

# A Complete Environment Setup for Pet Care Using IoT

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# Outline

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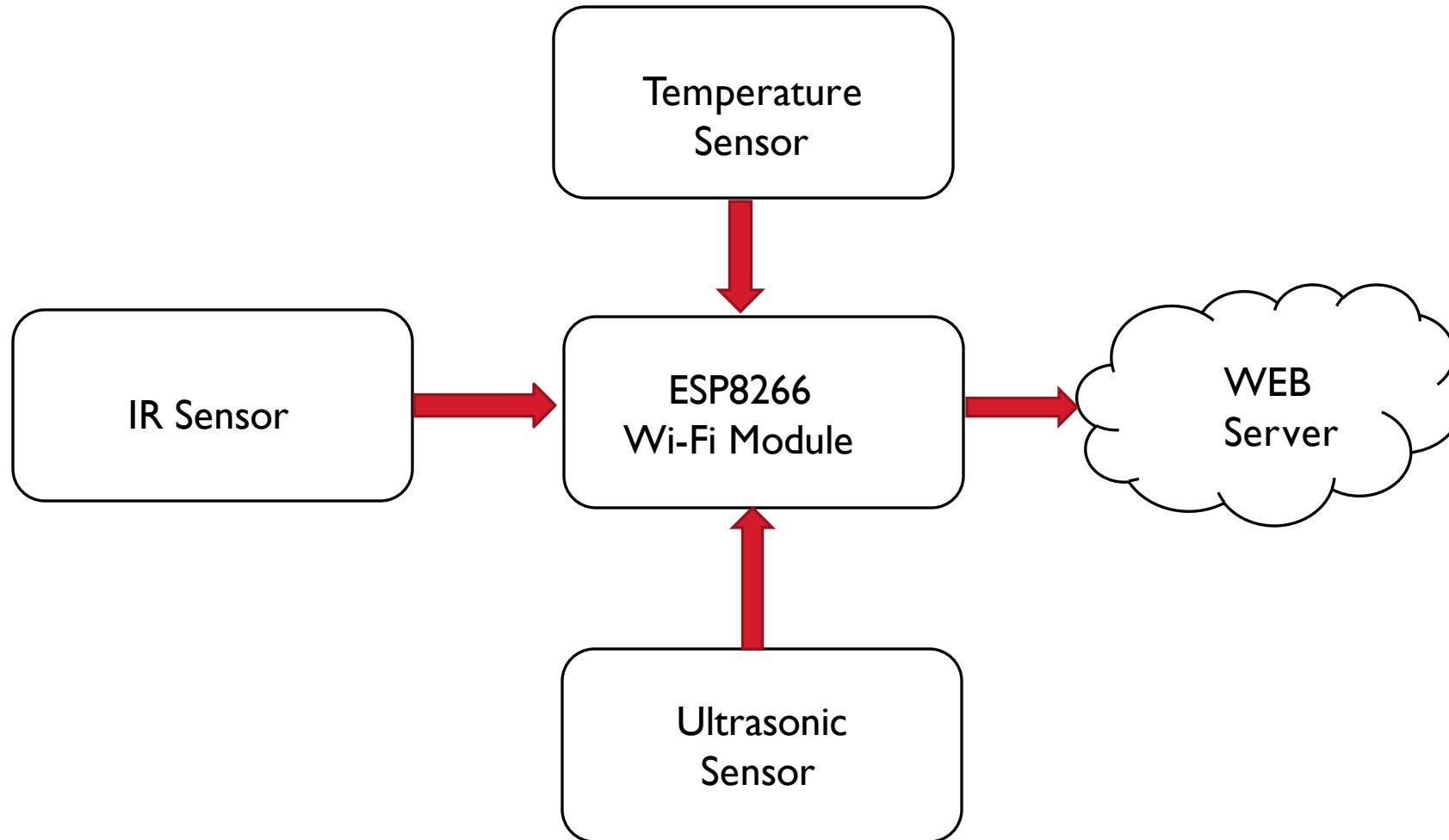
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- Acknowledgement

- Pet ownership is on the rise each year, and so are the demands for high-quality pet care products. This has led to the development of Internet of Things (IoT) technology in this sector.
- The internet of things allows pet owners to remotely track their pet's activity and location, monitor their pet's health condition, or even interact with their pets.
- Our project uses IoT technology to implement an integrated system consisting of a pet food feeder, water dispenser, and temperature control. These are three of the most significant factors pet owners are concerned about when they are busy or away from their pets.

