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REMOTE CONTROL BASED ROBOT TO ASSIST PATIENTS

ABSTRACT

This project is to make a robot which will be helpful for mankind. This robot will collect data from remote place and able to send those data to a remote Iot cloud database. This robot will be controlled via android mobile phone. We can control the movement of the robot by sending instructions via Bluetooth from our android phone. The robot will receive the instruction via the Bluetooth module or wifi module and process the data with Arduino microcontroller.

Then it will move the robot in all direction with the help of motor driver L298N by following the instructions received from android mobile phone. Then the robot will collect data of temperature and humidity from that place with the sensor and send those data via Wi-Fi to the cloud database with the help of node. Then the data will be shown as well as the remote place can be monitored from anywhere in the globe from the internet server used.

INTRODUCTION

BACKGROUND

- We can use the robot in helping mankind by taking remote data as well as in health sector too. The population of the entire world is constantly rising. Along with the rise of population industrialisation and urbanisation are also increasing at a mentionable rate
- The consequences of these activities are global warming which has severely affected the health issues of the people around the world.
- Under these circumstances, it has become very much essential to keep people's health parameters in constant observation.
    - In Bangladesh, from a statistical analysis it has been found out that one out of every eight people are suffering from serious health issues which could be avoided if their health were monitored more often. In the face of these issues, home-based and community-based healthcare services have been identified as necessary also in many developed countries as well as our country to maintain the quality of services delivered and To create much better health care facilities at less time.
- Analyzing all these conditions, we have come to the decision of creating such a beneficial project in the perspective of health.
- The most significant disadvantages include the security risk that comes with having large amounts of sensitive data stored in a single database, the potential need to regularly have an individual's sensors recalibrated to ensure that they're monitoring accurately, and possible disconnections from healthcare services if the patient was out of cellular range or their devices ran out of battery. As progress continues to be made to reduce the disadvantages, IoT-based systems for remote health monitoring are becoming an increasingly viable solution for the provision of healthcare in the near future

SUMMARY

- This project will result a robot that can move with the instructions from your android phone and can go to a remote abstruse place to collect data and help people. The Robot will be Bluetooth controlled having 360˚ movement and can be controlled from a distance place remotely.
- The robot can able to get the instructions from the mobile throw the Bluetooth module or wifi module. Then it will process the instruction through microcontroller Arduino and move the robot by following the instructions. Then it will collect data from there and send the collected data to cloud database via Wi-Fi and internet.
- In my system I have designed a cost Microcontroller Based Android controlled Robot. The robot will move forward, backward, left and right direction by following the instructions given from the mobile. This system can be helpful for various purpose
- The robot can serve the society. It can collect data from remote place. It can collect data from patients. Quantified health is going to be future of healthcare because health that is measurable can be better improved. Therefore, it is wise to take advantage of quantified health technology. We also know that data affects performance so, an object measurement and tracking of health for better outcomes is needed. Health is considered as one of the basic human needs. If sound health of mass people can be guaranteed, then the overall productivity is obvious to enhance. This will have a great positive impact on our society.

Objectives and Goals

- Can go a remote abstruse place where man cannot go.
- Receive and transmit data from abstruse remote place.
- Receive instructions and data via Bluetooth from android mobile phone.
- Move the robot with received information.
- It can be used for the disable persons.
- Finally, I made a wireless Android-controlled robot.
- Suitable to integrate with other electrical devices.
- Will collect data from there and send the collected data to cloud database via Wi-Fi and internet.

Controlling the Robot

A method, which is extensively used in motor controller, is the pulse width modulation (PWM). PWM switching technique is a best method to control the speed of DC motor as compared to any other method. The duty cycle can be varied to get the variable output voltage.

The Pulse-Width-Modulation (PWM) in microcontroller is used to control duty cycle of DC motor drive. PWM is an entirely different approach to controlling the speed of a DC motor. Power is supplied to the motor in square wave of constant voltage but varying pulse-width or duty cycle. Duty cycle refers to the percentage of one cycle during which duty cycle of a continuous train of pulses. Since the frequency is held constant while the on-off time is varied, the duty cycle of PWM is determined by the pulse width. Thus the power increases duty cycle in PWM.

Analog circuits can get very hot; the power dissipated is proportional to the voltage across the active elements multiplied by the current through them. Analog circuitry can also be sensitive to noise. By controlling analog circuits digitally, system costs and power consumption can be drastically reduced.

In a simple analog controller, a knob is connected to a variable resistor. As you turn the knob, the resistance goes up or down. As that happens, the current flowing through the resistor increases or decreases.

