DON BOSCO INSTITUTE OF TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION

BE Project: Progress Seminar I

DEVELOPING A CONTAINER GPS TRACKING SYSTEM TO ENHANCE SUPPLY CHAIN SECURITY

INDUSTRY COLLABORATION PROJECT: QDNET TECHNOLOGIES PVT. LTD.

Group Members: Group No. 4

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QDnet: Mr. Quentin Desouza

GSM

GPS

OVERVIEW

INTRODUCTION

- The proposed project aims to develop a container GPS tracking system that will help prevent theft and improve the security of the supply chain

- With the use of GPS technology, the system will enable companies to track the location of their containers in real-time and receive alerts if any unauthorized activity is detected

- By implementing this system, businesses can safeguard their precious shipments, ensure seamless logistics, and elevate overall customer satisfaction

ETHICAL AWARENESS

When using content for a project, ethical awareness is crucial to ensure responsible and respectful behavior
Key points that we kept in mind:

- Consent and Privacy
- Appropriate Use
- No Pirated Software
- Integrity and Honesty
- Avoid Plagiarism

LITERATURE SURVEY

Arduino based tracking system using GPS and GSM, International Journal of Advance Research, Ideas and Innovations in Technology, (10 August, 2019)

Authors- Thin Thin Htwe, Dr. Kyaw Kyaw Hlaing

Problems/Issues addressed in literature

The tracking system is crucial nowadays because people want their belongings to be secure and in safe hands

Drawbacks

The paper doesn't mention power usage, which is concerning for efficiency. We're working on a low-power system to ensure both functionality and energy savings.

LITERATURE SURVEY

Real Time Vehicle Tracking System using GSM and GPS Technology:
An Anti-theft Tracking System.
International Journal of Electronics and Computer Science Engineering : (June 2012)

Authors - Kunal Maurya , Mandeep Singh , Neelu Jain

Problems/Issues addressed in literature:

Live tracking the location of the vehicles using GPS, GSM and microcontroller technologies for anti-theft applications

Drawbacks:

- Short battery life
- Live tracking is not available

LITERATURE SURVEY

Vehicle Tracking System using GPS and GSM using Mobile Applications
International Journal of Innovative Science and Research Technology: (May 2018)

Authors - Ujwala Patil , Shishir Ramesh Patil , S.N.Mathad

Problems/Issues addressed in literature:

The main aim is to enhance security of the vehicles with the implementation of systems, we can have alerts to accidents, thefts, etc

Drawbacks:

- Low storage availability in microcontroller
- High Power Consumption

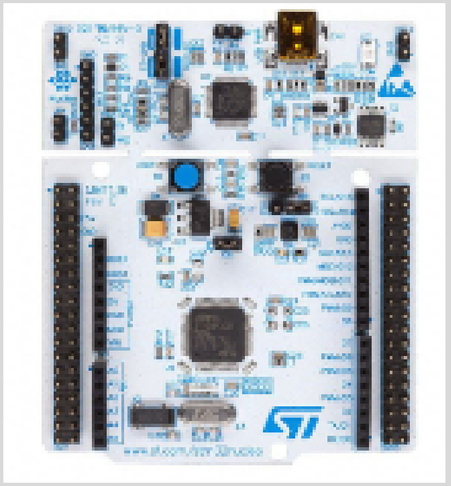
PROBLEM STATEMENT

Develop and implement a low-power container GPS tracking system for real-time monitoring and tracking of container locations and preventing theft to enhance supply chain security and ensure safe transportation of goods.

