Electronics Tasks Summary

Task1 – ESP Hello World! (Vital Signal Monitoring via Wireless)

Our Idea

- **NICU (Neonatal Intensive Care Unit)**

Specifications

Components	
Hardware	**Usage**
• ESP8266NodeMCU	• Establish a wireless connection to send data to server over WiFi
• Arduino Uno	• Burn code on it and Connect to sensor
• DHT Sensor	• Measure Temperature and Humidity
Software	**Usage**
• Qt Designer	• Desktop Application GUI
• MIT App Inventor	• Mobile Application GUI
App Development	
Language Used	**Why to Use?**
• **Desktop App:** Python-Pyqt	• Easy and Flexible language with many helpful libraries
• **Mobile App:** MIT App Inventor (Blocks)	• There was **no time** for learning new platform to develop a mobile app so it was the best choice for us as it is also Easy and Fast (just Drag and Drop)
Server	**Why to Use?**
• Firebase	• Store values for Temperature and Humidity and send it back to applications to be plotted

Conclusion

We use (ESP8266 NodeMCU) to connect to server and send (DHT Sensor) data [Temperature and Humidity] using wifi module, then in our desktop and mobile applications we retrieve this data from server and plot it into a graph

Task2 – GPS Module (Localization)

Our Idea

- **Simulated Map for Our Department Floor**

Specifications

Components	
Hardware	**Usage**
• ESP8266NodeMCU	• Establish a wireless connection to send location (WiFi Strengths) to server over WiFi
Software	**Usage**
• Meteor.js	• Desktop and Mobile Application GUI
App Development	
Language Used	**Why to Use**
• **Desktop and Mobile App:** JavaScript	• Ease of usage • Mobile App and Desktop App are developed in the same application
Server	**Usage**
• Firebase	• Store values for different WiFi Strengths after applying ML Model (Rain-forest Algorithm) and send it back to applications to determine the current location

Conclusion

We use (ESP8266 NodeMCU) to connect to cloud server (FireBase) and send (Percentage of WiFi-Strength) data using wifi module, then we use ML model (RandomForest) to predict my location (Class) and in our desktop and mobile applications we have a point moves according to my location

Task3 – Autonomous Vehicle (Self Driving Car)

Our Idea

- **Car work in both (Automatic Mode) and (Manual Mode)**

Specifications

Components	
Hardware	**Usage**
• ESP8266NodeMCU	• Establish a wireless connection to send data to server over WiFi
• 4 DC Motors • H Bridge • 4 Wheels	• Components of Car
• RFID	• Get value of RFID
• Ultrasonic	• Measure distance between object and car to take decisions according to it
Software	**Usage**
• Meteor.js	• Desktop and Mobile Application GUI
App Development	
Language Used	**Why to Use**
• **Desktop and Mobile App:** JavaScript	• Ease of usage • Mobile App and Desktop App are developed in the same application
Server	**Usage**
• Firebase	• Store RFID values to be retrieved by application
• Flask	• Apply lane detection algorithm on frames taken from mobile camera

Conclusion

- **Manual Mode:** We use (ESP8266NodeMCU) as an access point and control its output by connectin g to its server (Local Ip Address) from mobile app (Meteor App), then we use control the car using 4 buttons (Up, Right, Left and Down)
- **Automatic Mode:** we also use (ESP8266NodeMCU)