GANADIPATHY TULSIS JAIN ENGINEERING COLLEGE

Tracking Students Locations using GPS & GSM Raises Significant Privacy Concerns based on RFID Sensors for Traceability

Project Guide:

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OBJECTIVE

- Objective of our Project is Tracking Students Locations using GPS & GSM Live Location of Students.

ABSTRACT

- GPS Tracking into Leading to Potential harm to Students Safety and Privacy.
- In our Privacy Concerns due to the Potential Intrusion into Individuals Personal Lives and Movements.
- We propose the Design of a smart sensor Network based on RFID Communication Technologies, Reliability Patterns and Integration Techniques.

INTRODUCTION

- It can Help ensure the Safety of Students by Providing Real-time Tracking in case of Emergencies such as Accidents.
- The GPS based Student Tracking System is designed to find out the Exact location of any Student and Intimate the Position to the Concerned Authority about through an SMS.
- System includes a GPS Modem that it Retrieves the Location of a Student in terms of its Longitude and Latitude.
- This Hardware is fitted on to the Student in such a Manner that it was not Visible to Anyone.

Continued…,

- The System Automatically Sends a Return reply to that Particular Parent Mobile indicating the Current Location of the Student on Google map.

- RFID Sensors is used to read Student Informations and Store the details in Database, using Website we can Retrieve the Stored data and get the Student live Location.

LITERATURE SURVEY

TITLE	AUTHOR	PROPOSED SYSTEM	LIMITATIONS
GPS and GSM Based Vehicle Tracking System	Mohd Hakimi Zohari, IOT,2021	Arduino UNO, GSM module, GPS module, mobile Developing.	• Power Dependency • Cost of Implementation and Maintenance
RFID Sensors for Traceability	Virgilio Gilart Iglesias, IOT, 2015	RFID smart sensor network; cyber physical systems; communication technology.	• Data Security • Read Range

Biometric and RFID Passive Tag based Student Identification system for Attendance Management	Nagandra R, IEEE,2023	A daily brief message service (SMS) delivered by a GSM	• Security Risks • Maintenance and Support:
Smart ID-Card Based Child Security - Device	Alankrit Mishra,IEE, 2018	GPS , GSM , Tracking Capabilities, Google Maplink , Child Safety Device(CSD)	• False Alarms • Network Connectivity
Digital Student ID Card Using RFID Technology (DIGITAL INSTITUTE)	Priya .B,IEE, 2023	It can also be used to bootstrap different types of connections, such as Bluetooth or Wifi.	• Range Limitations Wifi • Limited Data Storage

EXISTING SYSTEM

- In Existing System used GPS chip integrated id Card to Track Current Location alone.

DISADVANTAGES:

- Potential for Abuse.
- Limited Range and Accuracy.

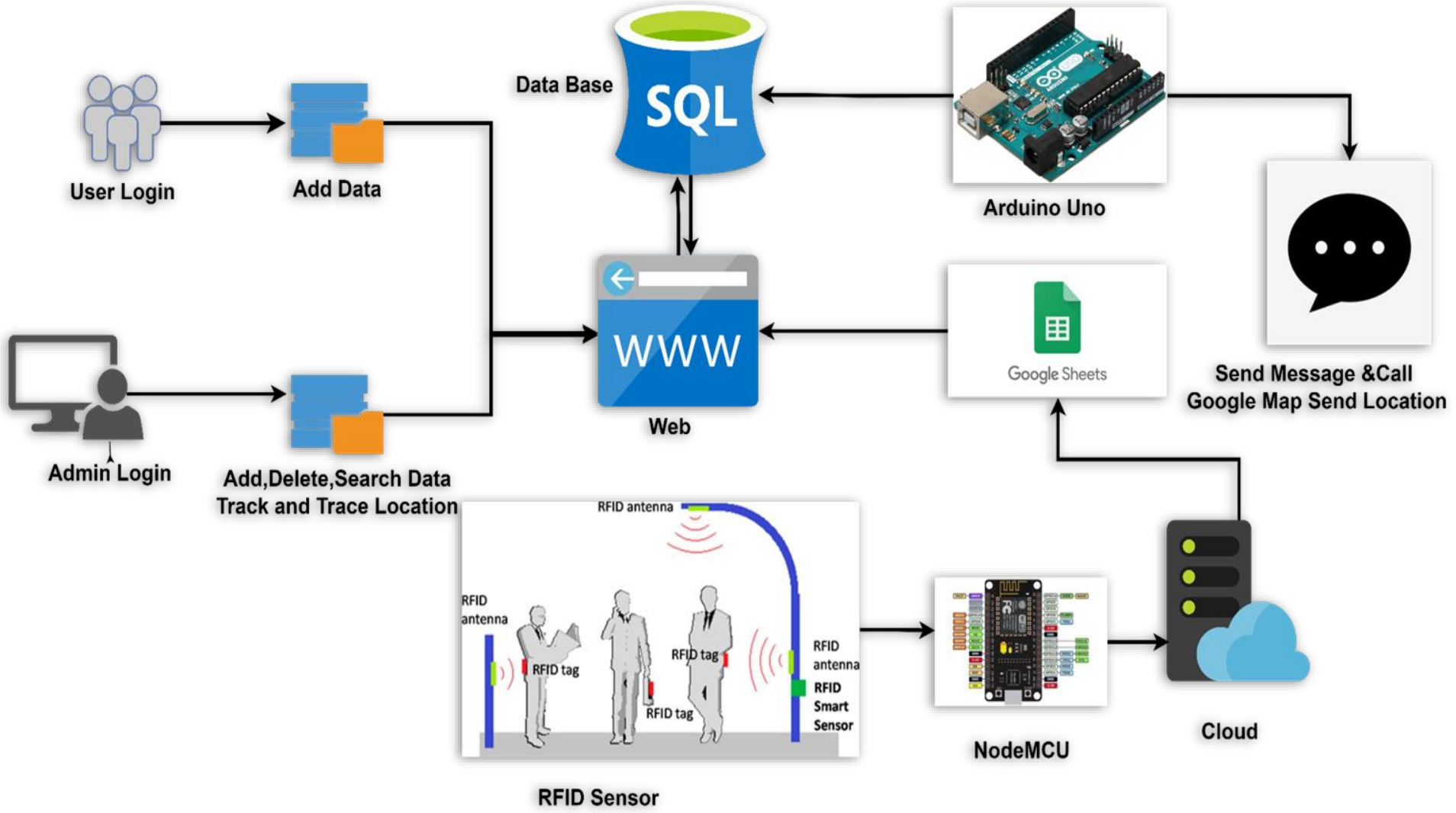
PROPOSED SYSTEM

- RFID Sensors provide Localized Tracking,This Approach may consider some Privacy Concerns Associated with GPS/GSM Tracking.
- We used RFID Sensors to Collect the Students id Card Details, that Smart Card Contains GPS Chip.

