Multipurpose Land Rover Using Artificial Intelligence in 5G Communication System

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Abstract— Automatic multipurpose voice control rover using Artificial intelligence in 5G wireless communication system is basically interchanging of data between database and rover. The data sensed using the sensor is captured from various places. Data is then transmitted to the controller using wired connection. The Wi-Fi module is used to transmit data to the internet through wireless communication. On reaching the internet, it is stored in a database. The data sensed using the sensor is captured from various places of our choice with the rover. Data is then transported to the controller using wired connection. The data gets stored in the database server. We can retrieve the data and display it on a webpage or web app. We show the data using graphs, maps, charts and other types of information.

Keywords: Artificial Intelligence, Wi-Fi Module, 5G, Sensor, Wireless, Communication, Rover, Database

I. INTRODUCTION

In India, many people still work in hazardous and risky jobs for very low daily wages. Also, in any case of disaster, the current technologies involve a lot of human effort and error. Sometimes victims get stuck in debris and die unnoticed, as it is very difficult for humans to locate them.

In the military, there are many situations which would be made less risky if an unmanned object is first sent for scouting before the troops are sent. These are some of the situations in real life that have motivated us to create a Multipurpose Unmanned Rover. There are some mundane jobs that could be replaced by automatic rovers.

II. BLOCK DIAGRAM

In Fig.1 it has a different sensor, ESP32 and Camera interface for live streaming and capturing images.

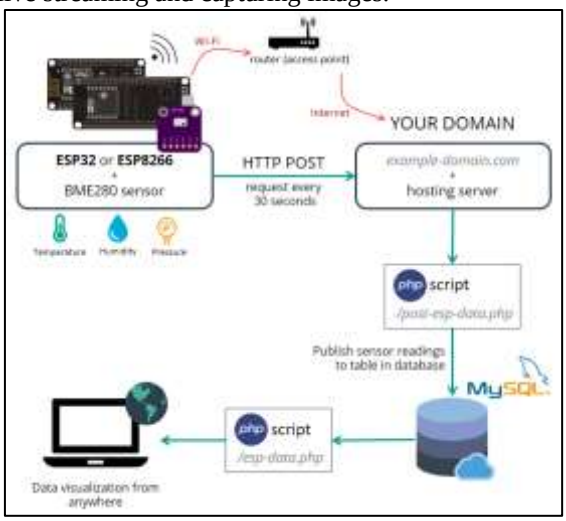

Fig. 1: Block diagram

In the era of science and technology where everything is at pace i.e. the communication is done at high speed transfer of information. The communication done at high speed requires precision and accuracy. Our project is based on multipurpose rover using voice controlled and artificial intelligence

We use the ESP32 cam module. It controls all the functions of the rover. ESP32 works here as a controller. We can control the rover using voice commands or using wirelessly remote controller. According to commands, the rover will work automatically. Sensors of the rover are connected to the ESP32 controller. Sensors and ESP32 are connected with wired connection. Sensors sense the environment surrounding the rover and send the data to ESP 32. ESP 32 processes the data and sends it to the database server using the internet.

In the database data will be stored according to sequence data will be stored in a specific manner. The data stored in the database allows us to access the data from anywhere using the internet. We can retrieve data from the database whenever we want and display it on a webpage or web app.

III. HARDWARE REQUIREMENT

A. *ESP32*

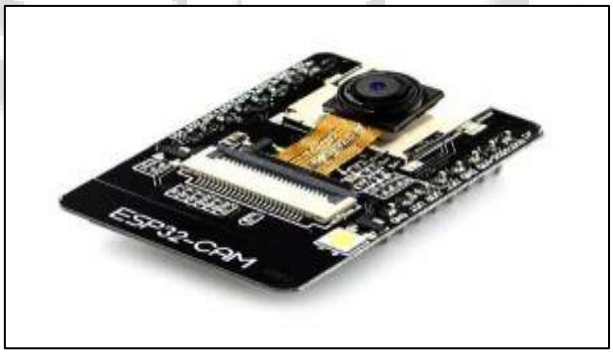

Fig. 2: ESP32 CAM Board

- It has a low power CPU of 32-bit, and also serves the application
- The smallest 802.11b/g/n Wi-Fi BT SoC Module
- 160MHz clock speed and computing power approx 600 DMIPS.
- Built-in 520 KB SRAM, external 4MPSRAMto both Word and PDF)
- OV7670 and OV2640 cameras support Flash lamps built on board.
- Support image wi-fi upload
- Support TF card
- Supports multiple sleep modes.
- Embedded IP and Free RTOS
- The smallest 802.11b/g/n Wi-Fi BT SoC Module
- Supports STA/AP/STA+AP operation mode
- Support Smart Config technology.

