

Group - 7

Project Report

Members :

Jasvin Bera	201701224
Jay Solanki	201701229
Yogesh Prajapati	201701259
Harsh Bhatt	201701407
Manas Kaul	201701417
Deep Godhani	201701418
Rushabh Gajab	201701432
Sairam Venkatachalam	201701433
Yash Bhalodi	201701454
Bhavya Bhatt	201701467

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Also, our appreciations and thanks go to each and every person who had been directly or indirectly helpful us in the course of this project.

Dead or alive using accelerometer and Sound sensor

Abstract

Here, in this project we have successfully attempted to detect whether a person is dead or alive, using two sensors namely, accelerometer (MPU-6050) and sound sensor (KY-038).

Traits such as the number of steps taken by the person, how often he has been walking, as well as how often he has been speaking and how often the voice of the person reaches the KY-038 module has been mainly used by us to model the death or life of the person.

Also, in this project we elaborated on how we have managed to get the required number of steps through the accelerometer as well as the sound of the person, providing a wide explanation of the code of the same.

Similar explanation for the code of the sound detection as well as wireless transmission is also given.

Other than this we have provided information about the different components that we have used as well as the terminologies related to them as deep as our knowledge sphere.

Working of the complete system has also been explained in this project using flowcharts and such techniques, such that its understanding becomes as easy as possible.

Finally, we have provided the conclusion of this project, believing that we were successful in the attempt in achieving the objective.

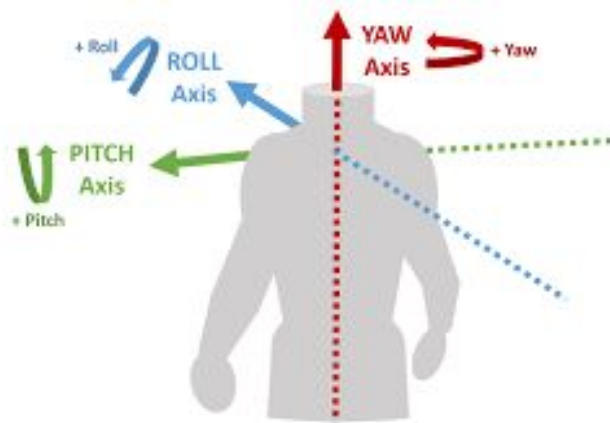
Objective

To extract data such as number of steps and voice modulation from a person, which will help us in determining whether the person is dead or alive using a combination of data from an accelerometer and sound sensor, and use of Zigbee module for data transmission.

Components used

Accelerometer(MPU-6050) :

The accelerometer we used had the capability to act as a gyroscope and also record temperature. For the purpose of this project the accelerometer records the pitch, roll and yaw and sends this data to the Arduino Lilypad. The pitch, roll and yaw are basically the rotational movement along the 3 axes as shown.



Sound Sensor(KY-038) :

The sound sensor can extract the sound data from a source in both analog as well as digital form. For the purpose of our project, we used the digital output.

Arduino Lilypad :

This is used as a microcontroller in our project and acts as an interface between the raw data and the processed output. Using our code in Arduino, we counted the number of steps from the raw data of the pitch movement.

Arduino UNO :

This component is used as a voltage regulator. The input voltage to the arduino UNO is provided by the battery. It provides an output voltage of 5V to Accelerometer and Sound Sensor, and also provides 3V to Zigbee module.

Zigbee Modules :