Frequency

Using the switch example, the frequency would be how fast the switch was turned on and off. If the frequency is too low (switch is changed slowly), then the motor will run at full speed when the switch is on, and completely stop when the switch is off. But if the frequency is too high, the switch may mechanically fail.

In reality there is no switch, but rather an electronic board named an H-Bridge that switches the motor on and off. So in electrical terms; if the frequency is too low, the time constant of the motor has enough time to fully switch between on and off. Similarly the upper limit on the frequency is the limit that the H-Bridge board will support, analogous to the mechanical switch.

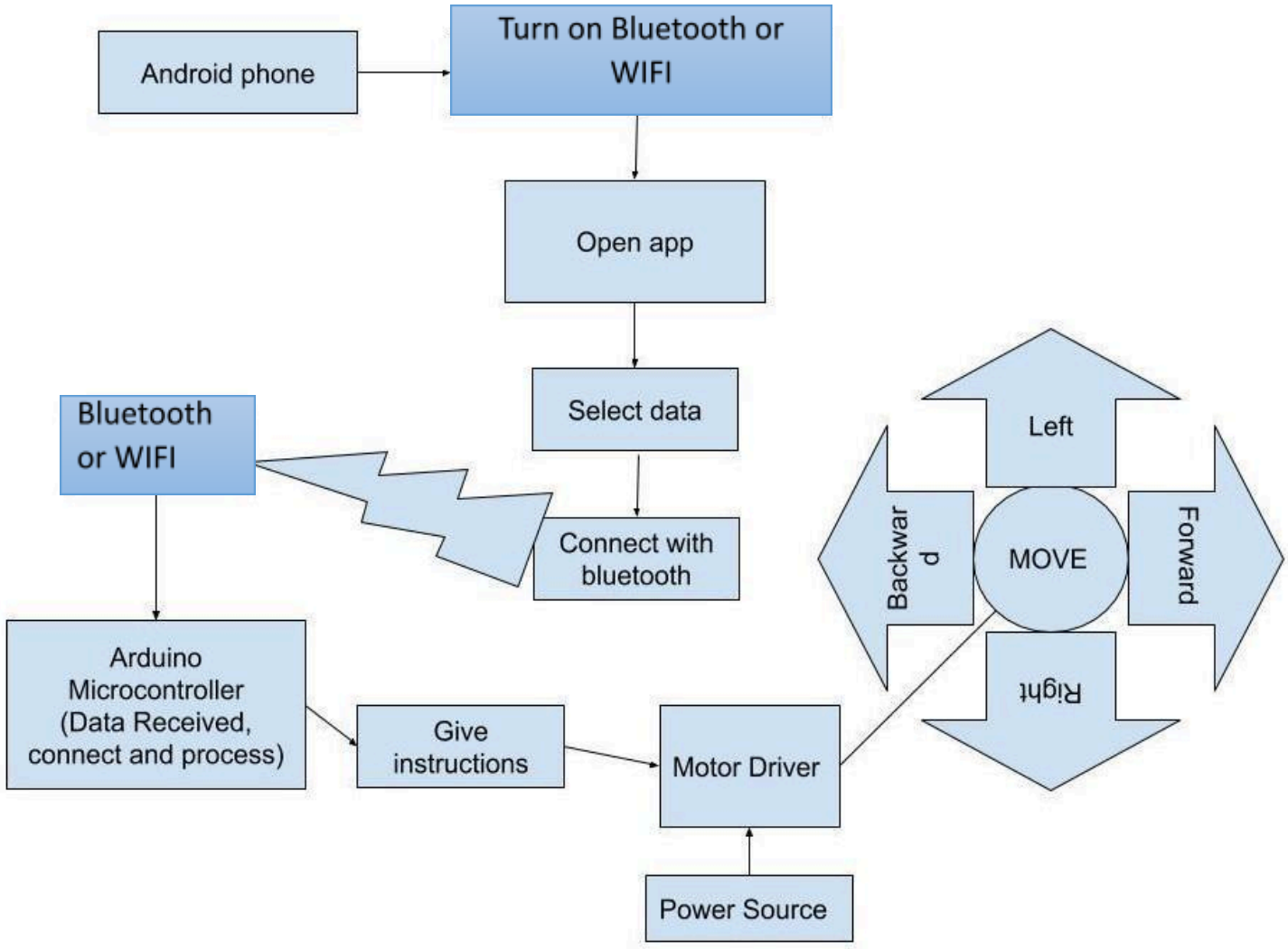
USART communication sensing:

This module is interfaced with microcontrollers by using the UART and the data is transmitted in the form of packets. The path for the data transmission and reception is formed by using the pins of Tx and Rx of module. The Tx pin of module should be connected to the Rx pin of the microcontroller. The Rx pin of sensing is connected to the pin of the Tx pin of the microcontrollers.