- This project presents an idea to construct a closed pet care environment system, in which the food, water and temperature can be monitored, controlled and accessed by the pet owner.
- The food and the water level are monitored using sensors.
- All these parameters are controlled by an ESP8266 board as an onboard computer.
- The pet owner will have access to monitor and control all the mentioned parameters using a Graphical User Interface (GUI).
- Furthermore, the GUI will also comprise an Authentication panel that provides confidentiality of the user details.

# BLOCK DIAGRAM

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**N** Institute for the Wireless  
Internet of Things  
at Northeastern

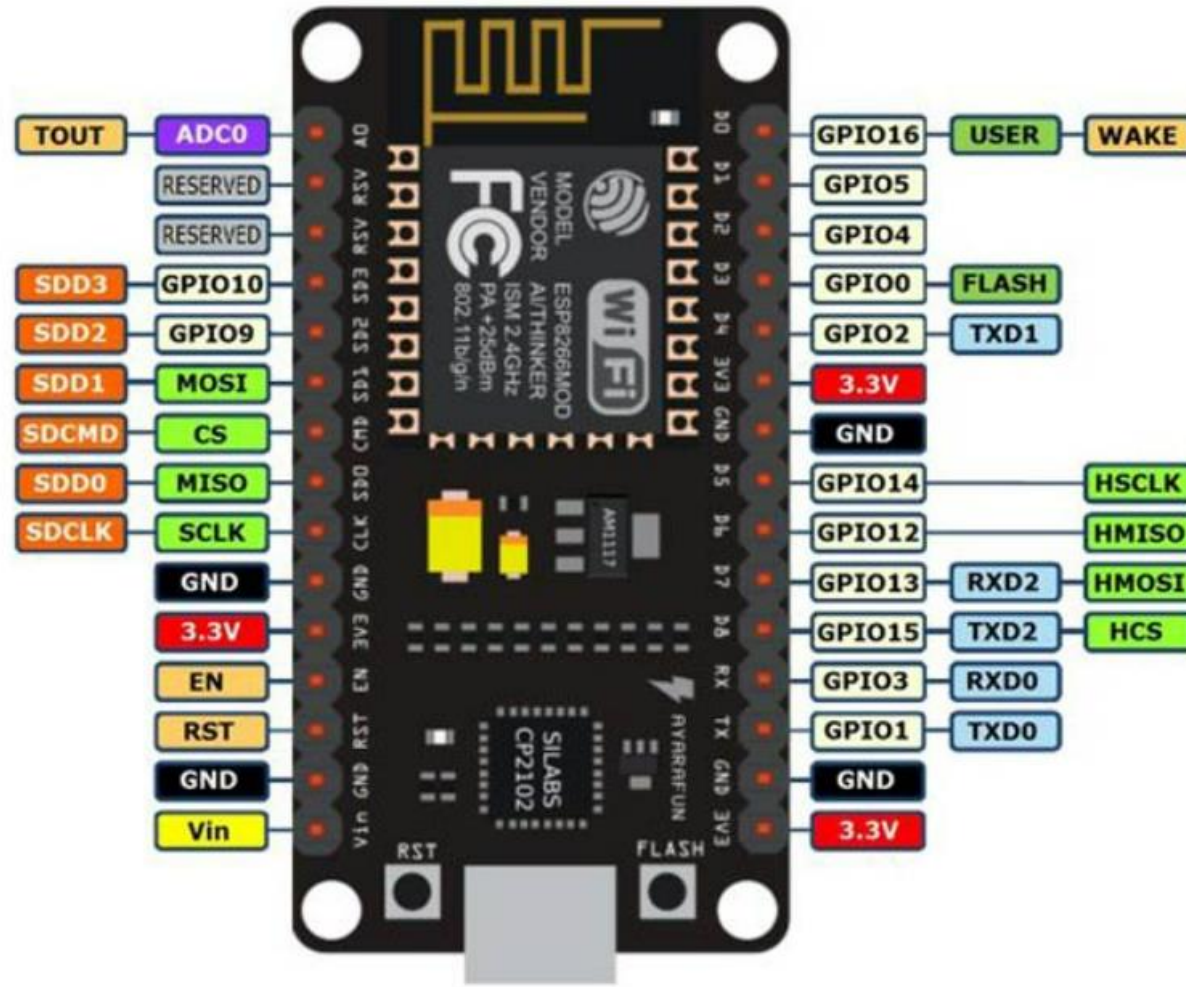


# Components

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- ESP8266 I2E:WiFi Module Board
- HW-20 I:Infrared Sensor
- HC-SR04:Ultrasonic Sensor
- Si702 I:Temperature and Humidity Sensor

# ESP8266 WiFi Module



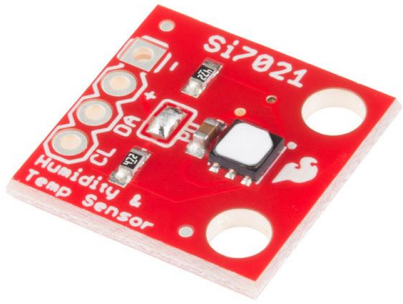


# ESP8266 WiFi Module – Key Specifications

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- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects

# Si7021: Temperature Sensor



## Features

Precision Relative Humidity Sensor  $\pm 3\%$  RH (max), 0–80% RH

High Accuracy Temperature Sensor  $\pm 0.4\text{ }^{\circ}\text{C}$  (max),  $-10$  to  $85\text{ }^{\circ}\text{C}$

