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KORİNT YAYINCILIK

SMART ASSISTANT FOR PARALYZED PATIENT: RESEARCH NEEDED

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ABSTRACT

We come across hospitals and NGOs serving paralytic patients who have their whole or partial body disabled by the paralysis attack. These people in most cases are not able to convey their needs as they are neither able to speak properly nor do they convey through sign language due to loss in motor control by their brain. This research proposes a system that helps disabled person in displaying a message over the LCD by just simple motion of any part of his body which has motion abilities. This system also takes care of the situation where in no one is present to attend the patient and thus sending a message through GSM of what he wants to convey in SMS. There are several instructions of movement gesture sensors presented in the paper in order to assist health officer in helping the paralyzed patient to complete their needs. The user now just needs to tilt the device in a particular angle to convey the message. Thus, by tilting device one can convey message easily. So, this system can help them out to convey a message.

Keywords: Smart assistant, Paralysis, motion abilities

INTRODUCTION

Paralysis is the inability to move muscles on your own and with purpose. It can be temporary or permanent. The most common causes are stroke, spinal cord injury, and multiple sclerosis. Paralysis can be a complete loss of movement known as plegia, or a significant weakness called paresis. Paralysis is most often caused by damage in the nervous system, especially the spinal cord. Other major causes are stroke, trauma with nerve injury, poliomyelitis, cerebral palsy, peripheral neuropathy, Parkinson's disease, ALS, botulism, spina bifida, multiple sclerosis, and Guillain-Barre syndrome. For example, monoplegia/ mono paresis is complete loss of movement or weakness of one limb. Hemiplegia/hemiparesis is complete loss of movement or weakness of arm and leg on same side of the body. Paraplegia/paraparesis is complete loss or weakening of both legs. Tetraplegia /tetra paresis or quadriplegia/quadriparesis is complete loss or weakness of both arms and both legs. Paralysis is caused by injury or disease affecting the central nervous system (brain and spinal cord) which means that the nerve signals sent to the muscles is interrupted.

Paralysis can also cause a number of associated secondary conditions, such as urinary incontinence and bowel incontinence. Though, there are innovative approaches for curing or treating paralysis patients, but the aim of treatment is to help a person adapt to life with paralysis by making them as independent as possible. Where we see a problem with these types of devices that are being developed is that they are very large and expensive machines. They seem to be only available in hospitals and not able to be used at the patient's home or at their convenience. Our goal is to make a device that will be able to retrain a patient's motion but have them be able to use the device themselves and have it be cheap enough for them to afford without much debt.

PROBLEM STATEMENT

In today's social Health Insurance structure where patients stay at home after operations, they are not possible monitored 24-hours by a medical caretaker or a family member so. Many people nowadays who work full time are facing a problem of monitoring their loved ones especially old age patient's. Besides, the existing machine in the hospital is too expensive and not all people can afford it to use at home. This machine also is less market in Malaysia.

OBJECTIVE

- Develop a hardware prototype for IOT Paralysis Patient Health Care.
- Testing the schematic diagram to help paralyzed patient.

SCOPE OF PROJECT

- People who facing the paralytic.
- Nurses or caretaker of paralytic patient.

IMPORTANT OF RESEARCH

- Help the paralysis patient convey various messages.

- Monitoring of paralytic patient health care.

METHODOLOGY

Hardware products that we used. It consists of arduino microcontroller (Arduino UNO), MPU6050, GSM module, LCD display 16x2, potentiometer and buzzer.

ATMEGA BASED MICROCONTROLLER (ARDUINO UNO)

Arduino/Genuino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller.

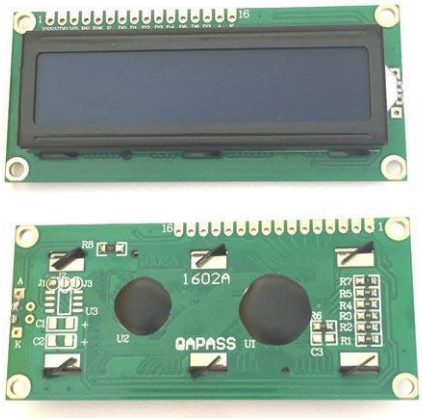
MPU6050

MPU6050 is a Micro Electro-mechanical system (MEMS), it consists of three-axis accelerometer and three-axis gyroscope. It helps us to measure velocity, orientation, acceleration, displacement and other motion like features. MPU6050 consists of Digital Motion Processor (DMP), which has property to solve complex calculations.