– Serial port local is supported and remote firmware upgrades (FOTA)

B. IR Sensor

Fig. 3: IR Sensor

– 5VDC Operating voltage
– I/O pins are 5V and 3.3V compliant
– Range: Up to 20cm
– Adjustable Sensing range
– Built-in Ambient Light Sensor
– 20mA supply current

C. DHT11

– PCB size 22.0mm X 20.5mm X 1.6mm

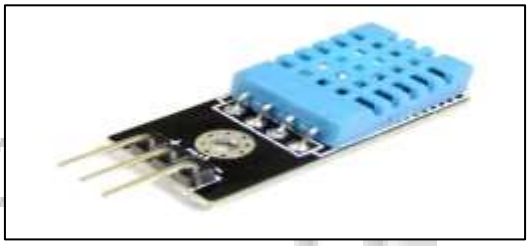

Fig. 4: DHT11

– Working voltage 3.3 or 5V DC
– Operating voltage 3.3 or 5V DC
– Measurement range 20-95%RH；0-50℃
– Resolution 8bit（temperature），8bit（humidity）
– Compatible interfaces 2.55, 4-pin Grove interface and 3-pin interface.

D. Ultrasonic Sensor

Fig. 5: Ultrasonic Sensor

pins	Pin name	Description
1	VCC	The VCC pin powers the sensor.
2	Trigger	Trigger pin is an input pin. This kept high for 10us, by sending waves it initialized measurement.
3	Echo	We got output at Echo pin. This pin foes high for a time which will be equal to time taken for the US wave to return back to the sensor.
4	Ground	Connected to Ground of system.

Table 1:

IV. SOFTWARE REQUIREMENT

A. Arduino IDE:

Arduino Software (IDE) is open source and uploading it to the board also makes it easy to write code. It could be used on Windows, Mac OS X, and Linux.

B. XAMPP:

XAMPP is a fully free, Apache distribution containing MariaDB easily installable, PHP and Perl. This is easy to use.

C. Android Studio:

This is the official IDE used to develop android apps. It's offers more features that enhance productivity when building Android apps, like:

A flexible Gradle-based build system. A fast and feature-rich emulator. It is unified environment, you can use for developing all Android devices

By apply Changes to push code and without restarting app resource can change running app.

Common app features are build using code templates and GitHub integration also can import sample code

Extensive testing tools and frameworks Catch performance by lint tools, version compatibility, usability, and problems.

C++ and NDK support Google Cloud Platform is supported by built-in, which makes it easy to integrate App Engine and Google Cloud Messaging.

V. RESULTS

Fig. 6: Demonstration using OpenCv

The Automatic multipurpose rover system is created which depending on the task it can perform the work of three and five people. It gives us various information about surroundings in real time and gives us proper output. In Fig 9 We demonstrate our website which shows us output like images, sensor data and live streaming.

Fig. 7: Camera Output

Fig. 8: PHP Code

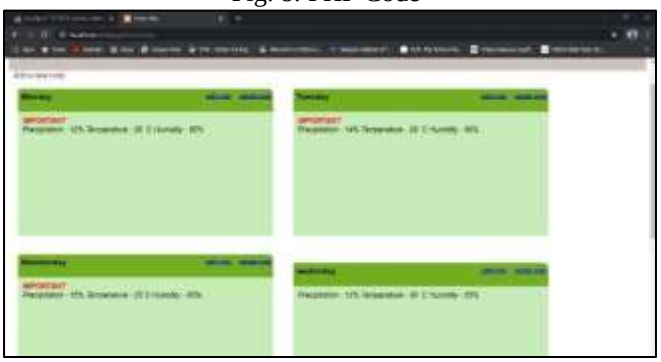

Fig. 9: Sensor Data Store to Database

VI. CONCLUSION

- The movement of the proposed robot can be controlled wirelessly either from the control unit within its transmitter's range or from any distance.
- The robot can be used in military and civil fields.
- For civil use, it can detect gas leaks in home or industry, surveillance of shopping malls, parking lots, office, industry, bank, museums, helping rescue operations during natural disaster and aftermath like searching for humans, supplying food and other essentials to the people under unreachable ruin.
- For military surveillance like spying enemy bases, exploring unknown enemy territory, night security on various spheres, anti-intrusion defence.

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