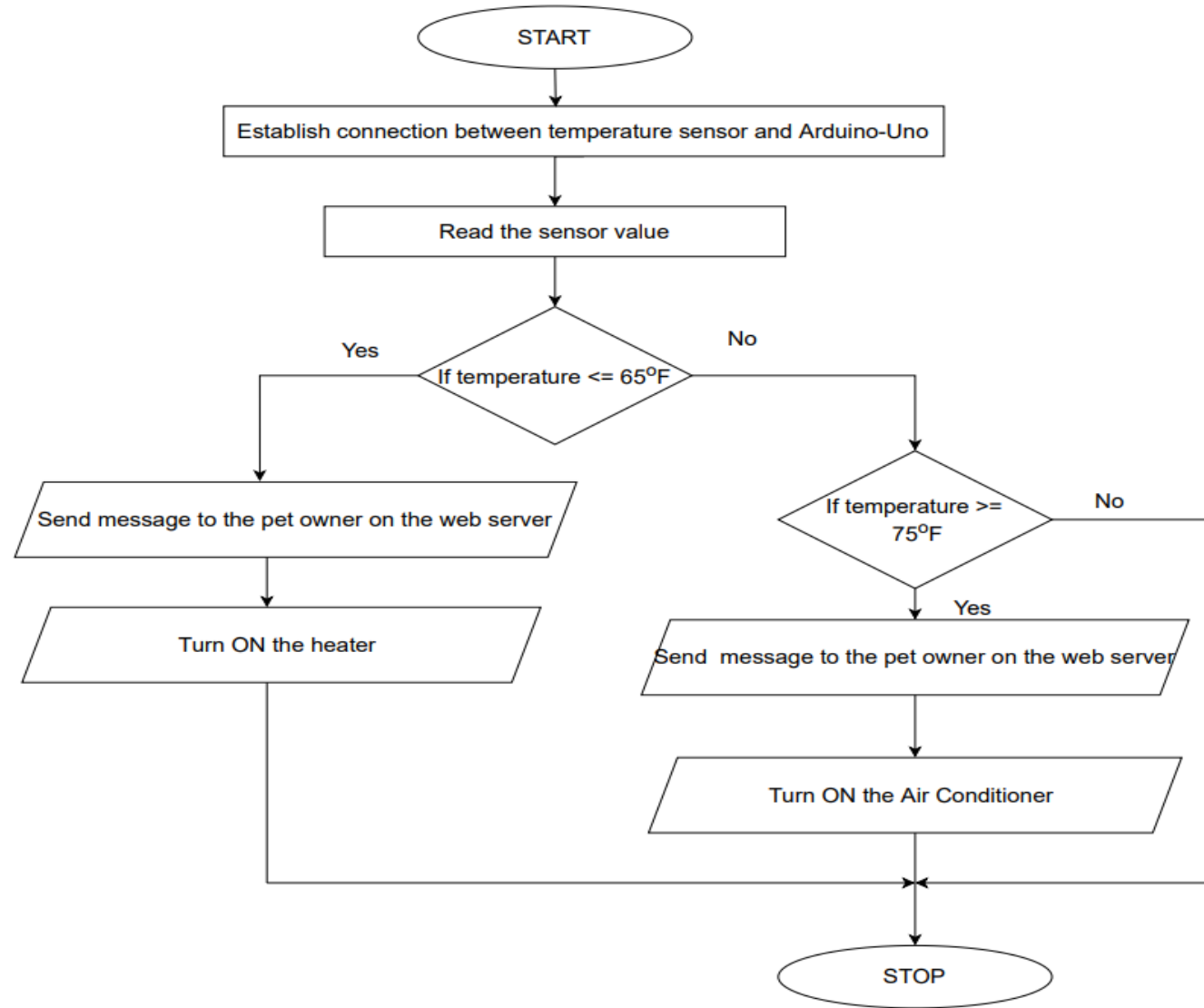
0 to 100% RH operating range

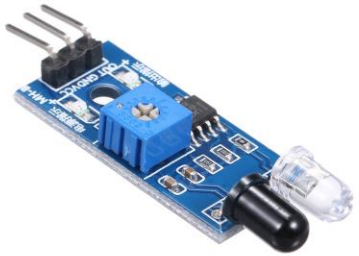
Up to  $-40$  to  $+125\text{ }^{\circ}\text{C}$  operating range

Wide operating voltage – (1.9 to 3.6 V)

