail id, this module is connected to the laptop to check the result. At the transmitting end the code is dumped to node MCU, The Wi-Fi connection should be strong for the modules to work. When programme is executed and no errors found, Then Switch button should be pressed which acts as an input to transfer the signal to the receiving module through the Transmitter Zigbee. At the receiving point the Raspberry pi receives the signal through the Zigbee receiver and pi camera captures the pictures, which stores and send it to the registered Mail ID. The switch is used for short distance upto 100meters. But for the long range Blynk App is used which works with both hardware and software. When button is pressed Blynk communicates with the wifi ESP8266 and Raspberry pi through the Blynk server and the pi Camera takes up the pictures, stores and send it to the registered Mail ID. This Blynk operates at a very long range.

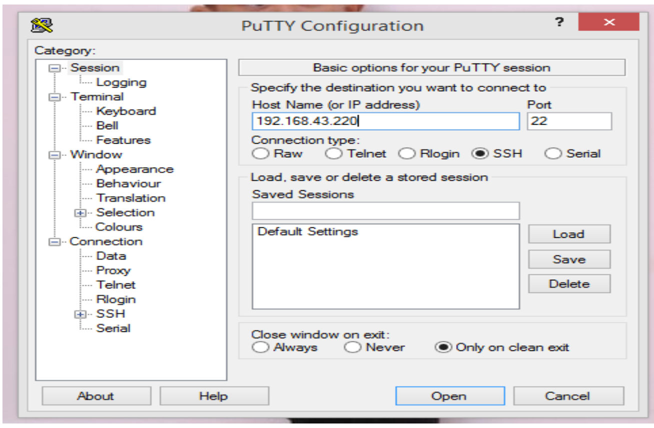

Fig: 4.2. Connecting IP address

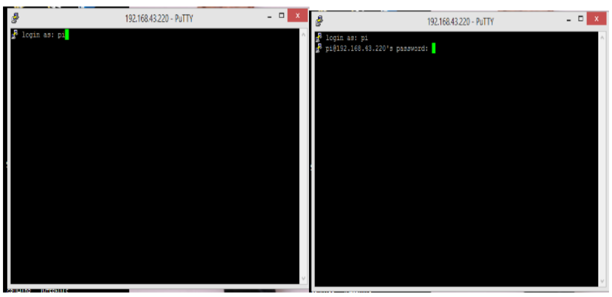

Fig: 4.3. Login ID and password for raspberry pi

The IP address is added to check which device is connected to wifi, and to that particular device login id and password is given to connect with that device. Through Blynk Raspberry pi is connected through mobile, in which mobile has IP address, in that IP address, which all devices are connected will be checked and to that particular device which we require should give login and password to connect that device.

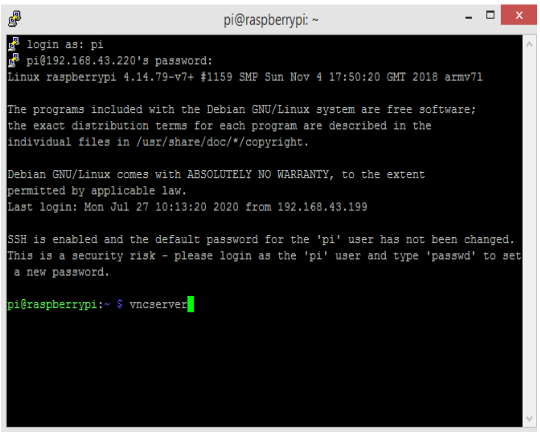

Fig: 4.4. VNC server to View the project

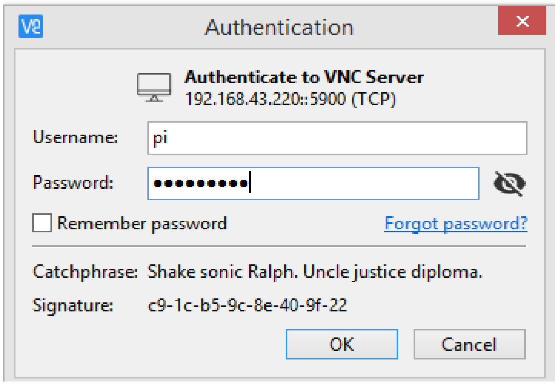

Fig:4.5. Authenticate to VNV Server

As we are connected with Raspberry Pi so the project should be viewed in VNC Viewer, So it should be Connected to VNC Server. After VNC Server is Connected it asks for a Authentication, authentication password should be given and it opens the output page to view.

