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A RESEARCH PAPER ON FINDING MISPLACED BAGS

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Abstract: This project aims to develop a system for finding misplaced objects using an Arduino-based GPS tracker and GSM module. The loss or misplacement of personal belongings is a common occurrence that can cause frustration and inconvenience. To address this issue, a miniaturized tracking system is designed and implemented to locate objects using GPS technology and communicate their whereabouts through GSM networks. The system consists of an Arduino microcontroller, a GPS module for obtaining location data, and a GSM module for transmitting the information to a mobile device. The project involves the integration of hardware components, development of software algorithms, and testing of the system's functionality. Through experimental evaluation and field trials, the reliability of the object tracking system will be assessed. The outcomes of this project will contribute to the development of innovative solutions for locating misplaced objects, providing individuals with a practical and efficient means to recover their belongings.

KEYWORDS: Miniaturized, Reliability, Integration.

I.I. INTRODUCTION

Losing or misplacing bags, especially during travel, can be a stressful and frustrating experience for individuals. The inability to quickly locate a misplaced bag can result in inconvenience, financial loss, and even potential security risks. To address this issue and provide a solution for locating misplaced bags, this mini project focuses on the development of a system that utilizes Arduino Uno, GSM (Global System for Mobile Communications), and GPS (Global Positioning System) technologies.

The main objective of this project is to create an efficient and reliable system that can track and locate misplaced bags using a combination of hardware and software components. By integrating the Arduino Uno microcontroller, GPS module, and GSM module, the system can accurately determine the bag's location and communicate it to the user's mobile device, enabling swift recovery of the misplaced bag.
GPS module uses the received signals to calculate the bag's latitude and longitude, providing accurate geographical coordinates.

II.II. BASIC PRELIMINARIES AND RELATED WORK
II.

Arduino UNO

The Arduino Uno is a popular open-source microcontroller board based on the ATmega328P microcontroller. It has 14 digital input/output pins (6 of which can be used as PWM outputs), 6 analog inputs, and a 16 MHz quartz crystal oscillator. The board also has a USB interface for programming and serial communication with a host computer. The Uno can be powered through the USB connection or an external power supply, and is compatible with a wide range of

shields, add-ons and libraries, making it a versatile platform for DIY electronics projects. The Arduino Uno is widely used in education, prototyping, and hobbyist applications due to its ease of use and flexibility.

Functionality and Working Principles:

This subsection explains how GPS calculates position and time using signals from satellites, the concept of trilateration, and the role of GPS modules in receiving and processing satellite signals.

V.III. LITERATURE REVIEW

V.

GPS-Based Tracking Systems

Overview

GPS-based tracking systems rely on the Global Positioning System to determine the location of objects. This section provides an overview of GPS technology, explaining its working principles and components. It discusses the role of GPS satellites, receivers, and the calculation of position based on satellite signals.

Strengths and Limitations

GPS-based tracking systems offer several strengths, such as accurate positioning, global coverage, and real-time updates. However, they also have limitations, including signal reception challenges in indoor environments, power consumption concerns, and potential inaccuracies in dense urban areas or obstructed environments.GSM-based tracking systems utilize the Global System for Mobile Communications network to transmit location data. This section provides an overview of GSM technology, explaining its communication protocols and network architecture. It highlights the role of GSM modules in transmitting location information.

GSM-based tracking systems offer advantages such as wide network coverage, real-time communication, and compatibility with mobile devices. However, limitations include potential signal interference, dependency on cellular network availability, and the need for a SIM card and associated costs

I.

VI.IV. PROPOSED WORK:

II.