GSM MODULE

SIM900A Modem is built with Dual Band GSM/GPRS based SIM900A modem from SIMCOM. It works on frequencies 900/ 1800 MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. SIM900A is an ultra compact and reliable wireless module. This is a complete GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor integrating AMR926EJ-S core, allowing you to benefit from small dimensions and cost-effective solutions.

LCD 16x2



An LCD is an electronic display module that uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in DIYs and circuits. The 16×2 translates o a display 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7 pixel matrix.

POTENTIOMETER

Potentiometers are variable resistors. Potentiometers are resistors where the resistance can be changed using a knob or a slider. Potentiometers are used to control many things, including how bright or dim the lights in your house are and the volume controls on your television. Some are used in voltage dividers. The idea of a device that could be used to control the amount of electricity going to a component was thought by many people, but the carbon potentiometer we commonly use today was invented by Thomas Edison in 1872 at the age of 25. He called this device a “coiled resistance wire rheostat”.

BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.

CIRCUIT BLOCK DIAGRAM

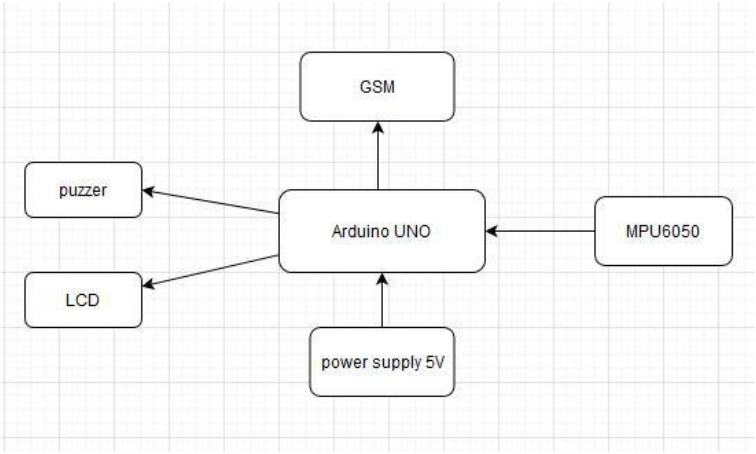


Figure 1 : Block Diagram of Smart Assistant for Paralyzed Patient

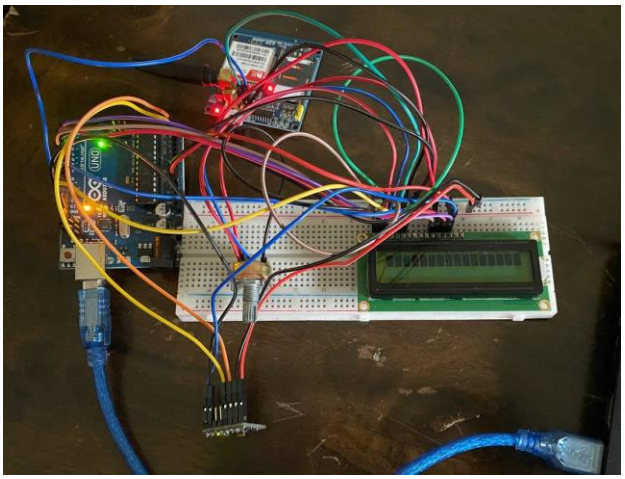


Figure 2 : Circuit diagram project Smart Assistant for Paralyzed Patient

FLOWCHART