OBJECTIVES

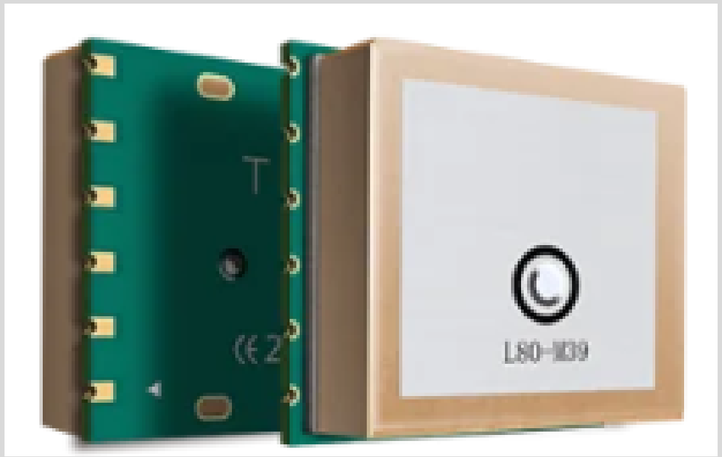
- To create a reliable GPS tracking solution for shipping containers
- Set up UART-GSM communication to send collected data to the server
- Efficiently designing and fabricating the PCB
- To design an closed circuit system for alerting any theft attempt
- To optimize power consumption to extend the tracking system's battery life
- To create data analysis algorithms for processing and interpreting GPS data on a web server

HARDWARE REQUIREMENTS



STM32-F302R8
Microcontroller

QUECTEL
M66
GSM module



QUECTEL
L80
GPS module

TTL convertor

SOFTWARE REQUIREMENTS

- **STM32 Cube IDE :** Designed for programming and developing applications for STM32 microcontrollers

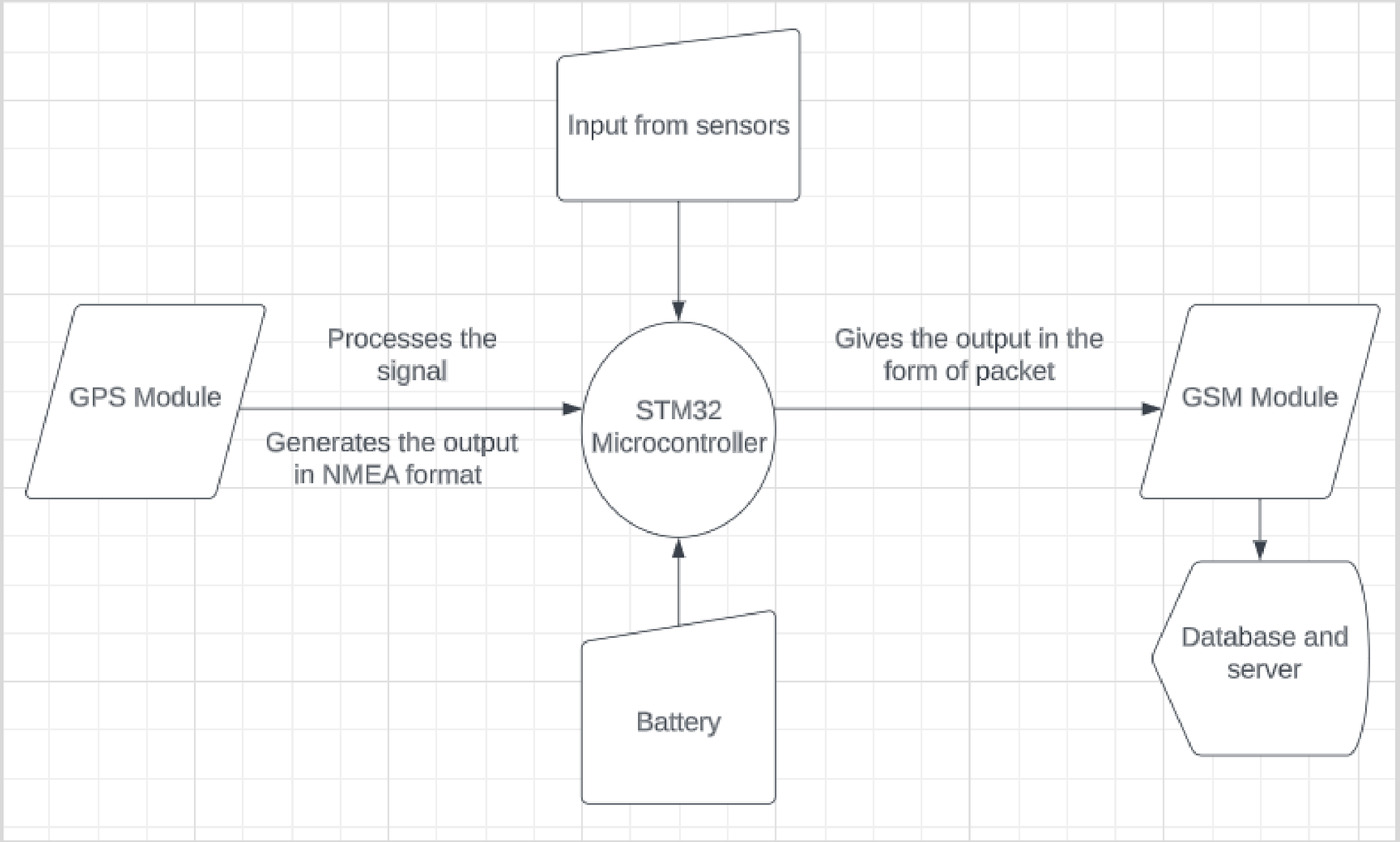
- **Arduino IDE :** Development environment for programming Arduino microcontrollers, thus simplifying development of embedded projects