Low Power Consumption –  $150\text{ }\mu\text{A}$  active current

# Temperature Measurement Flow Chart

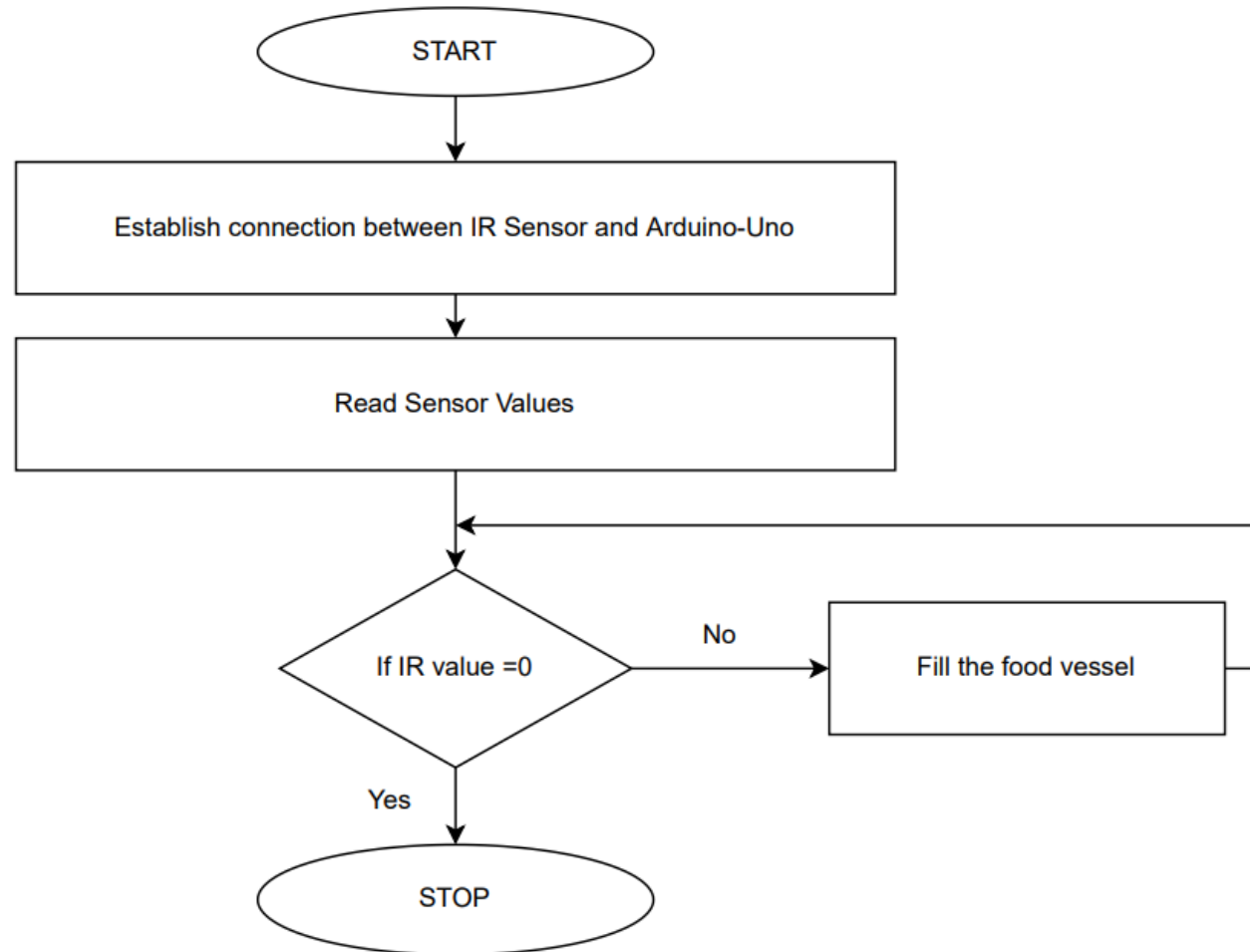




## Features

- The operating voltage is 5VDC
- I/O pins – 3.3V & 5V
- Mounting hole
- The range is up to 20 centimeters
- The supply current is 20mA
- The range of sensing is adjustable
- Fixed ambient light sensor