To pairing the module with our device the key pin of the module is used. The Sensing terminal applications should be present in our devices like mobile & PC to communicate with the microcontroller. We have no. of apps which are present on the internet for the different types of like OS, Android, Windows, Mac, and other programming devices.

Methodology

The system methodology by which the robot moves is described by the following block diagram



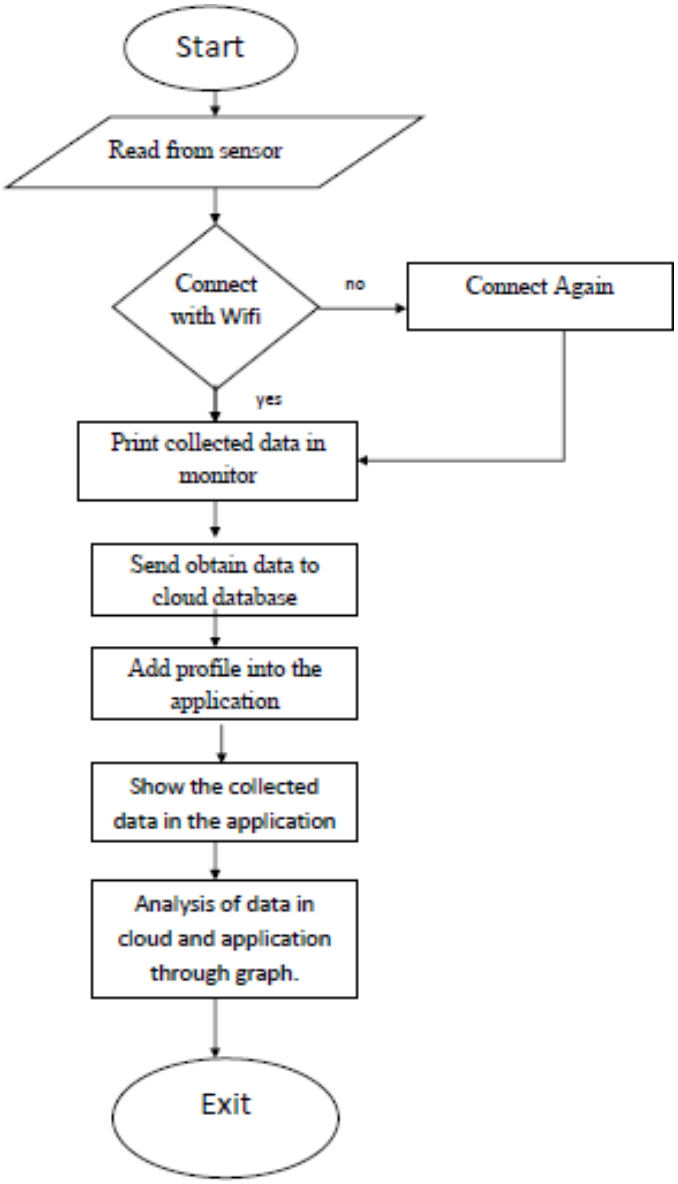
system methodology to move the robot

Algorithm

The algorithm by which the full project work is as follows:

1. If receive data == F then Forward going function works.
2. If receive data == B then Backward going function works.
3. If receive data == L then Left going function works.
4. If receive data == R then Right going function works.
5. If receive data == S then Stop function works.
6. By a loop the DHT11 sensor collects temperature and humidity values.
7. It shows the values in the oled display.
8. It connects with wifi router through NodeMCU ESP 8266.
9. Then sends the data to the declared cloud server
10. Monitored the data and take actions.

The flowchart of the remote sensing part and data sending:



Arduino Micro Controller

I have used Arduino Uno R3 and node MCU here.

The board selection has two effects: it sets the parameters (e.g. CPU speed and baud rate) used when compiling and uploading sketches; and

sets and the file and fuse settings used by the burn bootloader command. Some of the board definitions differ only in the latter, so even if you've been uploading successfully with a particular selection you'll want to check it before burning the bootloader. You can find a comparison table between the various boards here.