ADVANTAGES:

- GPS & GSM track and trace System.
- RFID smart sensor Network.

ARCHITECTURE DIAGRAM



MODULES

- Admin Login .
- RFID Sensors.
- GPS Module.
- GSM Module.

Admin Login

Authentication Mechanism:

- The module includes an authentication mechanism to verify the identity of administrators based on the credentials provided.
- It verifies the entered username and password against a database of authorized users.
- Passwords are usually encrypted or hashed for security purposes.

Data Access by Admin:

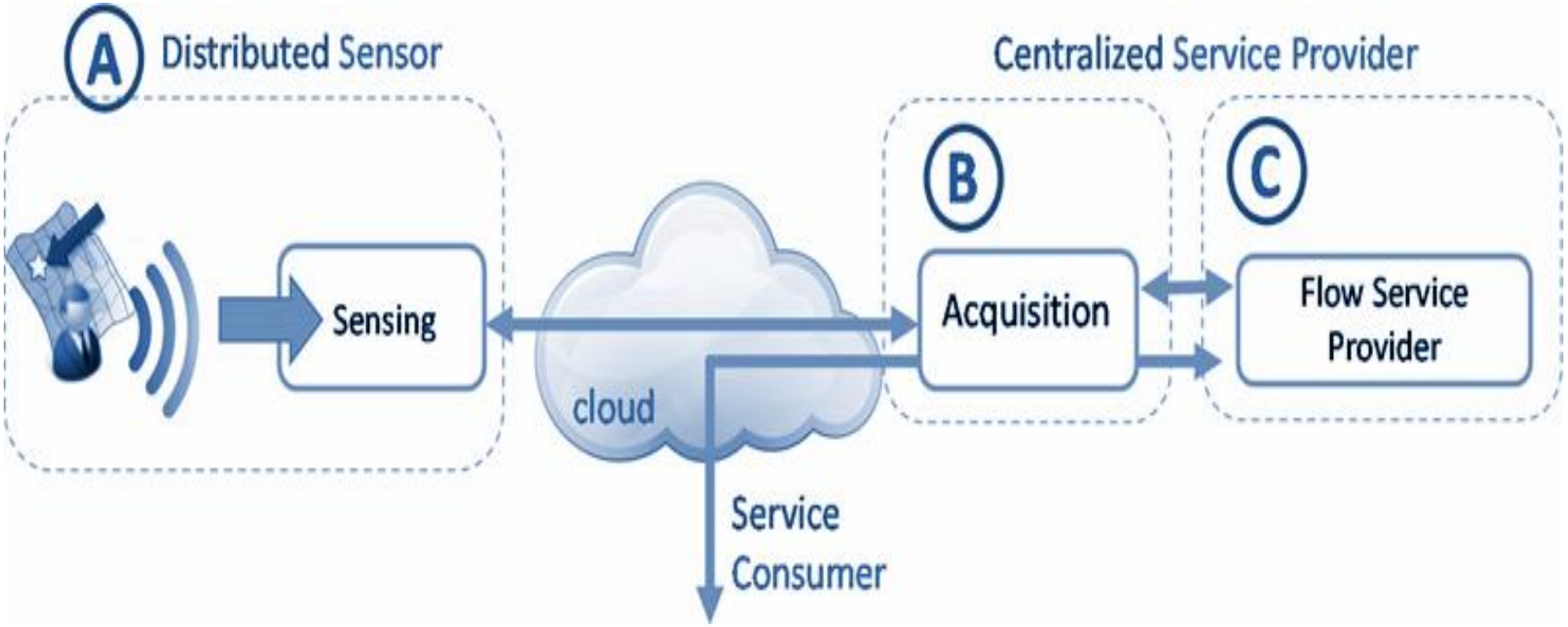
Admin can Access the Data Stored in the DataBase

Eg:-

1. Add data.
2. Delete data.
3. Update data.
4. Track Location .

RFID Sensors

Overall Computational architecture of the citizen track and trace system:



RFID System Components:

- **RFID Tag:** This is a small electronic device that consists of a microchip attached to an antenna. The microchip stores data and communicates with RFID readers via radio waves.
- **RFID Reader:** Also known as an RFID interrogator, the reader sends radio waves to the RFID tag and receives data back from the tag.
- **Antenna:** The antenna is used by both the RFID tag and reader to transmit and receive radio signals.

Tag Initialization:

- Each RFID tag is assigned a unique identification number (UID) during manufacturing. This UID is stored in the microchip's memory.
- Additional data can also be programmed into the tag, such as product information, serial numbers, or other relevant details.

Communication Process:

- When an RFID tag comes within range of an RFID reader, the reader emits radio waves.

- The RFID tag's antenna receives these radio waves, which provide the energy needed to power the microchip on the tag.
- The microchip modulates the radio waves and sends data back to the reader.
- The reader decodes the data and processes it accordingly.

Data Transmission:

- The data transmitted by the RFID tag can include its unique identifier and any additional information stored on the tag.

- This data is typically sent in digital format and can be used for various purposes such as inventory management, tracking shipments, access control, and authentication.

Reading Range:

- The reading range of an RFID system depends on several factors including the frequency of operation, power output of the reader, and environmental conditions.
- RFID systems can have reading ranges ranging from a few centimeters to several meters.

RFID Frequencies:

- RFID systems operate at different frequencies, including low-frequency (LF), high-frequency (HF), and ultra-high-frequency (UHF).
- Each frequency range has its own advantages and disadvantages in terms of reading range, data transfer speed, and interference resistance.

GPS and GSM Module:-

GPS Module:

- A GPS module is a device that receives signals from satellites orbiting the Earth to determine its precise location anywhere on the planet's surface.
- **How it works:** The GPS module communicates with multiple satellites in the GPS constellation orbiting the Earth. Each satellite transmits precise timing signals along with orbital information. By receiving signals from at least four satellites, the GPS module can calculate its exact latitude, longitude, altitude, and precise time.