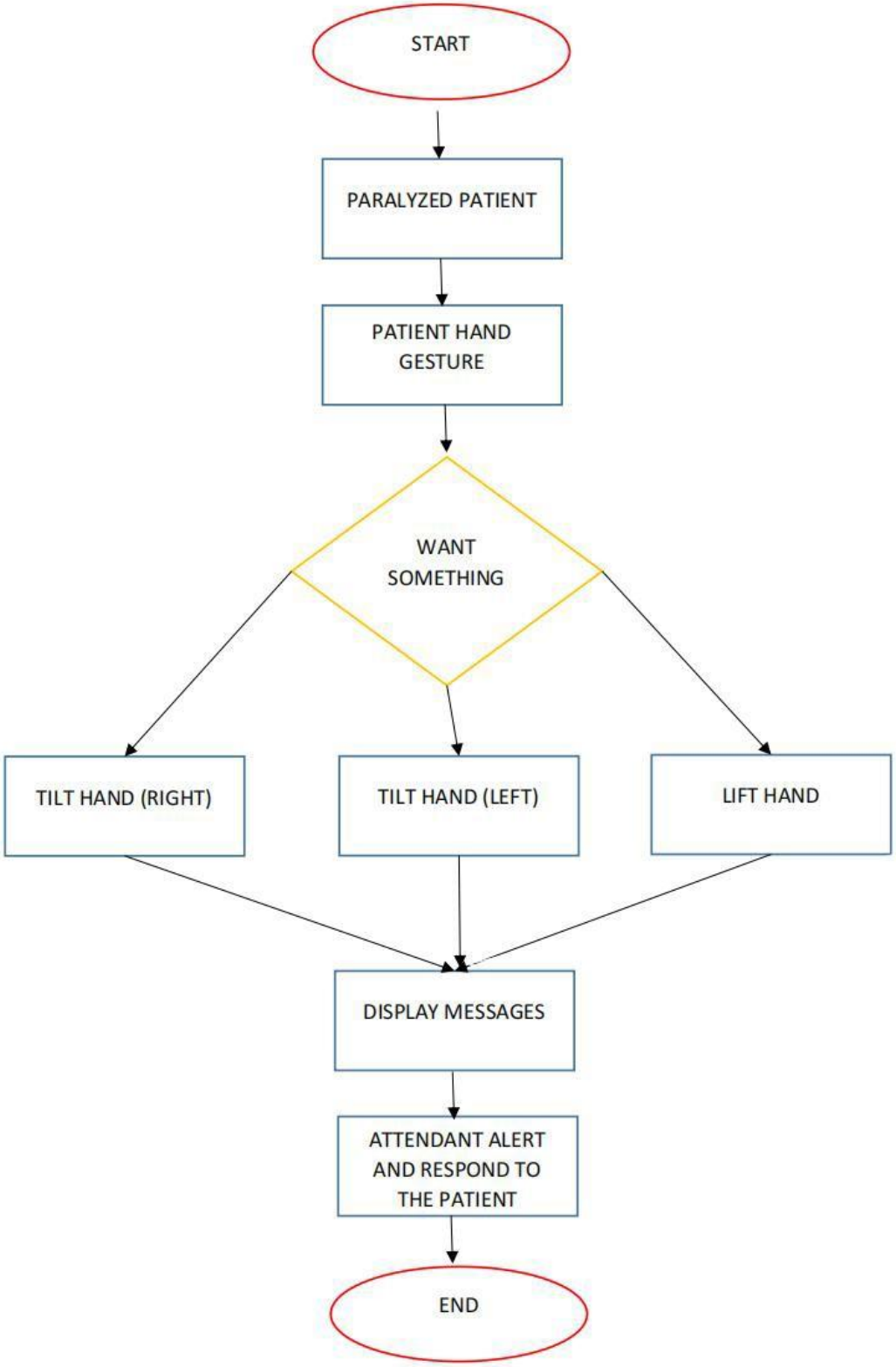


Figure 3 : Flowchart of Smart Assistant for Paralyzed Patient

EXPECTED RESULTS

When a 9V power source is connected to the Arduino board via the AC jack, the Arduino is turned on, and then the instructions are shown on the LCD. The person concerned presses the push botton, after that MPU6050 sensor is activated on the current position of the hand and message displayed on the LCD then waiting for the gesture movement. After the user did the gesture, a ringing sound is issued to indicate the completion of the command and MPU6050 sensor determines the gesture and then send the message or make a call. After that, the device returns to the first position, waiting to press the push button again and repeat the same previous steps.

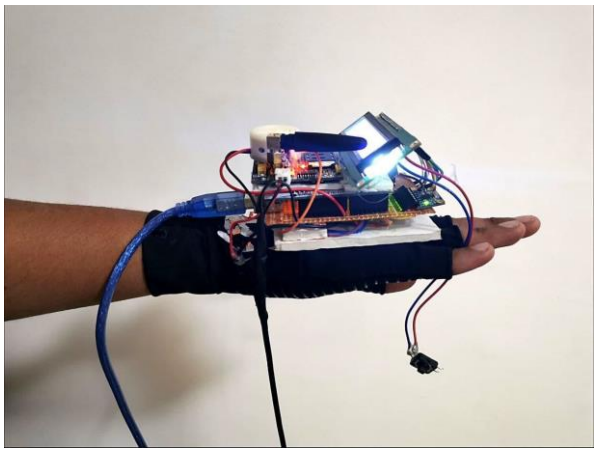


Figure 4 : Practical circuit project Smart Assistant for Paralyzed Patient

Figure 5 : Example output on the LCD display

CONCLUSION

This system is really helpful for paralyses patients. When they need help then they can ask by using some movements they can also survive in this world like normal people by using this movement detection. This system is reliable and cheap and less weight so they can buy without debt. This system will make paralysis patients to achieve an independent of mobility. This is not a trivial task just because it varies from person to person in its nature and type. Therefore, different methods are essential to support these people, and it is us duty, as future engineers, to develop new technologies to help paralyzed patients.

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