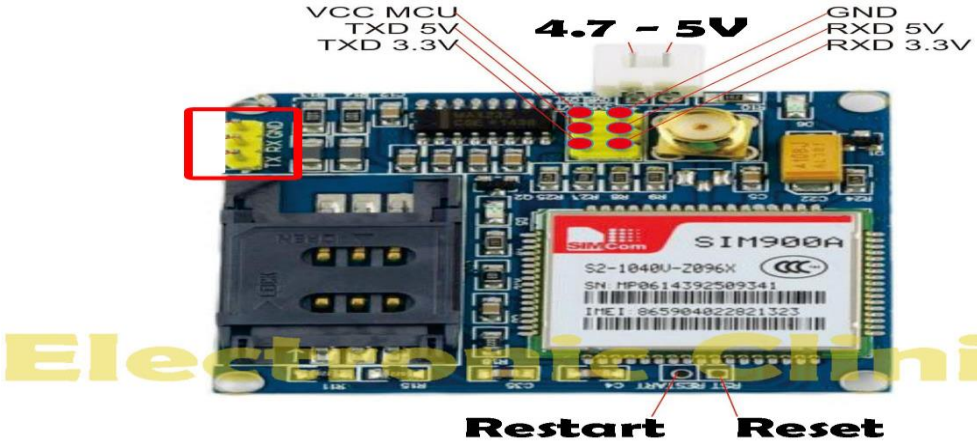
Hardware:

1. 12V BATTERY

A 12V battery, typically a lead-acid battery, converts chemical energy into electrical energy. It consists of lead plates immersed in an electrolyte solution, generating 12 volts of power for various applications, such as automotive use.

2. SIM 900a (GSM MODULE)

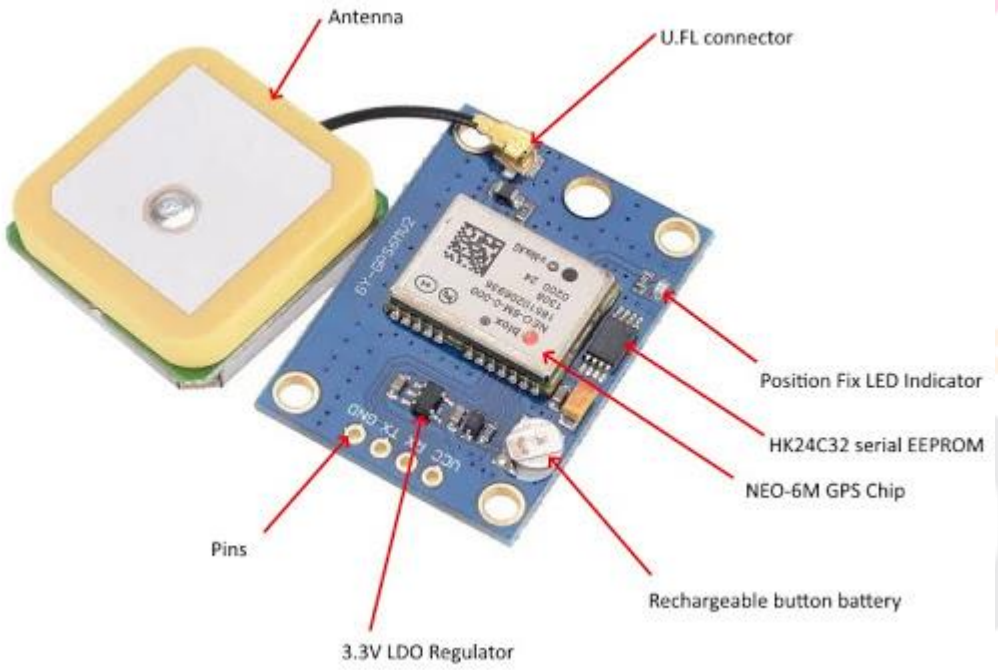
The SIM900A is a GSM/GPRS module that enables wireless communication in embedded systems. It operates on quad-band frequencies (850/900/1800/1900 MHz) and supports voice, SMS, data, and fax communication. The module uses AT commands over a serial interface to communicate with a host microcontroller, and features a built-in TCP/IP stack with support for HTTP and FTP protocols for internet connectivity. The SIM900A module has a compact form factor with a SIM card slot, a built-in audio jack, and an antenna connector. It is widely used in applications such as vehicle tracking, remote monitoring, and IoT devices due to its low power consumption, reliable performance, and easy integration with microcontrollers.