- **Components:** A GPS module typically consists of a GPS receiver chip, antenna, and sometimes additional components such as a microcontroller or communication interface.
- **Applications:** GPS modules are used in a wide range of applications including navigation systems, vehicle tracking, asset tracking, location-based services, and outdoor recreational activities.

GSM Module:

- A GSM module is a hardware device that allows electronic devices to communicate over the GSM cellular network.
- **How it works:** The GSM module contains a GSM modem that enables communication via the Global System for Mobile Communications (GSM) network. It interfaces with the device's microcontroller or processor and provides functionalities for sending and receiving data, making voice calls, and sending SMS (Short Message Service) texts.

- Components: A GSM module typically includes a GSM modem, SIM card interface, antenna, and communication interfaces (such as UART, SPI, or USB) for connecting to the device.
- Applications: GSM modules are widely used in applications such as mobile phones, IoT (Internet of Things) devices, security systems, remote monitoring systems, and industrial automation.

comparison:

GPS Module:

- Receives signals from GPS satellites.
- Determines precise location (latitude, longitude, altitude).
- Does not require cellular network connectivity.
- Used primarily for location-based applications.

GSM Module:

- Communicates over the GSM cellular network.
- Facilitates voice calls, SMS, and data communication.
- Requires a SIM card for network authentication.
- Used for remote communication and control over cellular networks.

SYSTEM CONFIGURATION

HARDWARE CONFIGURATION:

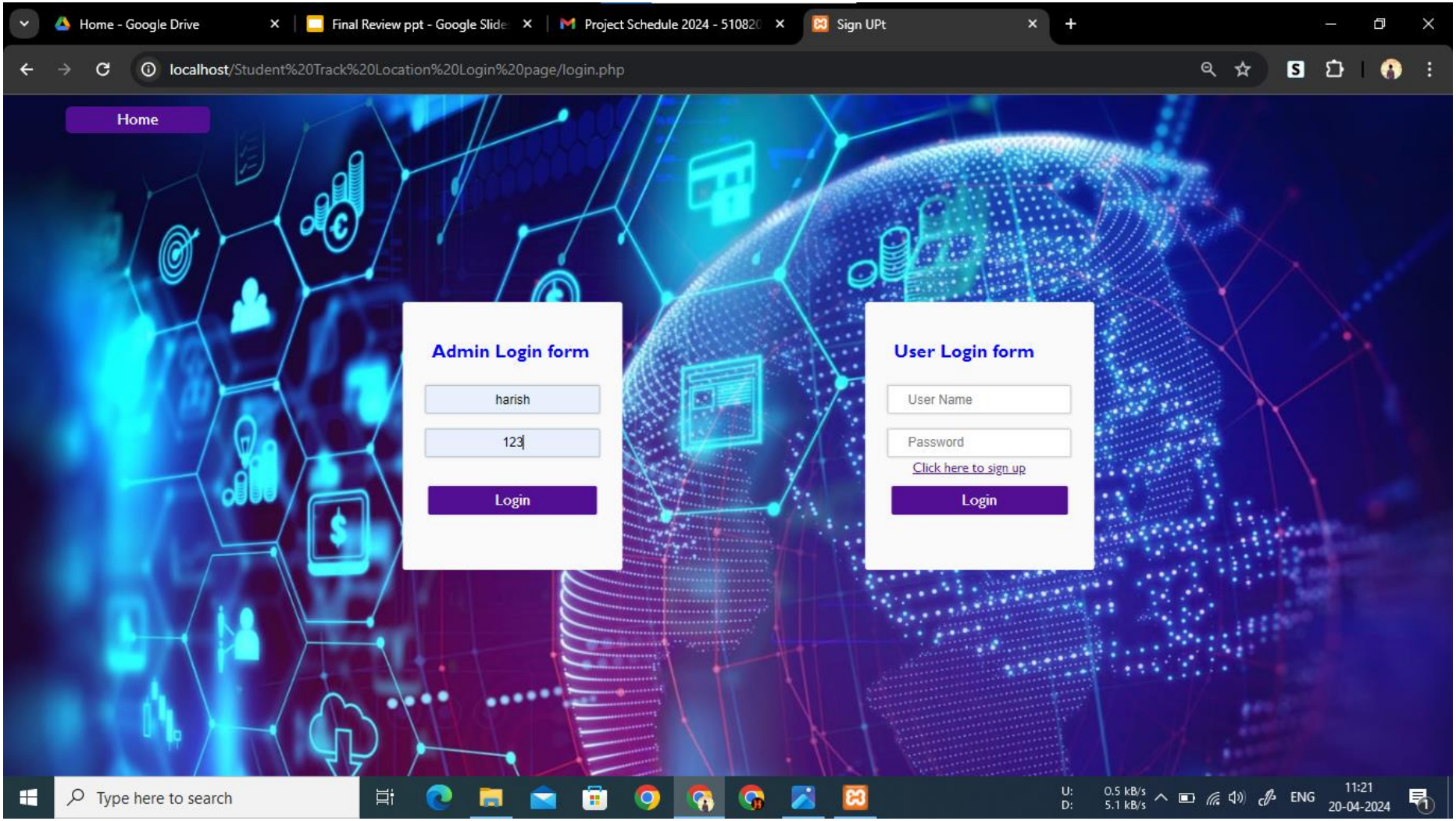
- Board - Arduino UNO, Breadboard,nodemcu(esp8266)
- GPS - Ublox Neo 6m
- GPRS - SIM800L GSM Module
- Sensors - RFID Reader module(RC522)
- Battery - Two Li-on Battery with 3.7v
- Light - LED light blue

SOFTWARE CONFIGURATION:

