

Progress Presentation-I

e-Yantra Summer Internship-2018

Low Cost Sensor Node

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IIT Bombay

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Overview of Project

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Overview of Project

Overview of Task

Task Accomplished

Challenges Faced

Future Plans

Thank You

■ Project Name: Low Cost Sensor Node

■ Objectives:

- 1 A custom built power supply for optimized for low power sensor node applications
- 2 Ability to program via Arduino IDE/ Atmel Studio
- 3 Use nRF2401 for RF communication
- 4 Completely open source design and sample codes to make it useful for WSNs
- 5 Can be used as general purpose microcontroller board for learning interfacing and C programming

■ Deliverables:

- 1 A sensor node platform along with sample codes for rapid prototyping
- 2 A firmware for low power modes and nRF24L01 networking
- 3 Documentation on Hardware and Software

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Task No.	Tasks	Completion
1	Study about different sensor nodes platform available and their USP. Take desirable aspects of each	Completed
2	Review low power modes in ATmega328p, nRF2401 literature review	Completed
3	Build prototype using Arduino Pro Mini and nRF2401, test range theoretically and experimentally in outdoor environment	Completed
4	Research components available and select to fit price v/s performance metric	Completed
5	Build PCB design, source components, evaluation in Proteus (if necessary)	Completed
6	Prototype soldering and testing	Pending
7	Building a network of 3 nodes, relaying info, power consumption analysis	Working on
8	Making reusable firmware for nRF2401, interfacing soil moisture, temperature/humidity sensors	Working on
9	Gateway implementation using ESP32	Completed
10	Firmware documentation, hardware manual and reporting result	3

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- Change fuse bit in Atmega328p as per our application
- Complete circuit designing and send to printing
- Writing SPI library for Atmega328p in Atmel Studio
- Replacing Arduino core functions with our own GPIO functions for Atmega328p
- Testing of nRF24L01 transceiver on new firmware for our WSN
- Implement mesh network using 3 nodes
- Complete Duty cycling of Atmega328p

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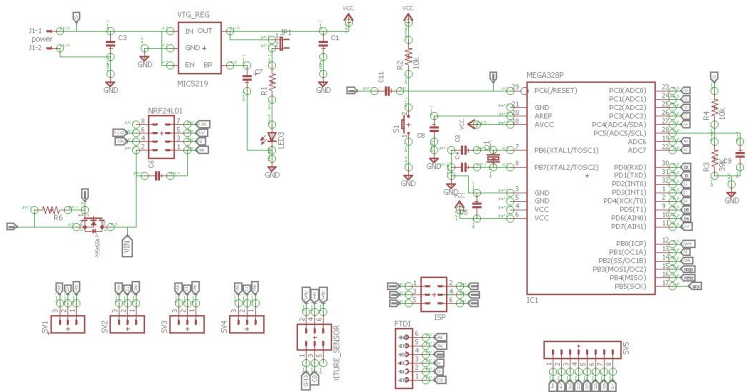


Figure 1: Schematic Design

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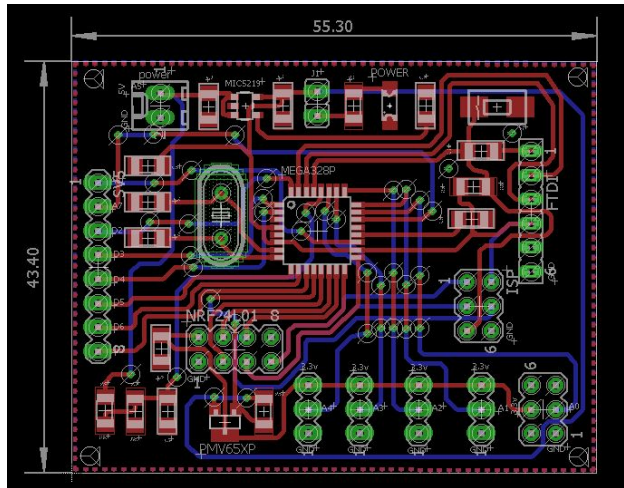


Figure 2: Board Design

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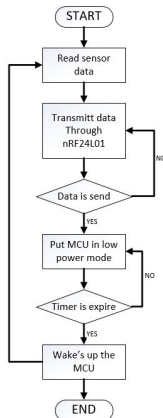


Figure 3: Transmitter flow

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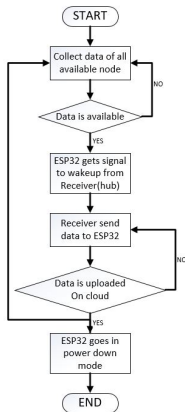


Figure 4: Receiver flow

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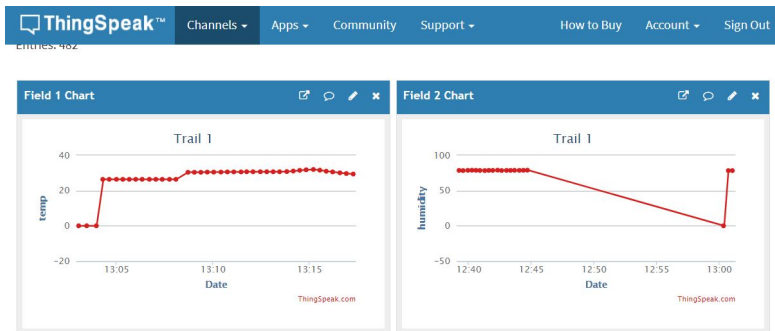


Figure 5: Graph of uploaded data

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- Importing C file in C++
- Understanding new concept in embedded C++
- Timing issue with SPI library
- Transmit and Receive float value in string

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- PCB soldering and testing
- Setup of 5 nodes WSN star network
- Operating life prediction of WSN
- Add soil moisture, light intensity sensor, humidity sensor on board and make provision to connect other sensors if needed

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THANK YOU !!!