- **Docklight :** Docklight is a testing, analysis and simulation tool for serial communication protocols

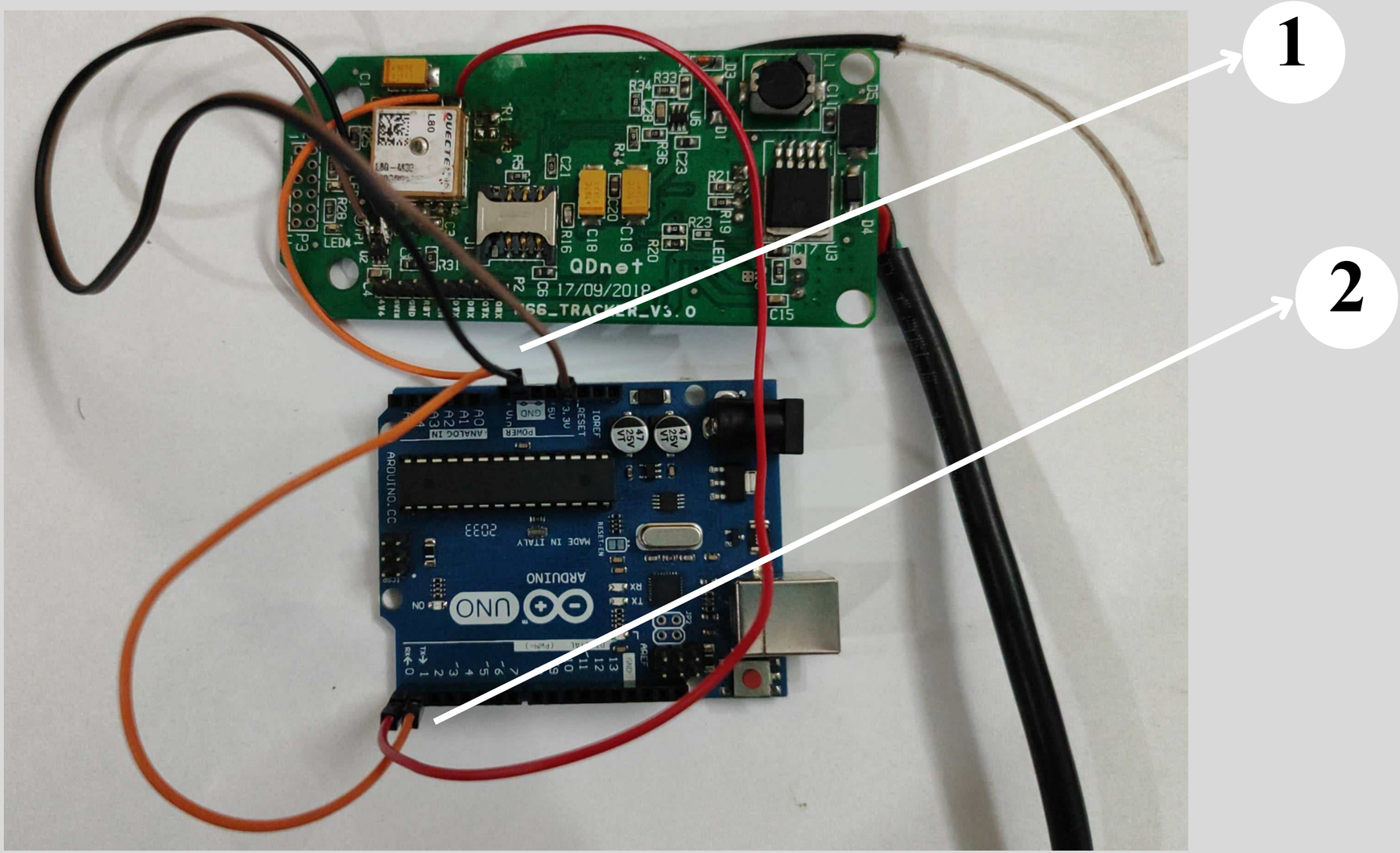
- **KiCad :** KiCad is an open-source electronic design automation (EDA) software suite for creating schematics and printed circuit boards (PCBs)