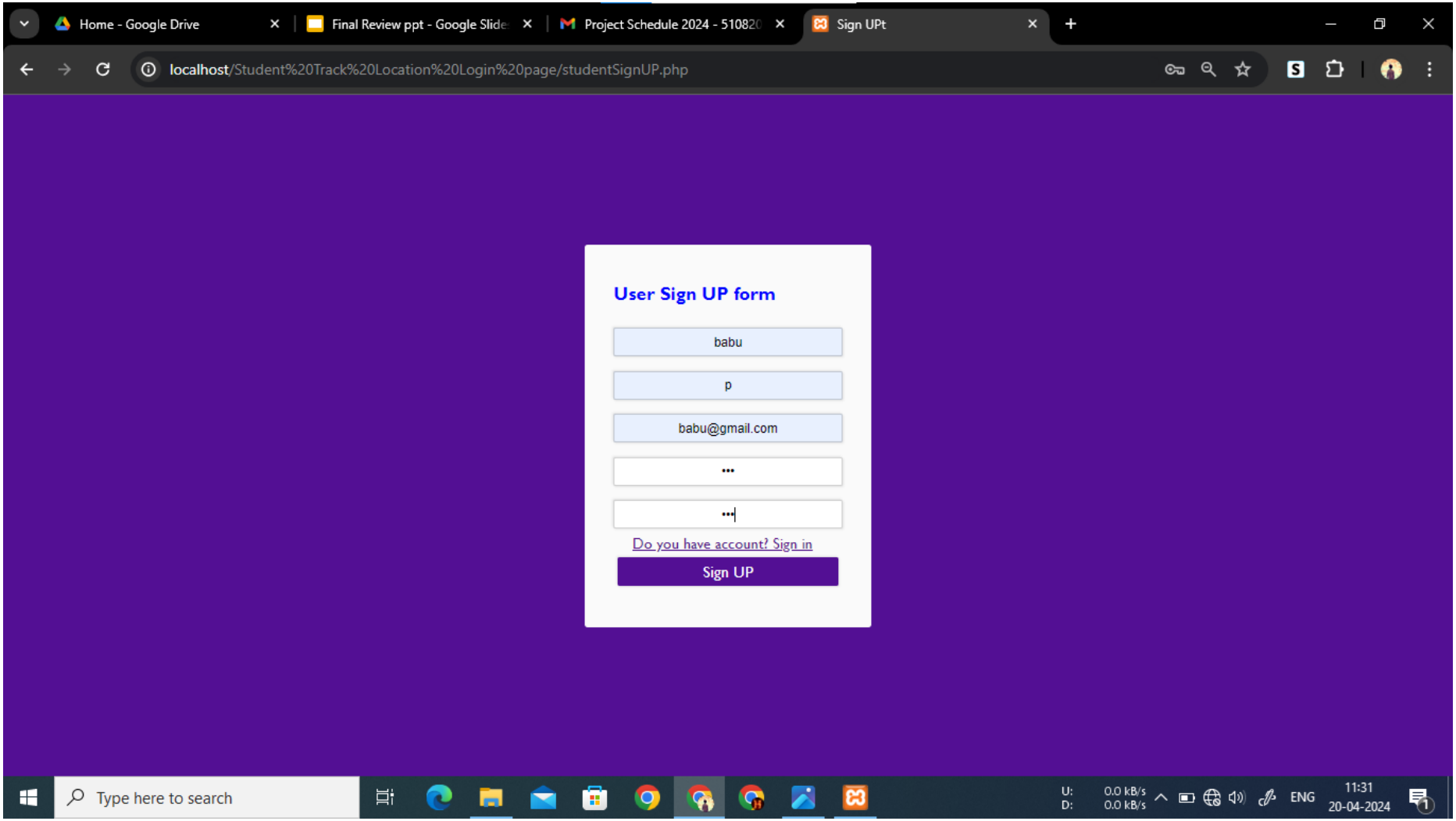
- Operating System: Windows 7/8/10/11.
- Application Server: Tomcat7.0/Apache.
- Front End: HTML, CSS.
- Scripts: JavaScript, PHP.
- Database: Mysql.
- Application: Arduino IDE Software

