

## GUI Controlled Robot with MATLAB

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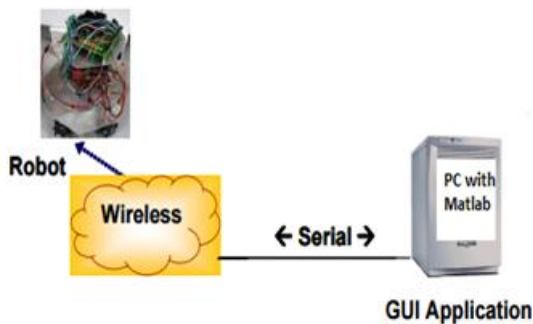
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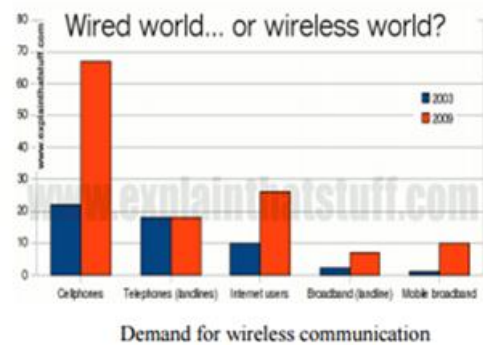
### Abstract:

With the advancement in science and technology, there has been an exponential increase in the demand in the field of wireless communication. The drawback of wired communication is high cost of materials which can be overcome by wireless communication. In this paper an idea of communication between GUI and ARM7 board is presented. A high performance application is developed and integrated with the robot.



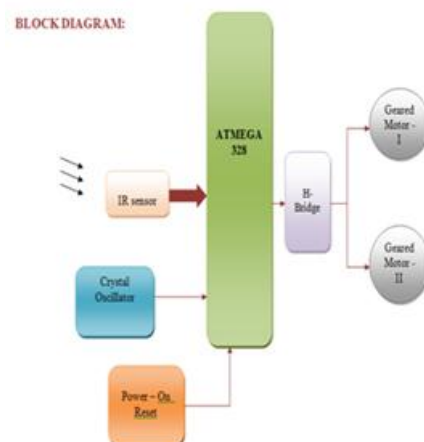
### Introduction:

The demand for the wireless communication is increasing exponentially with the time. The figure depicts the usage of different means of communications where telephones and wired broadband are wired type of communication and the rest are wireless. Examining the figure will give a picture of how the demand in different wireless communications has been increased within a short span i.e. in 6 years which indirectly supports the above said advantage in abstract.



### Existing System:

Autonomous Guided Vehicle is new and innovative concept. These vehicles are used for multi purpose. This robot works with IR transmission – reception principle. This vehicle can be moved using geared motors without anybody’s control. Also this robot can take sharp turnings whenever an obstacle is detected. This project uses ATMEGA328 MCU as its controller. This project has an IR transmitter and a receiver. Whenever an obstacle is detected, the IR light will be reflected, and received by the IR receiver. This sends a signal to microcontroller and the direction of the robot will be changed to avoid collision with the obstacle.



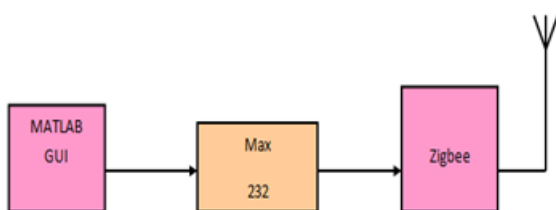
### Drawback:

This robot cannot be controlled by us. It takes own decision about the movement.

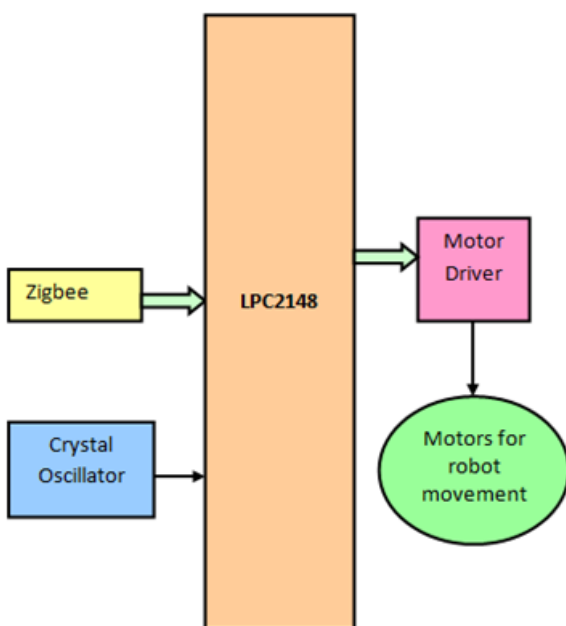
### Proposed System:

The project aims in designing a Robot to help a human being from a calamity which is capable of moving inside the cave or mine according to the user commands given from PC through MATLAB. The robot is operated through PC using wireless Zigbee technology. It is a low cost robot used to monitor the changes of different parameters in the caves or mines. The controlling device of the whole system is a Microcontroller. Whenever the user presses a button of the GUI, the data related to that particular button is sent through Zigbee module interfaced to PC. The objective of the project is Wireless controlling of Robot through PC using Zigbee technology.

