

Report on WLAN Communications in the Internet of Things

The main purpose of the project is to learn WLAN communication in Internet of Things. We have developed a device to get the light-level data from LDR to a Server via Internet. Here, we have used Arduino based NanoESP Board which acts as an mediator to transfer data from LDR to server.

Description of the Components

1. **Arduino based NanoESP board:** The WIFI Pretzel board aka NanoESP board is compatible with the well-known Arduino Nano TM board, which is similar to the well-known Arduino Uno TM board , but is much smaller. The WIFI NanoESP board also has 30 pins, is pin-compatible and uses the same Atmega328 microcontroller from Atmel as well as a USB interface and a so-called bootloader so that it can be easily programmed via the USB cable using the free Arduino development environment.



Fig 1. Wi-Fi Pretzel board

2. **Light dependent Resistor:** A photoresistor is a passive component that decreases resistance with respect to receiving luminosity on the component's sensitive surface. The resistance of a photoresistor decreases with increase in incident light intensity; in other words, it exhibits photoconductivity.



Fig. 2 : Light Dependent Resistor

Hardware implementation

Beginning the setup of the given, we will take an Wifi Pretzel board with power supply and connect one input of LDR to A0(Analog input) pin of Pretzel board and the other one to power supply of

Pretzzel board. We should be careful here, as we should not connect it directly to the Arduino because due to overvoltage, it may damage the Arduino board or Sensor itself. Hence, we need to place the resistor in between them. So, to calculate the value of tap resistor. In our application, we have used 10k Ω resistor.

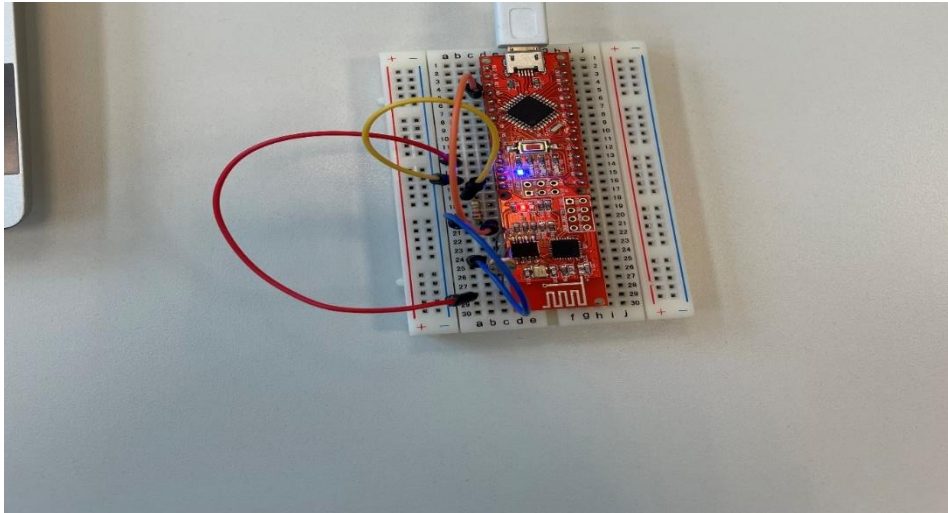


Fig.3 Actual picture of the Setup

After the connections, we will connect our Pretzel Board with Micro-USB to the computer .Meanwhile, we need to configure our Arduino IDE according to given board, processor and COM Port and after that we will sketch a relevant code in Arduino IDE with necessary library and then upload it to the board.

Output

After successful upload of the program, we can actually see our output in the Server window.

Explanation of Code

In the first part, we are configuring the Pretzel Wi-Fi Board to build a stabile communication with a server. First step in the code is the initialization of the relevant libraries, the WLAN information(SSID and Password) and the definition of the device. The setup code is only executed once, therefore it make sense to set up the communications with the serial monitor. Besides that, the WLAN and TCP/IP connection is established. In the loop-code, it is configured to send the data every four seconds to the server. For this you need first to read the light value. When you have data from the sensor, you are implementing a code to send this to the server.

Statistics

In order to collect some statistics, we conducted 3 different situations. In the first one, we leave the LDR as unaffected as possible. For this we get a mean value of 170. In the second attempt, we take the light-function of a smartphone and hold it against the sensor. We get a mean value of 686. In the third and final attempt, we have covered the sensor part by holding a finger in front of the sensor and receive the mean value 41.