LANDING PAGE

Admin Login & User Login



User Sign UP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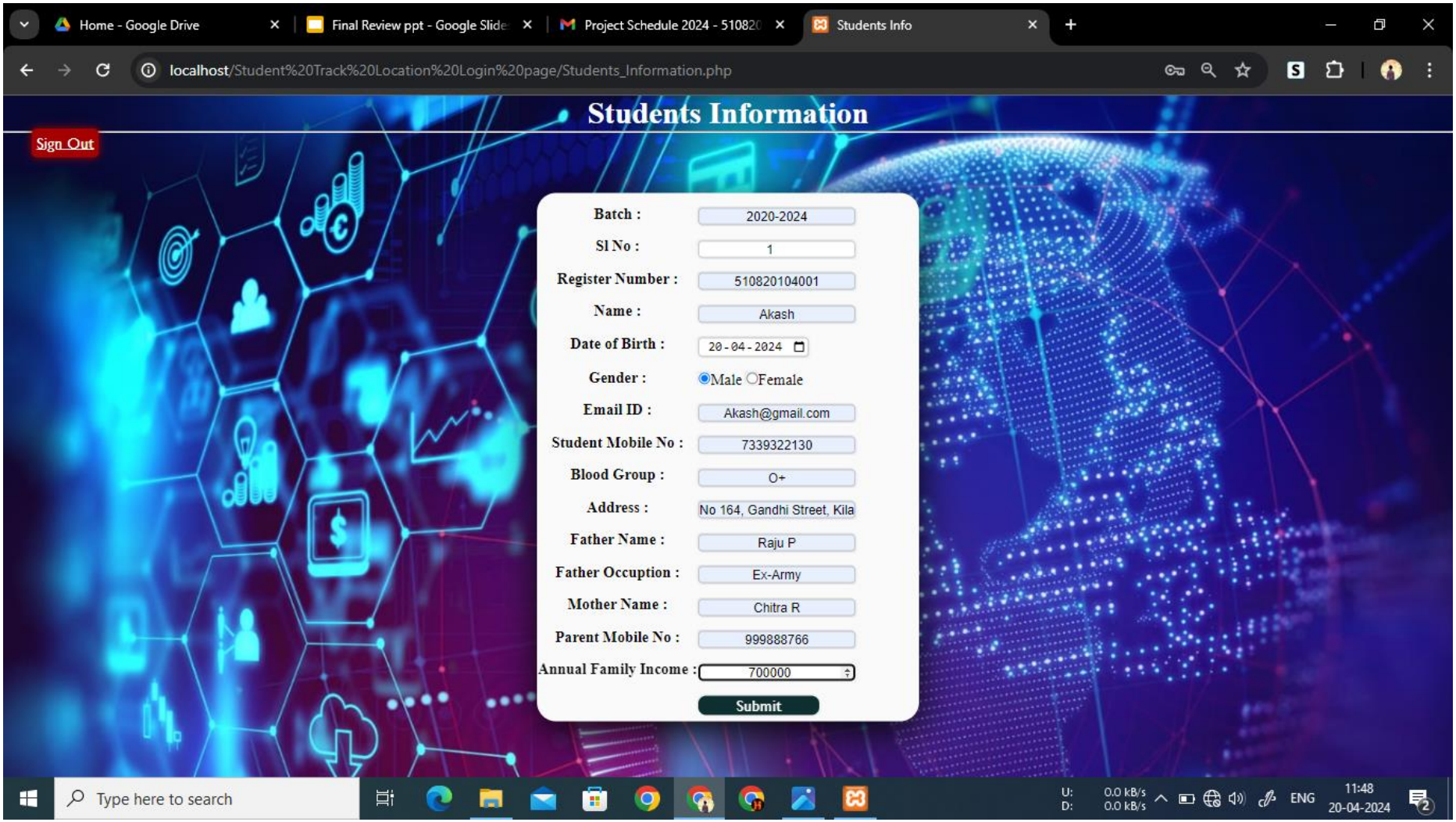
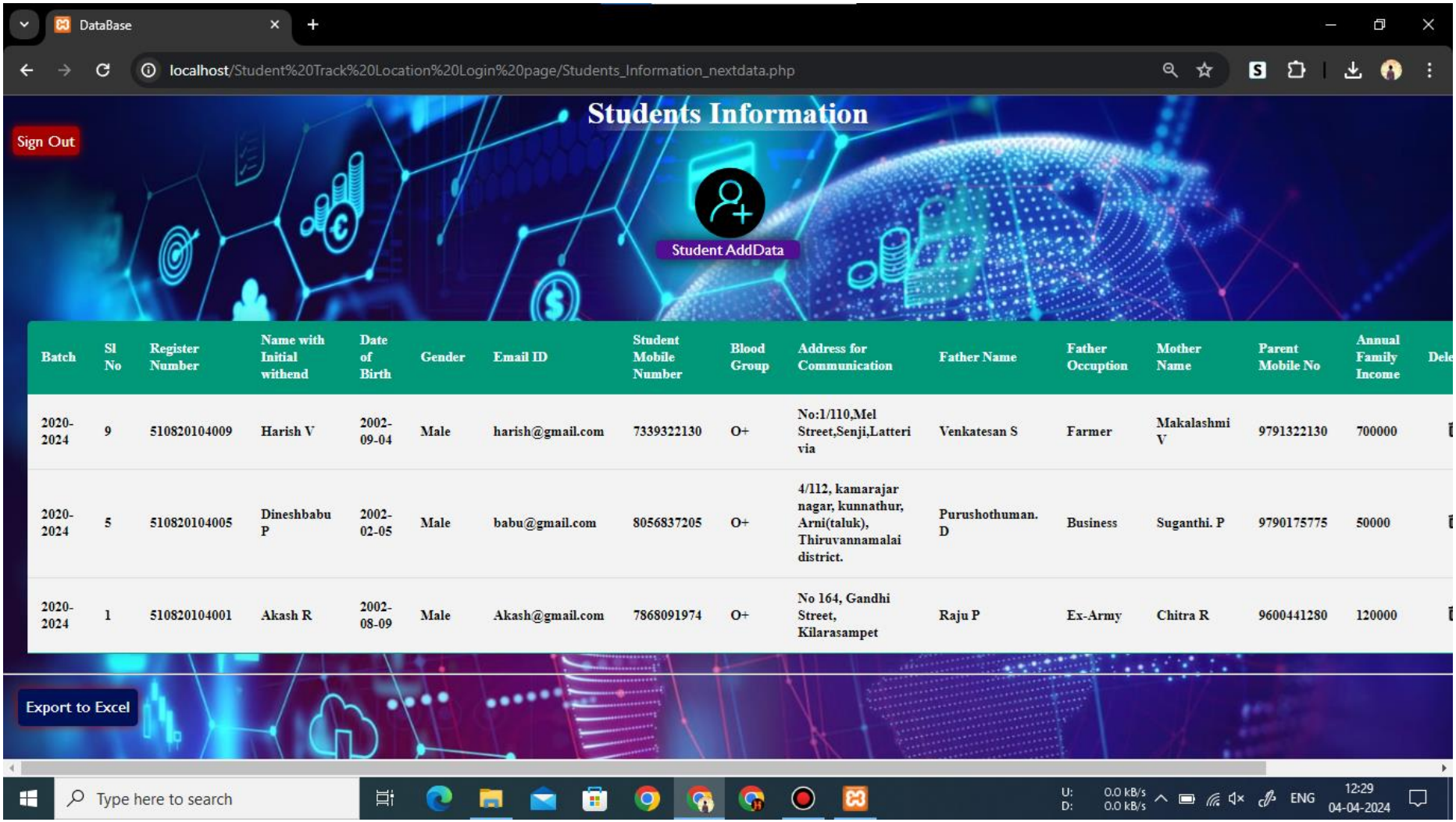
User Login & Add Students Information