SIM 900a (GSM module)

NEO-6M GPS Module

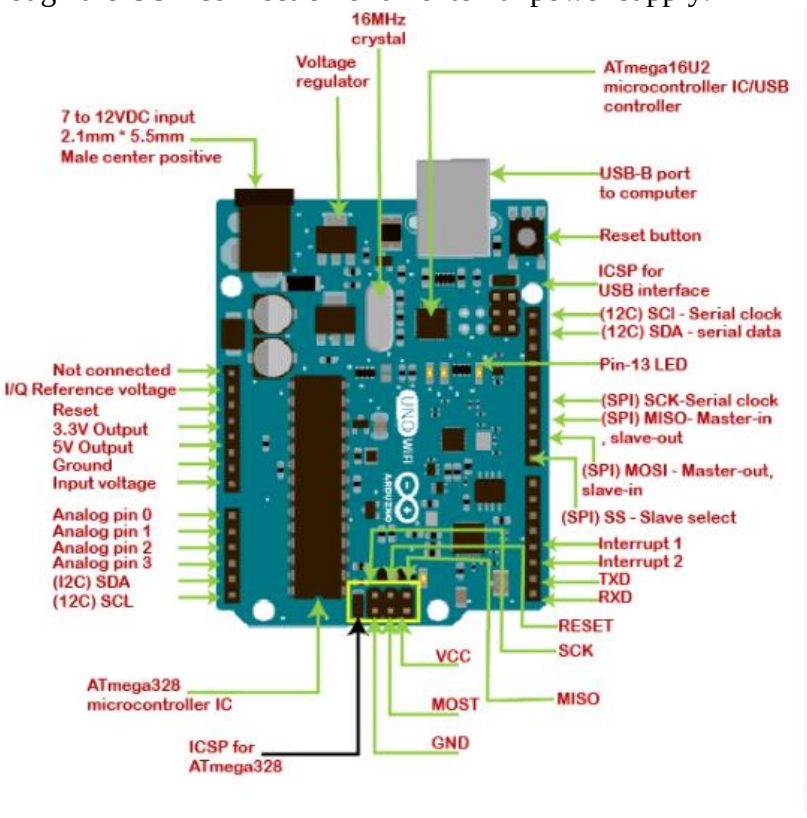
The NEO-6M is a small, low-cost GPS module that provides accurate position, velocity, and time information to embedded systems. It features a u-blox chipset and supports GPS, GLONASS, and BeiDou satellite systems. The module communicates with a host microcontroller via a serial interface, and provides NMEA format data at a default baud rate of 9600. The NEO-6M module has a built-in patch antenna and can be powered from a 3.3V or 5V supply. It is widely used in applications such as navigation, tracking, and timing, and is popular among hobbyists and professionals alike due to its small size, ease of use, and affordability.



NEO-6M GPS Module

ARDUINO UNO:

The Uno can be powered through the USB connection or an external power supply.



Arduino UNO

Patch cords

Patch cords, also known as patch cables or patch leads, are short cables with connectors at each end used to connect electronic devices, such as computers, routers, and switches. They are typically used in local area networks (LANs) and data centers to connect equipment in a rack or a patch panel. Patch cords come in various lengths and colors to aid in organization and identification of cables.

Arduino ide (software)

The Arduino Integrated Development Environment (IDE) is a software application used to program and upload code to Arduino microcontroller boards. It provides a user-friendly interface for writing, editing, and debugging code in the Arduino programming language, which is based on C and C++. The IDE includes a code editor, a serial monitor for debugging, and a library manager for managing pre-built libraries. It also features a compiler and a bootloader that enables code to be uploaded to the Arduino board via a USB connection. The Arduino IDE is free, open-source software and is compatible with various operating systems, including Windows, macOS, and Linux.