NOTE: All softwares used are open-source

BLOCK DIAGRAM



GPS (ARDUINO CONNECTION)



METHODOLOGY

1) Initialize GPS module

2) Establish UART communication between GPS and STM32 microcontroller

3) Retrieve data in the form of NMEA sentences and convert it into a suitable format

4) Initialize GSM module with AT commands

5) Establish UART communication between GSM and STM32 microcontroller

6) To send the collected data from STM32 to the server via GSM

7) Repeat steps 3 to 7 at hourly intervals for continuous tracking and updating

TIMELINE / GANTT CHART

Task	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March
Literature Survey										
Finalising and working on GSM and GPS modules										
Serial communication through STM32										
Designing Circuit diagram, schematics										
Layout and fabrication										
Testing										
Paper Publication										

CO-PO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
ECL704.1		3	3				1					1
ECL704.2	3	3									3	1
ECL704.3				3	3							1
ECL704.4									3		3	1
ECL704.5						2		3				1
ECL704.6										3		1

BILL OF MATERIALS

Components	Quantity	Price (Rs.)
GSM module	1	1,549.04
GPS module	1	450
STM32F302R8	1	912.91

REFERENCES

- San, Ni & Naing, Ma & Naing, San. (2019). GPS and GSM Based Vehicle Tracking System. International Journal of Trend in Scientific Research and Development. Volume-3. 271-275. 10.31142/ijtsrd23718.

- Maurya, Kunal & Singh, Mandeep & Jain, Neelu. (2012). Real Time Vehicle Tracking System using GSM and GPS Technology-An Anti-theft Tracking System. International Journal of Electronics and Computer Science Engineering. 1.

- H. D. Pham, M. Drieberg and C. C. Nguyen, "Development of vehicle tracking system using GPS and GSM modem," 2013 IEEE Conference on Open Systems (ICOS), Kuching, Malaysia, 2013, pp. 89-94, doi: 10.1109/ICOS.2013.6735054.

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- Fleischer, P.B.; Nelson, A.Y.; Sowah, R.A.; Bremang, A., "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," Adaptive Science & Technology (ICAST), 2012 IEEE 4th International Conference on , vol., no., pp.1,6, 25-27 Oct. 2012.

Thank You