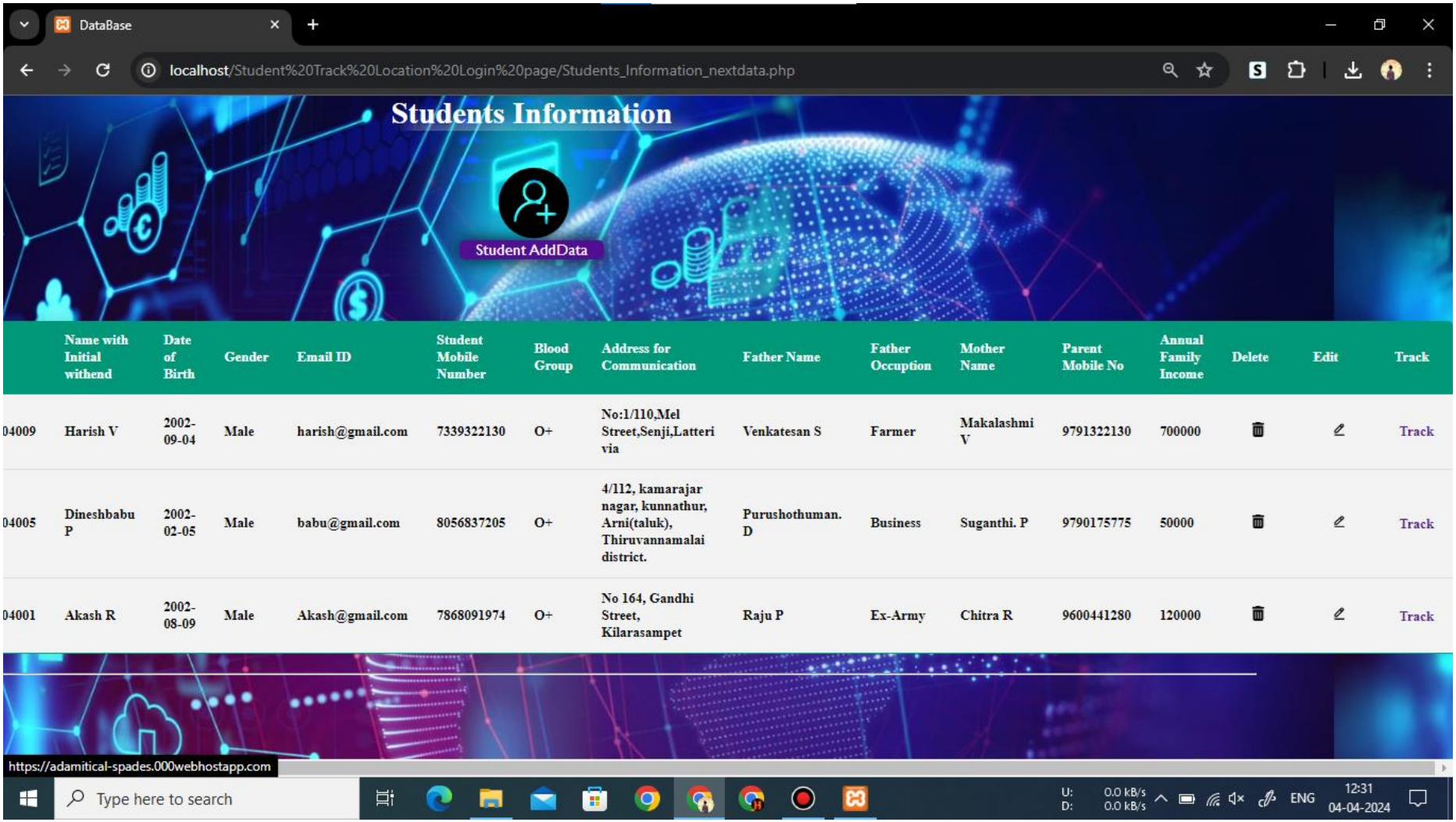


Admin Login & View All Data



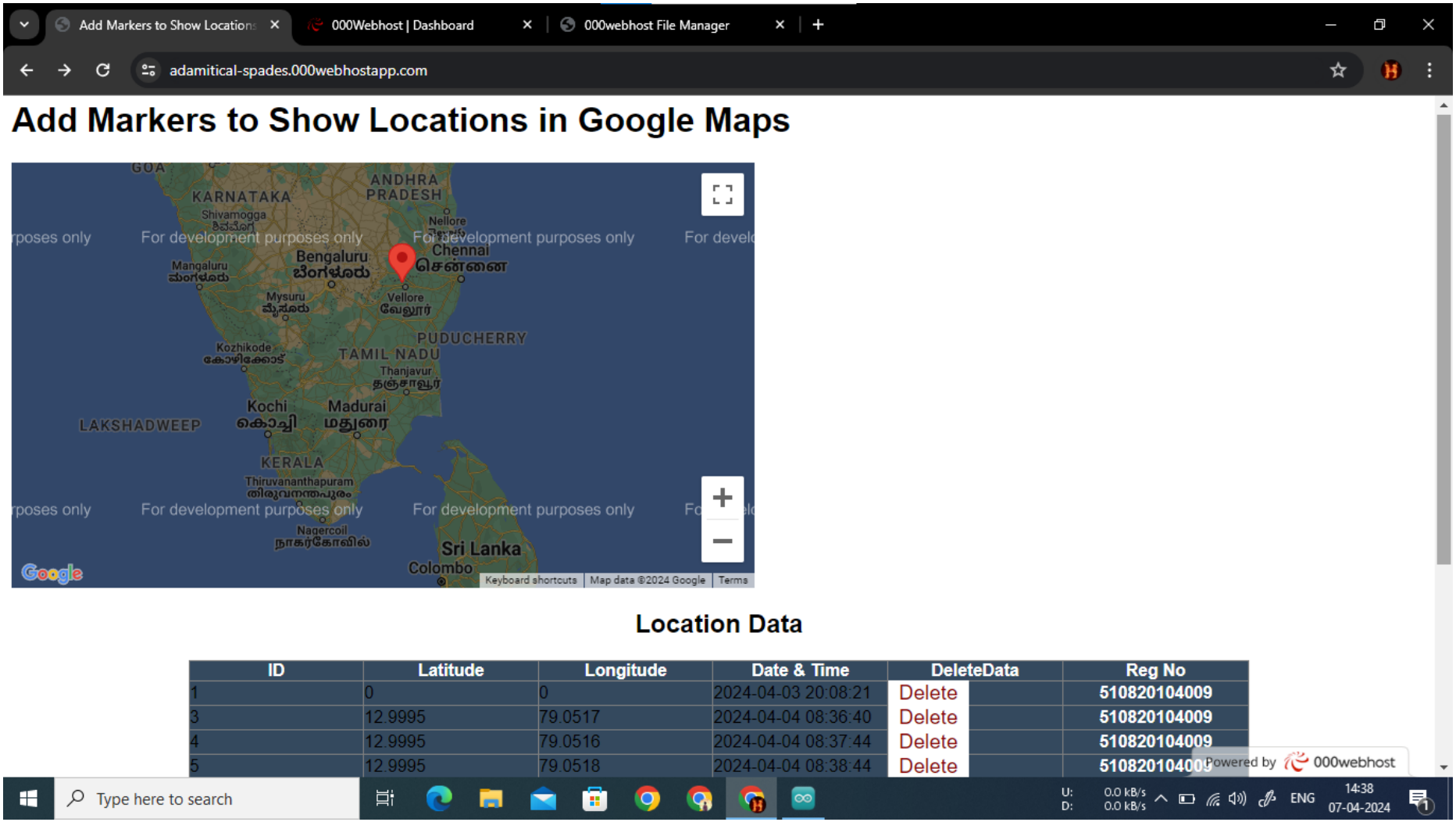
Batch	Sl No	Register Number	Name with Initial withend	Date of Birth	Gender	Email ID	Student Mobile Number	Blood Group	Address for Communication	Father Name	Father Occuption	Mother Name	Parent Mobile No	Annual Family Income	Dele
2020-2024	9	510820104009	Harish V	2002-09-04	Male	harish@gmail.com	7339322130	O+	No:1/110,Mel Street,Senji,Latteri via	Venkatesan S	Farmer	Makalashmi V	9791322130	700000	
2020-2024	5	510820104005	Dineshbabu P	2002-02-05	Male	babu@gmail.com	8056837205	O+	4/112, kamarajar nagar, kunnathur, Arni(taluk), Thiruvannamalai district.	Purushothuman. D	Business	Suganthi. P	9790175775	50000	
2020-2024	1	510820104001	Akash R	2002-08-09	Male	Akash@gmail.com	7868091974	O+	No 164, Gandhi Street, Kilarasampet	Raju P	Ex-Army	Chitra R	9600441280	120000	