In terms of circuit connections, the Arduino Uno is connected to the GPS module and GSM module using specific digital pins. The GPS module typically communicates with the Arduino Uno through a serial communication protocol, such as the Serial Peripheral Interface (SPI) or Universal Asynchronous Receiver-Transmitter (UART). The GSM module, on the other hand, is connected to the Arduino Uno through digital pins, and communication is established using the GSM library. These connections facilitate seamless data exchange and effective control of the GPS and GSM modules by the Arduino Uno

V. SOFTWARE:

To implement the system, software code needs to be developed for the Arduino Uno. The code includes routines for initializing and configuring the GPS and GSM modules, handling incoming SMS commands, extracting and processing GPS data, and sending location information via SMS to the user's mobile device. Programming languages

like Arduino IDE, which is based on C/C++, can be used to write the code for the system. The code needs to be carefully designed to ensure efficient utilization of system resources, accurate GPS data processing, and reliable GSM communication.

By creating a practical and user-friendly solution for locating misplaced bags, this mini project aims to reduce the stress and inconvenience associated with losing personal belongings. The integration of Arduino Uno, GPS, and GSM technologies offers a robust tracking system that can provide peace of mind to individuals who frequently travel or have a need for keeping track of their bags. Swift bag recovery through accurate location tracking helps individuals save time, money, and effort while ensuring the security of their belongings.

Functionality and Working Principles:

This subsection explains how GPS calculates position and time using signals from satellites, the concept of trilateration, and the role of GPS modules in receiving and processing satellite signals.

VI. RESULTS AND DISCUSSION:

The working principle of the system revolves around utilizing GPS technology to determine the precise location of the misplaced bag and GSM technology to communicate that information to the user. The Arduino Uno acts as the central processing unit, coordinating the functionalities of the GPS and GSM modules.When a bag is misplaced, the user can initiate the tracking process by sending a specific command through SMS (Short Message Service) to the GSM module connected to the Arduino Uno. Upon receiving the command, the Arduino Uno triggers the GPS module, which starts acquiring data from multiple satellites. The GPS module uses the received signals to calculate the bag's latitude and longitude, providing accurate geographical coordinates.

Once the location data is obtained, the Arduino Uno utilizes the GSM module to send an SMS containing the bag's coordinates to the user's mobile device. The user can then use this information to track and retrieve the misplaced bag. The SMS communication between the system and the user's mobile device enables real-time updates and facilitates convenient bag recovery.

VII.CONCLUSION

In conclusion, the development of a system for finding misplaced bags using Arduino Uno, GSM, and GPS technologies offers an efficient and reliable solution to address the issue of lost or misplaced bags. The integration of these technologies allows for accurate bag tracking, seamless communication, and prompt bag recovery.

Through the successful implementation of this mini project, we have demonstrated the effectiveness of the system in locating and tracking misplaced bags. By leveraging the Arduino Uno microcontroller as the central processing unit, we were able to coordinate the functionalities of the GPS module and GSM module, enabling real-time bag tracking.

The GPS module played a vital role in determining the bag's precise location. It received signals from This data was then processed by the Arduino Uno, which coordinated with the GSM module to send SMS updates to the user's mobile device.

By sending a specific command through SMS to the GSM module, users can trigger the bag tracking system, initiating the acquisition of GPS data. The Arduino Uno efficiently processed the incoming GPS signals and extracted the necessary coordinates. These coordinates were then transmitted to the user's mobile device through SMS, allowing for swift bag recovery.

The successful integration of the hardware components, including the Arduino Uno, GPS module, and GSM module, ensured the seamless operation of the system. The circuit connections, adherence to communication protocols, and accurate data processing were essential for the system's functionality.

Additionally, the software code developed for the Arduino Uno played a crucial role in handling SMS commands, processing GPS data, and facilitating SMS communication. The code was designed to optimize system resources, ensure accurate data processing, and enable reliable communication with the user's mobile device.

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