

GUI Controlled Robot with MATLAB using μ C

Nishant Ahmed Khan

Research Scholar,
Bhagwat University, AJMER.

Dr. Kalpana Sharma

HOD,
Bhagwat University. AJMER.

Abstract:

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 Microcontrollers used in the project are programmed using Embedded C language.

INTRODUCTION:

Necessities are the mother of inventions. Whenever human being finds the need of something it's led to a wonderful invention. With the technological advancement, there has been great development in the field of electronics. Moreover, most of the devices are being computerized and organized by GUI process via application of software. Along with the growing continuous development it is proposed to design a BOT (robotic car) which is based on both software and hardware. A BOT is a machine that can help to sense the atmospheric factors that are very important from research point of view i.e. a life on other planets and far extent places. Bot can move to those places where humans are unable to reach. A robot has important and essential characteristics:

Movement:

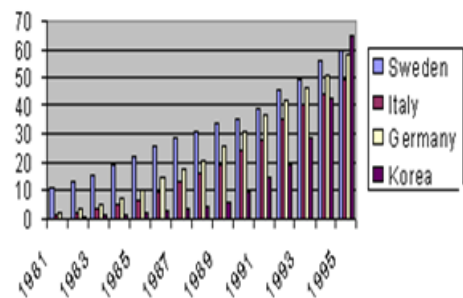
A robot should have this essential feature. Robot should be able to move or walk from one place to another. A robot can move either by using wheels, legs or by pushing by thrusters.

In order to consider it as robot whether a full robot should move such as Sojourner or few pieces or some parts of robot moves such as Canada Arm.

Energy:

This characteristic is most important and above of all. Just like humans need a food to remain alive or to get energy in order to do work or job. Similarly, robots also required a power in order to perform tasks properly. The robot can be powered by solar, electrically or battery. The tasks or operations performed by robot depend on the energy gained by the robot.

**Number of Robots per 10,000
Employees in Industry**



Intelligence:

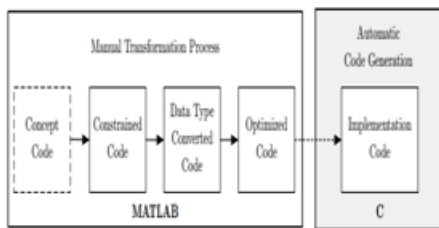
A robot really needs "smartness". Now, programming and coding comes into picture. A robot gains its "smartness" through programming that has been provided by programmer. Basically, how much beneficial a robot is or how much efficient a robot is judged by the "smartness". The project is based on MATLAB titled "GUI controlled BOT using image processing". Here, through MATLAB programming, GUI is controlling tool and BOT is gesture controlled system. Here, signals are transferred via COM port of system. The basic parts of this project are as follows:

Microcontroller AT89S52, motor shield, wires, Power supply 12V (DC).

GUI:

(Graphical user interface) GUI is known as Graphical User Interface. GUI is a MATLAB based tool which supports the operators in order to establish and evolve an integrate code and works efficiently. GUI is a most attractive and user helpful interface. Moreover, MATLAB offers an atmosphere and device known as GUIDE. GUIDE is an environment for the development of graphical user interface. It also permits GUIs to be generated or any type of modification intractably from fig. files. In order to start GUI, we need to write GUIDE on command window of MATLAB. Then a dialog box appears, select a blank page and click “OK” for further processing and to use GUI. GUI has two files namely: fig file and m file.

- .fig file - This file includes the full elaboration of the figure in GUI and also contains a constituents of the GUI based.
- .m file – This file includes the coding part on which GUI depends and performs the desired task. Using m file editor, the user can do coding on callbacks in this particular file



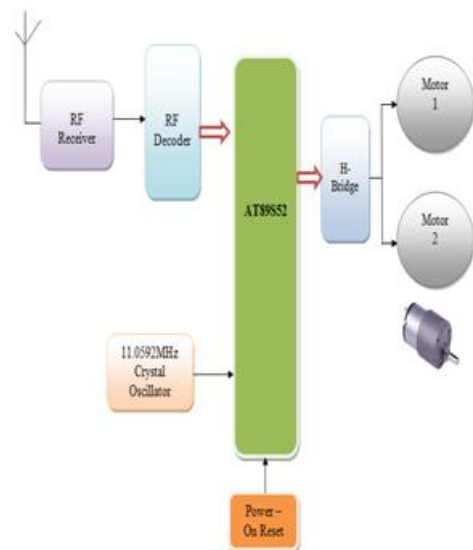
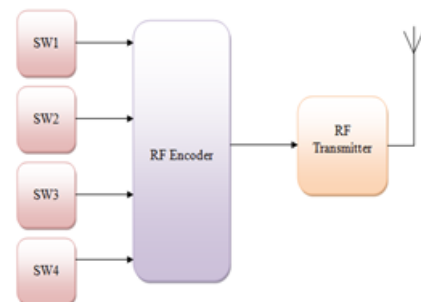
High-level view of proposed code generation workflow



EXISTING METHOD:

This robot is controlled by a RF remote. This can be moved forward and reverse direction using DC motors. Also this robot can take sharp turnings towards left and right directions. This project uses AT89S52 as its controller. The RF modules used here are Transmitter, Receiver, RF Encoder and RF Decoder. The four switches are interfaced to the RF transmitter through RF Encoder. The encoder continuously reads the status of the switches, passes the data to the RF transmitter and it transmits the data. At the receiver end RF decoder takes the data bit wise and moves the robot accordingly.