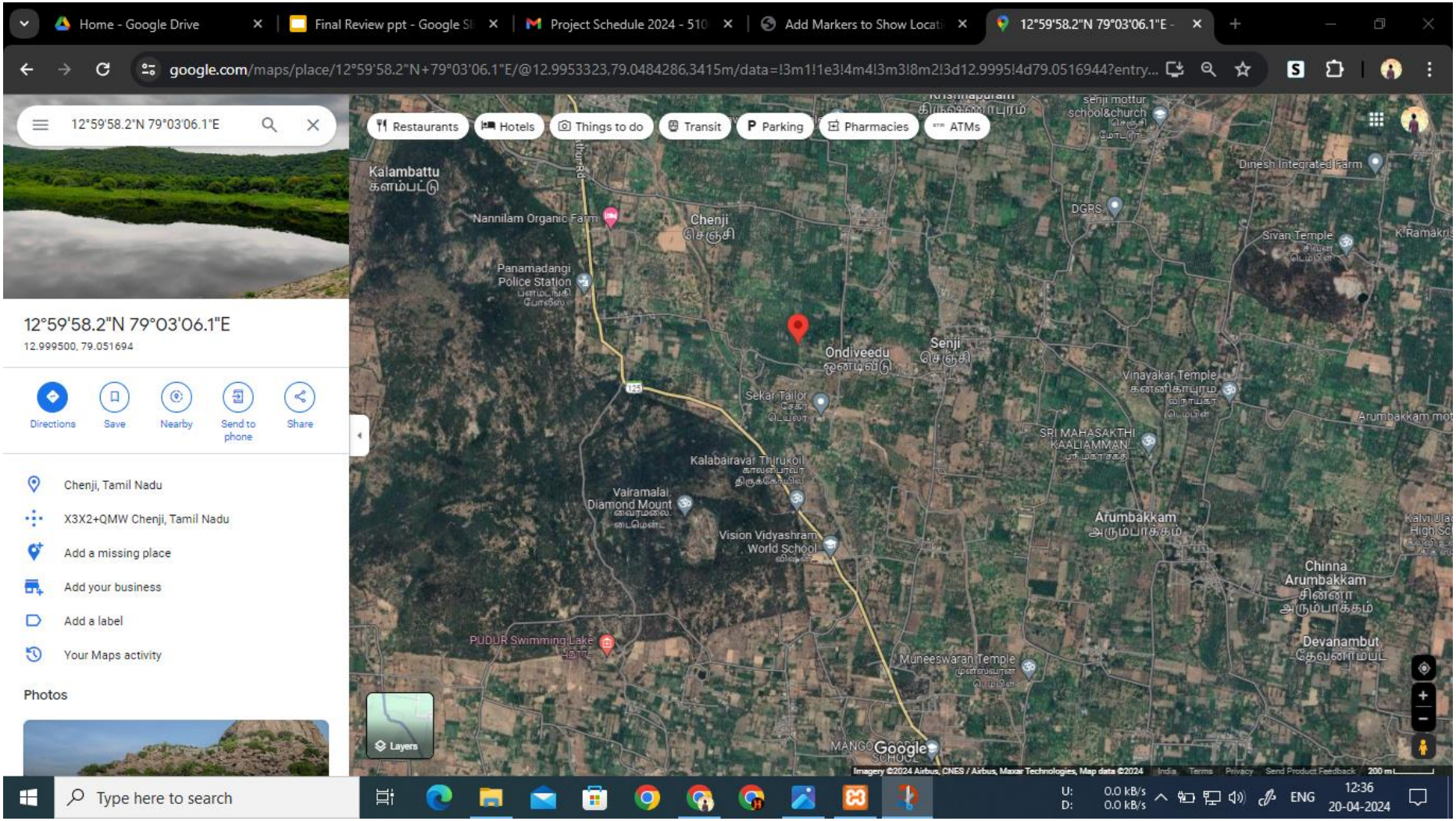
Add, Update, Delete, Track and Table to Excel



	Name with Initial withend	Date of Birth	Gender	Email ID	Student Mobile Number	Blood Group	Address for Communication	Father Name	Father Occuption	Mother Name	Parent Mobile No	Annual Family Income	Delete	Edit	Track
04009	Harish V	2002-09-04	Male	harish@gmail.com	7339322130	O+	No:1/110,Mel Street,Senji,Latteri via	Venkatesan S	Farmer	Makalashmi V	9791322130	700000			Track
04005	Dineshbabu P	2002-02-05	Male	babu@gmail.com	8056837205	O+	4/112, kamarajar nagar, kunnathur, Arni(taluk), Thiruvannamalai district.	Purushothuman. D	Business	Suganthi. P	9790175775	50000			Track
04001	Akash R	2002-08-09	Male	Akash@gmail.com	7868091974	O+	No 164, Gandhi Street, Kilarasampet	Raju P	Ex-Army	Chitra R	9600441280	120000			Track