# Food Level Detection Flow Chart



# HC-SR04 Ultrasonic Sensor



## Features

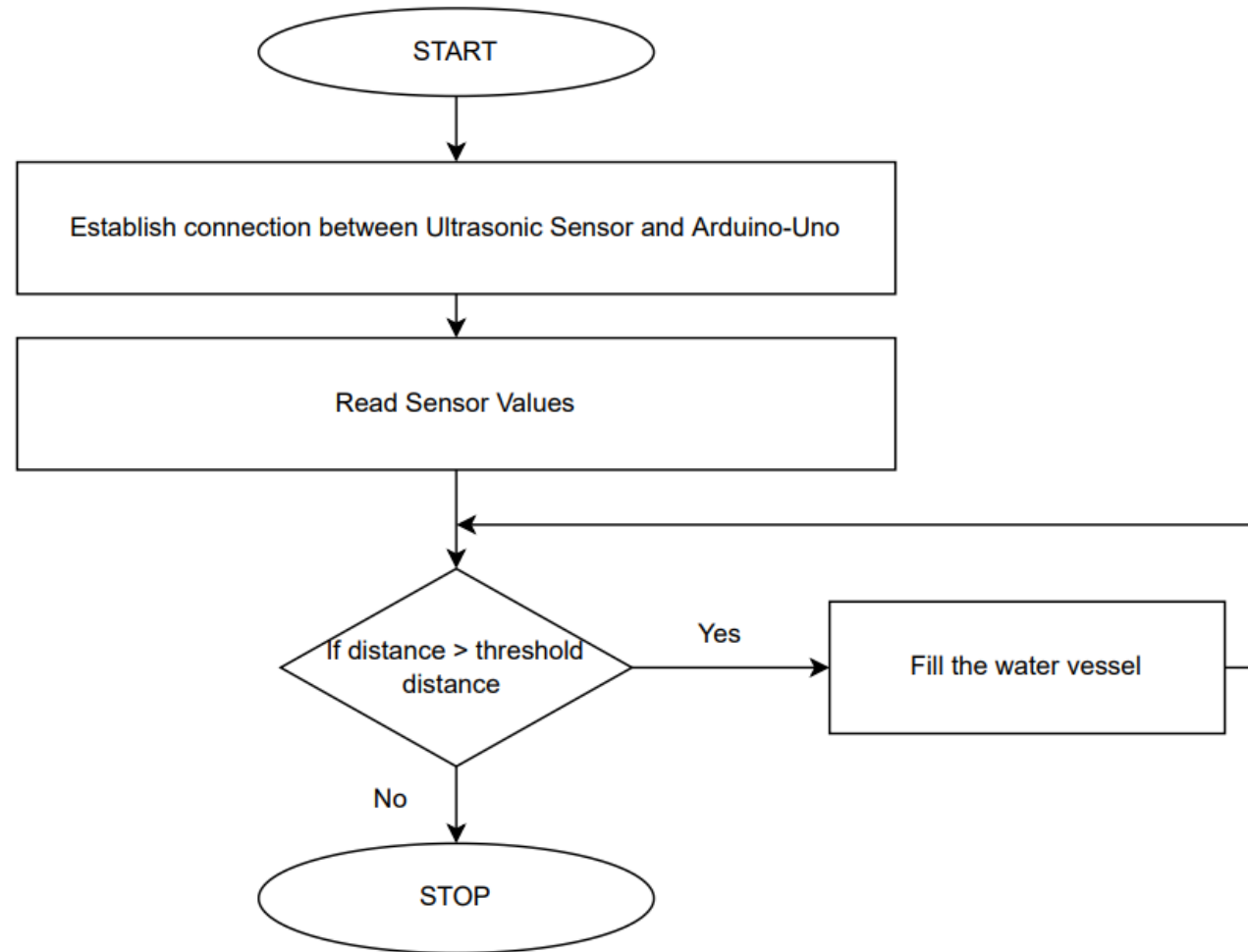
Power Supply	5V DC
Working Current	15 mA
Working Frequency	40 kHz
Maximum Range	4 meters
Minimum Range	2 cm
Measuring Angle	15°
Resolution	0.3 cm
Trigger Input Signal	10uS TTL pulse
Echo Output Signal	TTL pulse proportional to the distance range

- [Go to this Link...](#)

- This presentation presents different algorithms for the connection between different types of sensors (such as IR sensor, Ultrasonic sensor, Temperature and Humidity sensor) with arduino IDE by using Node MCU.
- We also provide the wireless solution for IoT enabling devices. This paper also provides a brief description of Node MCU and explain the brief introduction of sensor and its types.
- In this paper we are trying to write the step wise step method to provide connectivity with IoT technology and development board Node MCU.
- Proposed algorithms are algorithm for glowing LED, algorithm to set wireless connection , algorithm for infrared sensor(IR Sensor), algorithm of connect light dependent resistor, algorithm for humidity and temperature Sensor(Si7021) and algorithm to connect ultrasonic sensor via Node MCU board.



# Water Level Detection Flow Chart



# Future Scope

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- Create a better User Interface.
- Add a GPS sensor to the pet to track the pets movements and find them when they are lost.
- Add an extra embedded microcontroller board to operate the motors, fan, etc.

# Acknowledgement

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- We would like to thank, Our professor, and Dr. Leonardo Bonati. He explain the sensor's very well, and all the concepts were clean to me.
- We would Like to thanks our HCA student Eli MacColl who helped us understand the datasheet of the sensors, and configure them to find a proper solution.
- We would like to thank the Electrical and Computer Engineering department, of College of Engineering at Northeastern University, to give us this excellent opportunity.

- Ali, Al-Sabri & Bao, Xianan. (2021). Design and Research of Infrared Remote Control Based on ESP8266. OALib. 08. 1-14. 10.4236/oalib.1107314.
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