Block Diagram: Transmitter



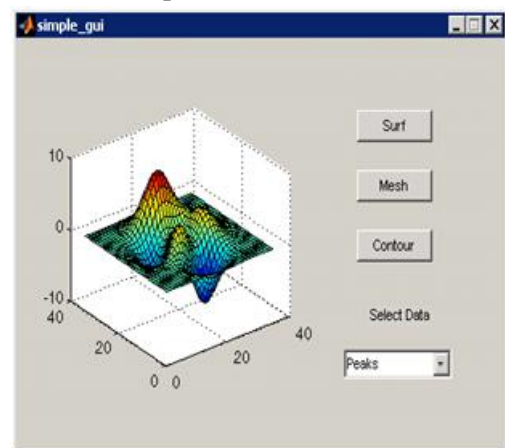
### Receiver:



### Modules Used In This Project:

#### GUI:

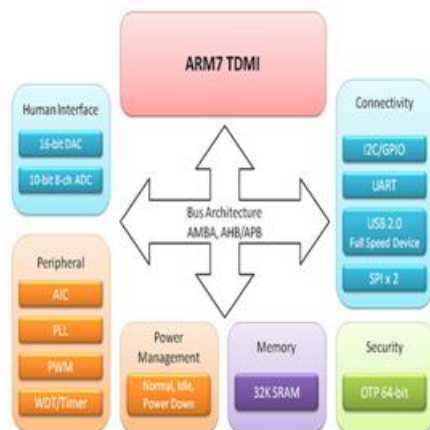
A graphical user interface (GUI) is a graphical display in one or more windows containing controls, called components that enable a user to perform interactive tasks. The user of the GUI does not have to create a script or type commands at the command line to accomplish the tasks. Unlike coding programs to accomplish tasks, the user of a GUI need not understand the details of how the tasks are performed. GUI components can include menus, toolbars, push buttons, radio buttons, list boxes, and sliders—just to name a few. GUIs created using MATLAB® tools can also perform any type of computation, read and write data files, communicate with other GUIs, and display data as tables or as plots.



#### ARM7:

The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT, PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale.

With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



This project uses regulated 3.3V, 500mA power supply. Unregulated 12V DC is used for relay. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

### ARM7TDMI Processor Core:

- Current low-end ARM core for applications like digital mobile phones
- TDMI
  - T: Thumb, 16-bit compressed instruction set
  - D: on-chip Debug support, enabling the processor to halt in response to a debug request
  - M: enhanced Multiplier, yield a full 64-bit result, high performance
  - I: Embedded ICE hardware
- Von Neumann architecture

### DC Motor:

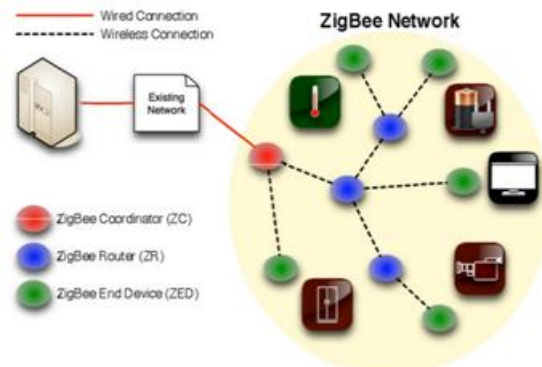
An electric motor is a machine which converts electrical energy into mechanical energy.

### Principles of Operation:

In any electric motor, operation is based on simple electromagnetism.

A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

### Zigbee:



It is the wireless device for transmitting and receiving purpose or simply it called as Transceiver. Zigbee is based on the IEEE802.15.4 protocol. The range of the Zigbee is covered as 100m. Its range is 10 times better than Bluetooth device so it can be more preferable one in wireless device. The data rate is very low for transmission while using this device.



Zigbee is a PAN technology based on the IEEE 802.15.4 standard. Unlike Bluetooth or wireless USB devices, ZigBee devices have the ability to form a mesh network between nodes.



**Applications:**

- Industrial applications such manufacturing, chemical etc.,

**Advantages:**

- Reliable
- Economical
- Eco-Friendly
- Low cost

**Conclusion:**

In this experiment we have integrated a high performance application with robotics and utilized the Zigbee technology as a fast, secure and reliable connection between them. By this project it is found that it is possible to control any hardware via the same hierarchy that is mentioned.

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Associate Professor, She has completed her Master's degree with specialization in Digital Electronics and communication systems from Mahaveer Institute of Science & Technology affiliated to JNTU Hyderabad in the year 2008. Prior to this has completed bachelor's degree in Electronics and communication engineering from G. Narayanamma Institute of Technology and Science affiliated to JNTU Hyderabad. Her carrier started as a lecturer and has total 7 years of experience in teaching field. Out of which 3 years worked as Assistant Professor and 4 years as Senior Assistant Professor in a single organization named Abhinav Hi-Tech College of Engineering. Presently working as an Associate Professor for SIDDHARTHA INSTITUTE OF ENGINEERING AND TECHNOLOGY in Department of Electronics and Communication Engineering. She attended and also conducted many workshops and conferences. She is very much interest to do research on DECS, wireless technology and signals. Her hobbies are reading books, surfing net for technical up gradation and listening music.



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from Dr. S G I E T, Markapur and Master of Technology in Embedded Systems from SRM University, Chennai. He has 13 years of teaching experience and has published 12 Papers in International Journals, 2 Papers in National Journals and has been noted under 4 International Conferences. He has a fellowship of The Institution of Electronics and Telecommunication Engineers (IETE) along with a Life time membership of Indian Society for Technical Education (ISTE). He is currently bounded as an Associate Professor and is being chaired as Head of the Department for Electronics and Communication Engineering discipline at Siddhartha Institute of Engineering and Technology, Ibrahimpatnam, Hyderabad.