Arduino Software (IDE) includes the built in support for the boards in the following list, all based on the AVR Core. The Boards Manager included in the standard installation allows to add support for the growing number of new boards based on different cores like Arduino Due, Arduino Zero, Edison, Galileo and so on.

- *Arduino Yùn*
  An ATmega32u4 running at 16 MHz with auto-reset, 12 Analog In, 20 Digital I/O and 7 PWM.

- *Arduino/Genuino Uno*
  An ATmega328 running at 16 MHz with auto-reset, 6 Analog In, 14 Digital I/O and 6 PWM.

- *Arduino Diecimila or Duemilanove w/ ATmega168*
  An ATmega168 running at 16 MHz with auto-reset.

- *Arduino Nano w/ ATmega328*
  An ATmega328 running at 16 MHz with auto-reset. Has eight analog inputs.

- *Arduino/Genuino Mega 2560*
  An ATmega2560 running at 16 MHz with auto-reset, 16 Analog In, 54 Digital I/O and 15 PWM.

- *Arduino Mega*
  An ATmega1280 running at 16 MHz with auto-reset, 16 Analog In, 54 Digital I/O and 15 PWM.

- *Arduino Mega ADK*
  An ATmega2560 running at 16 MHz with auto-reset, 16 Analog In, 54 Digital I/O and 15 PWM.

- *Arduino Leonardo*
  An ATmega32u4 running at 16 MHz with auto-reset, 12 Analog In, 20 Digital I/O and 7 PWM.

- *Arduino Fio*
  An ATmega328 running at 8 MHz with auto-reset. Equivalent to Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega328, 6 Analog In, 14 Digital I/O and 6 PWM.

- *Arduino BT w/ ATmega328*
  ATmega328 running at 16 MHz. The bootloader burned (4

KB) includes codes to initialize the on-board bluetooth module, 6 Analog In, 14 Digital I/O and 6 PWM..

- *LilyPad Arduino USB*
  An ATmega32u4 running at 8 MHz with auto-reset, 4 Analog In, 9 Digital I/O and 4 PWM.

- *LilyPad Arduino*
  An ATmega168 or ATmega132 running at 8 MHz with auto-reset, 6 Analog In, 14 Digital I/O and 6 PWM.

- *Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega328*
  An ATmega328 running at 16 MHz with auto-reset. Equivalent to Arduino Duemilanove or Nano w/ ATmega328; 6 Analog In, 14 Digital I/O and 6 PWM.

- *Arduino NG or older w/ ATmega168*
  An ATmega168 running at 16 MHz *without* auto-reset. Compilation and upload is equivalent to Arduino Diecimila or Duemilanove w/ ATmega168, but the bootloader burned has a slower timeout (and blinks the pin 13 LED three times on reset); 6 Analog In, 14 Digital I/O and 6 PWM.

- *Arduino Robot Control*
  An ATmega328 running at 16 MHz with auto-reset.

- *Arduino Robot Motor*
  An ATmega328 running at 16 MHz with auto-reset.

- *Arduino Gemma*

  An ATtiny85 running at 8 MHz with auto-reset, 1 Analog In, 3 Digital I/O and 2 PWM.

Arduino IDE

I use here Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

Android Phone, An App

A general Arduino Bluetooth app can be used. I read their sending data and made my code by following their data and conditions. To run those apps, we need an Android phone. The app is not a matter. Any app that can connects HC05 and able to send data can be used here.

Technical details:

- Low cost
- 3 to 5V power and I/O
- 2.5mA max current use during conversion (while requesting data)
- Good for 20-80% humidity readings with 5% accuracy

- Good for 0-50°C temperature readings ±2°C accuracy
- No more than 1 Hz sampling rate (once every second)
- Body size 15.5mm x 12mm x 5.5mm
- 4 pins with 0.1" spacing

Financial budget

Motors	1,00,000
Camera module	1,50,000
Arduino full Setup	1,80,000
Connecting wires	1,00,000
Control board	1,70,000
Screen touchpad	1,00,000
3D-printing	3,50,000
Extra items	1,00,000
TOTAL	**12,50,000 (12.5L)**

Out come of Innovation:

- The robot can serve the society. It can collect data from remote place. It can collect data from patients. Quantified health is going to be future of healthcare because health that is measurable can be better improved
- Therefore, it is wise to take advantage of quantified health technology. We also know that data affects performance so, an object measurement and tracking of health for better outcomes is needed
- Health is considered as one of the basic human needs. If sound health of mass people can be guaranteed, then the overall productivity is obvious to enhance. This will have a great positive impact on our society