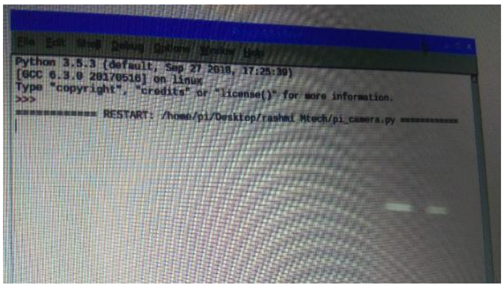

Fig: 4.6. Waiting for the input

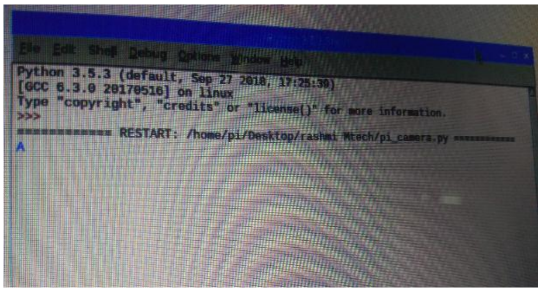

Fig: 4.7. When Switch or Blynk Button is pressed pi camera captures pictures

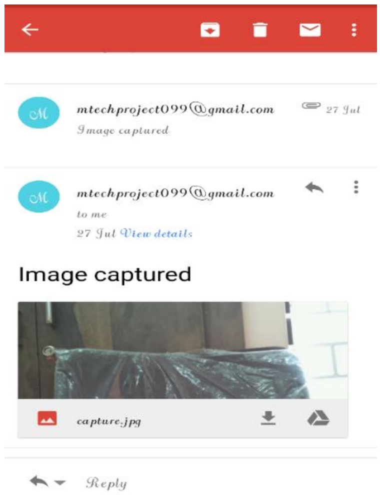

Fig: 4.8. Captured pictures Sent to mail ID

Fig: 4.9. View of an captured picture

5. Conclusion

In this paper a network of Wireless Sensors called WSN-SELFIE is usefull to develop and deploy a network of selfie camera wireless long range tethering. More precisely, WSN-SELFIE incorporates the innovative concept existing wireless long-range tethering system. In WSN-SELFIE, an Arduino NodeMCU and Raspberry Pi based Raspberry PI Camera is operated via WSN. Implementation checks show that WSN-SELFIE is suitable for tethered wireless selfie shooting at long range. In cost- and run-time terms, this also outperforms GIGA-SELFIE and photography drones. A low-power wireless network of sensors is designed with combined embedded. This is an adaptive method, feasible before the other methods. It provides communication over the long-range. A Wireless Long Range Tethering System (WSN-SELFIE) based on a Wireless Sensor Network (WSN) that can take long-distance selfies and landscape photos. It provides high rate of transmission, low energy consumption, high rate of transmission, low cost. This project can be used for animal monitoring, criminal activity monitoring, health care, monitoring infrastructure, surveillance of forests, etc.

REFERENCES

[1] S. S. Sonavane, V. Kumar, and B. P. Patil, "Designing wireless sensor network with low cost and low power," in Proc. 16th IEEE Int. Conf. Netw., Dec. 2008, pp. 1–5.

[2] L. K. Ketshabetswe, A. M. Zungeru, M. Mangwala, J. M. Chuma, andB. Sigweni, "Communication protocols for wireless sensor networks: A survey and comparison," Heliyon, vol. 5, no. 5, 2019, Art. no. e01591.

[3] A. Ali, Y. Ming, S. Chakraborty, and S. Iram, "A comprehensive survey on real-time applications of wsn," Future Internet, vol. 9, no. 4, p. 77, 2017.

[4] A. More and V. Raisinghani, "A survey on energy efficient coverage protocols in wireless sensor networks," J. King Saud Univ. Comput. Inf. Sci., vol. 29, no. 4, pp. 428–448, 2017.

[5] F. Fanian and M. K. Rafsanjani, "Cluster-based routing protocols in wire- less sensor networks: A survey based on methodology," J. Netw. Comput. Appl., vol. 142, pp. 111–142, Sep. 2019.

[6] P. T. A. Quang and D.-S. Kim, "Enhancing real-time delivery of gradient routing for industrial wireless sensor networks," IEEE Trans. Ind. Infor- mat., vol. 8, no. 1, pp. 61–68, Feb. 2012.

[7] D. D. Tan, N. Q. Dinh, and D.-S. Kim, "Grata: Gradient-based traffic- aware routing for wireless sensor networks," IET Wireless Sensor Syst., vol. 3, no. 2, pp. 104–111, Jun. 2013.

[8] D. D. Tan and D.-S. Kim, "Dynamic traffic-aware routing algorithm for multi-sink wireless sensor networks," Wireless Netw., vol. 20, no. 6, pp. 1239–1250, 2014.

[9] A. V. Katsenou, L. P. Kondi, and K. E. Parsopoulos, "Motion–related resource allocation in dynamic wireless visual sensor network environ- ments," IEEE Trans. Image Process., vol. 23, no. 1, pp. 56–68, Jan. 2014.

[10] C. Li, J. Zou, H. Xiong, and C. W. Chen, "Joint coding/routing optimiza- tion for distributed video sources in wireless visual sensor networks," IEEE Trans. Circuits Syst. Video Technol., vol. 21, no. 2, pp. 141–155, Feb. 2011.