Track Location Students

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Restaurants
Hotels
Things to do
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Parking
Pharmacies
ATMs
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Nannilam Organic Farm
Chenji
Panamadangi Police Station
Ondiveedu
Senji
Sekar Tailor
Kalabairavar Thirukoil
Vairamalai Diamond Mount
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Muneeswaran Temple
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Dinesh Integrated Farm
DGRS
Sivan Temple
Vinayakar Temple
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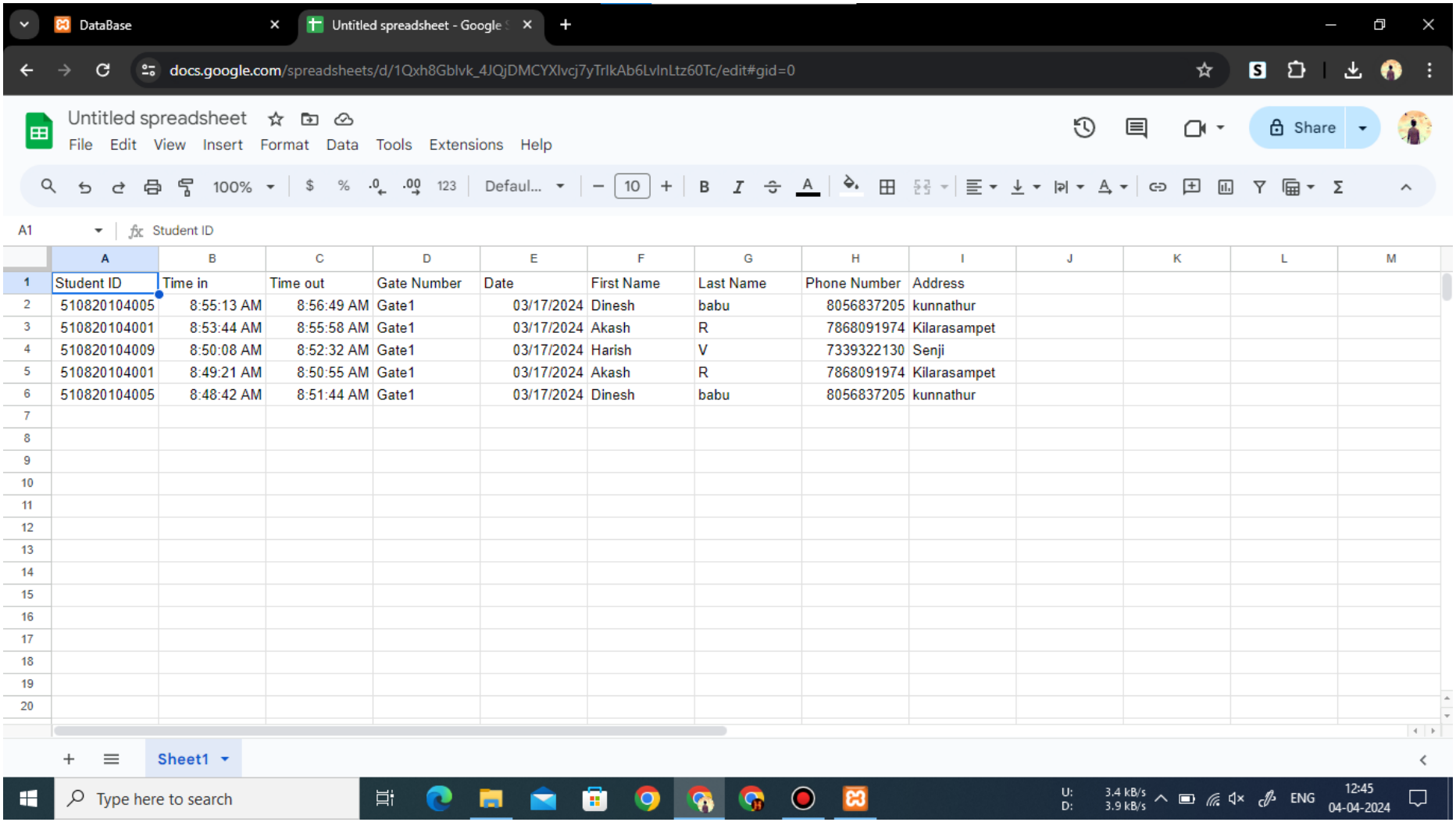
RFID Sensors Read in and out Time



DataBase | Untitled spreadsheet - Google

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Untitled spreadsheet

File Edit View Insert Format Data Tools Extensions Help

Share

A1 | Student ID

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Student ID	Time in	Time out	Gate Number	Date	First Name	Last Name	Phone Number	Address				
2	510820104005	8:55:13 AM	8:56:49 AM	Gate1	03/17/2024	Dinesh	babu	8056837205	kunnathur				
3	510820104001	8:53:44 AM	8:55:58 AM	Gate1	03/17/2024	Akash	R	7868091974	Kilarasampet				
4	510820104009	8:50:08 AM	8:52:32 AM	Gate1	03/17/2024	Harish	V	7339322130	Senji				
5	510820104001	8:49:21 AM	8:50:55 AM	Gate1	03/17/2024	Akash	R	7868091974	Kilarasampet				
6	510820104005	8:48:42 AM	8:51:44 AM	Gate1	03/17/2024	Dinesh	babu	8056837205	kunnathur				
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CONCLUSION

In conclusion, while the use of GPS, GSM, and RFID sensors for tracking students' locations offers potential benefits such as enhanced safety and security, it also raises significant privacy concerns.It’s simple and easy to use.

FUTURE WORK

Need to be implemented the crash detection to Indicate Exact location to the admin and parents

REFERENCES

- **[1]** Akash Moodbidri, Hamid Shahnasser, “Child Safety Wearable Device” IEEE Trans.Volume: 06 Issue: 02 | Feb 2019
- **[2]** G. Bharathi, L.Ramurthy , “ Implementation of children tracking system using ARM7 microcontroller”, International Journal of Industrial Electronics and Electrical Engineering, Volume2(12): pages 18-21, Dec.-2014
- **[3]**Dhiraj Sunehra, Pottabathini Laxmi Priya, Ayesha Bano “Children Location Monitoring on Google Maps using GPS and GSM Technologies”
- **[4]**V.Sivasankaran et.al ,“ Advanced embedded system assisted GSM and RFID based smart school management system” , International journal of advanced research in electrical , Electronics and Instrumentation Engineering, Vol 2(7): pages 3124- 3128, July 2013.

THANK YOU