Block Diagram: Transmitter

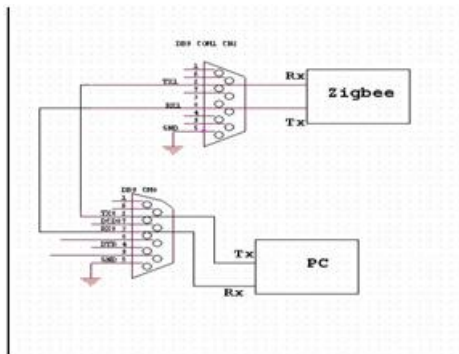


DRAWBACK:

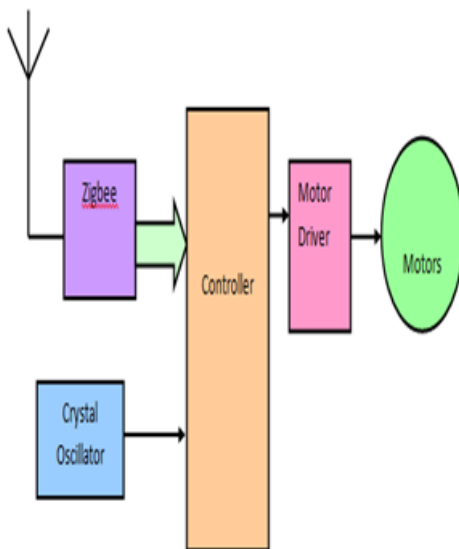
Wireless communication RF can be implemented only with shorter distance. Hardware cost is also increased because of transmitter section.

PROPOSED METHOD

Block diagram

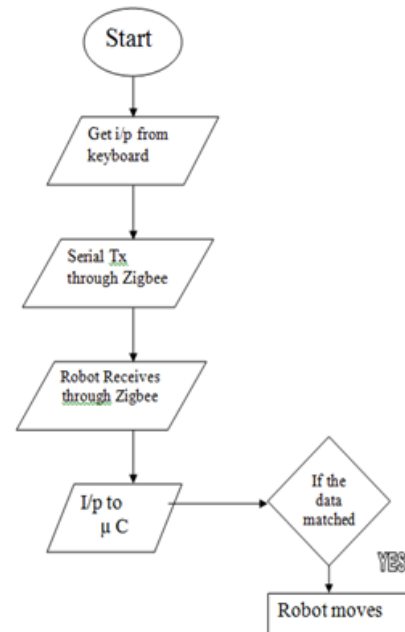


Transmitter section



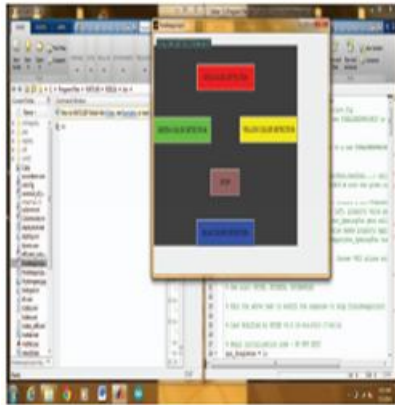
Receiver section

Flow chart



RESULTS AND DISCUSSION:

In order to operate this Robot, users should use this GUI which is shown in the figure. This particular project is implemented by MATLAB interfacing. The objective or aim of this project is to create a virtualized environment. Moreover, we are analyzing movement of robot for further applications in field of science and technology. The future enhancement of this project can be such as we can also create wireless Robot by using transmitter and receiver. Moreover, in order to have spy scene, we can also attach webcam to our BOT. we can also implement this work by using mobile via DTMF. Further to make it more efficient and effective, we can implement more work on Matlab to controller interface. In order to attain high accuracy, we can work towards MATLAB.



GUIWindow

Embedded MATLAB might yet serve its purpose as a bridge between software engineers and scientists, providing a common platform for research and development. In this context, Extreme Programming principles such as pair programming might be highly successful. The researchers do not need to step outside their comfort zone of the MATLAB environment, and can be a highly valuable asset in the implementation and verification of the algorithm. A decreased threshold for the researcher to participate in the embedded implementation may benefit the quality of the result greatly as the researcher has domain knowledge that can be very difficult for software engineers to obtain or apply.

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