

GPS Guided Bluetooth Rover

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Abstract—A rover is usually an electro-mechanical machine that is guided by computer. It is an autonomous vehicle which can be remotely controlled using a mobile application. It can be used for many purposes. Already there have been a remarkable progress in the field of Automation and Robotics. GPS Rover can perform various tasks which include Military surveillance, agricultural tasks, household work and many more.

Keywords— GPS (Global Positioning System) , military and Automation



Fig 1 : Arduino Mega 2560

INTRODUCTION

The GPS Guided Bluetooth Rover is an autonomous device that Can be used to navigate terrain and execute specific commands remotely. The design of The Rover includes Arduino Mega 2560 (micro controller), motor driver, wheels, HC-05 Bluetooth Module, Neo 6M GPS Module, Ultrasonic Sensor, etc. The Rover is remotely controlled using an app made with the help of MIT App Inventor Software. This mobile application provides user with a wide range of commands that can be executed by the rover. The Bluetooth module allows wireless communication between the Mobile app and the Rover, while the GPS module provides accurate positioning information. The implementation of the GPS Guided Bluetooth Rover involved several steps, including assembling the hardware components, developing the mobile app, and integrating the GPS and Bluetooth modules. We used an Arduino microcontroller, a GPS module, a Bluetooth module, and motor drivers and wheels to build the rover. We also developed a mobile app for controlling the rover. The GPS and Bluetooth modules were integrated using a software library, and the rover was tested in an outdoor environment.

ARDUINO MEGA:

The Arduino Mega 2560 is a microcontroller and it is based on the ATmega2560. [1] It has overall 54 digital input/output pins out of which 15 can be used as PWM outputs,with 16 analog inputs and 4 UARTs hardware serial ports. There is also a 16 MHz crystal oscillator, a USB(Universal Serial Bus) connection, power jack, ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC- to-DC adapter or battery to get started. ATmega 2560 board is compatible with most shields. It is designed for the Arduino Uno and the former boards which include Duemilanove or Diecimila.

The Mega 2560 is an update to an Arduino Mega, which it has replaced now.

Microcontroller	ATmega2560
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	54 (of which 15 provide PWM output)
Analog Input Pins	16
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	256 KB of which 8 KB is been used by the bootloader
S RAM	8 KiloBytes
EEP ROM	4 KiloBytes
Clock Speed	16 Mega Hz
LED _ BUILTIN	13

Length (in mm)	101.52 mm
Width (in mm)	53.3 mm
Weight (in grams)	37 gram



Fig 2 : HC-05 Bluetooth Module

[2] HC-05 is a 6 Pin Wireless Serial Module which is a Bluetooth module which can be used with any microcontroller. It uses the UART (Universal Asynchronous Receiver/Transmitter) protocol which makes it easy to send and receive data wirelessly.

The HC-06 Bluetooth module is a slave only device. It can be connect to most of the Smartphones and computers with has Bluetooth but it cannot be connected to another slave-only device. For example : keyboards and other HC-06 modules. To connect with other slave devices, it requires a master module which is necessary such as the HC-05 version which can do both master as well as slave.

Applications :-

1. Embedded Projects
2. Industrial Applications
3. Computer and Portable devices
4. GPS receiver

Features :-

1. Working current: matching for 30 m Ampere which matches with the communication for 8 m Ampere.
2. Dormancy current: no dormancy.
3. Used for a GPS navigation system, water, and electricity gas meter reading system.
4. With a computer and a Bluetooth adapter, PDA(Personal digital assistant) and seamless connection equipment.
5. HC-08 Bluetooth module, Master and slave Two in one module.
6. Use the CSR (Corporate Social Responsibility) mainstream Bluetooth chip and Bluetooth V2.0

protocol standards.

7. Potter default rate of 9600 by which the user can be set up.
8. Bluetooth protocol: Bluetooth Specification v2.0+EDR
9. Speed = Asynchronous: 2.1Mbps (Maximum) / 160 kbps, Synchronous = 1Mbps / 1Mbps.
10. Security: Authentication and encryption.
11. Profiles: Bluetooth serial port.

NEO 6M GPS MODULE



Fig 3 : Neo 6M GPS Module

[3] The Neo 6M GPS module has serial TTL output. The module has four pins: TX, RX, VCC, and GND. There is a software named u-center software for configuring the GPS. This software also helps in changing the settings and much more.

FEATURES

1. 5Hz position update rate
2. Operating temperature ranges from 40 to 85° CUART TTL socket
3. EEPROM to save configuration settings
4. Rechargeable battery for Backup
5. The cold start time is of 38 seconds and Hot start time of 1 second.
6. Supply voltage: 3.3 V
7. It is configurable from 4800 Baud to 115200 Baud rates. (default 9600)
8. SuperSense ® Indoor GPS with -162 dBm of tracking sensitivity
9. Support SBAS (WAAS, EGNOS, MSAS, GAGAN)
10. Separated 18X18mm GPS antenna

ULTRASONIC SENSOR



Fig 4 : Ultrasonic Sensor

Ultrasonic sensor is an electronic device that measures the distance of a target object using ultrasonic sound radiations. It works by emitting ultrasonic sound waves and then converts the reflected sound into an electrical signal.

Ultrasonic waves travel quicker than the speed of Audible Sound i.e. The sound that we humans can hear.

ARDUINO IDE SETUP:

Arduino allows the installation of third-party platform packages by using a board manager.

1. Install Arduino 1.6.8 from the Arduino Website. Start Arduino and open Preference window.
2. Select the board.
3. Install the required libraries.
4. Now, the program is ready to load.
5. Open Boards manager from tools > board menu and install Arduino mega 2560 platform.
6. We can also view the status on serial window of Arduino

module- with-button/

[3] <https://robu.in/product/ublox-neo-6m-gps-module/>

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ROVER HANDLING MOBILE APPLICATION



Fig 5: Rover handling App

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