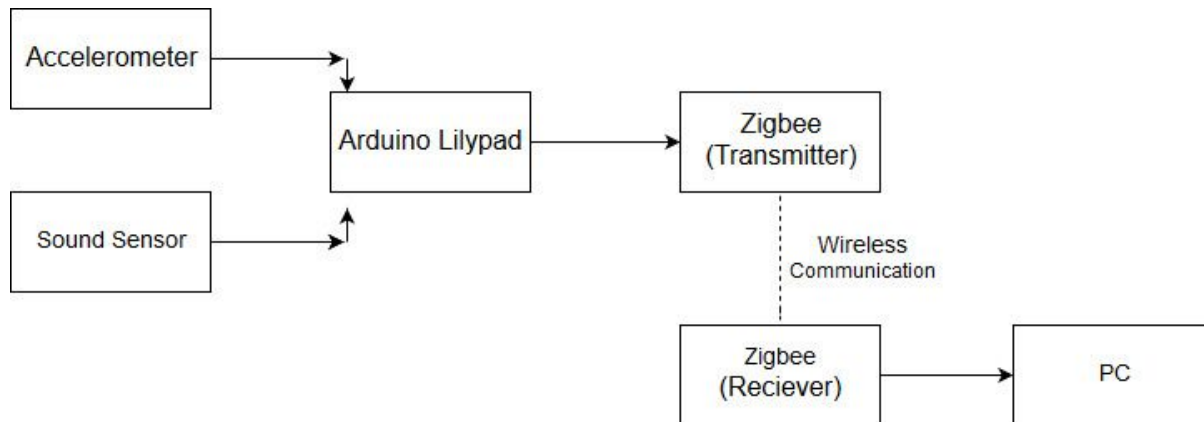
This component is used as a transmitter as well as a receiver and we have used it as both for our project. The zigbee modules operate in the radio frequency range of 2.4 GHz.

USB Cable :

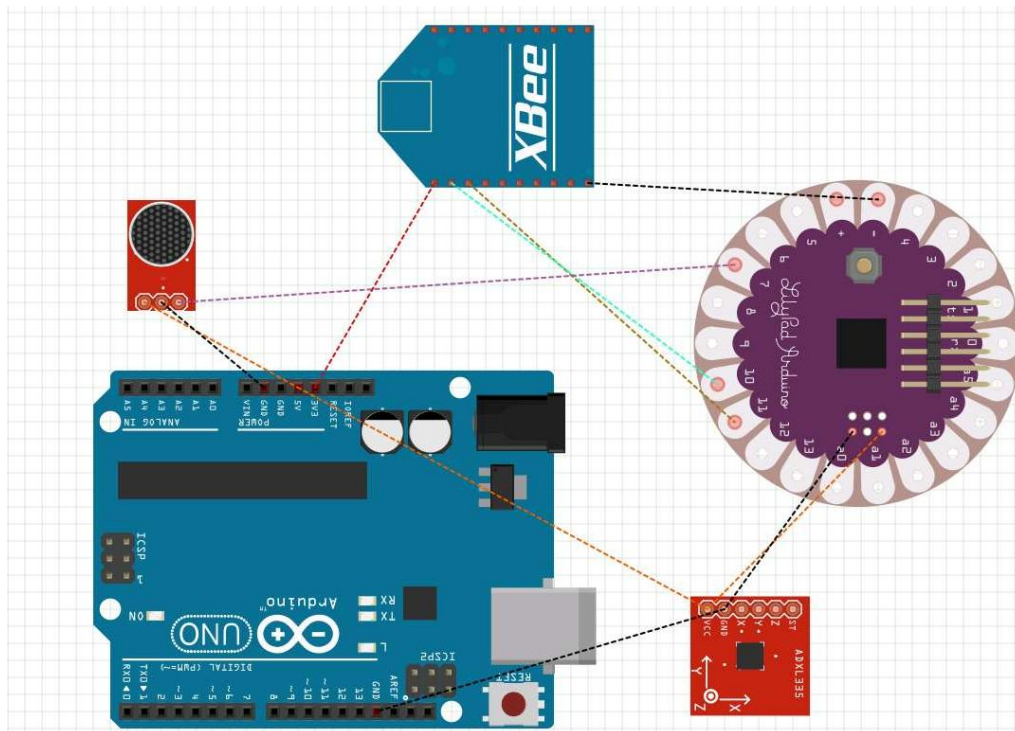
We used a usb cable connection in order to connect the Zigbee module to a PC to retrieve the data.

Working

The following flow chart will give the reader an idea about the connections and setup used in this project.



Circuit Diagram



Detection of movement

The accelerometer is attached to the arms of the test subject. The subject would then perform the arm action of walking. The accelerometer records the pitch, roll and yaw as stated previously and sends this data to the Arduino Lilypad.

This raw data is received by the Arduino Lilypad. Using our code in Lilypad, we used the data for the pitch to determine when one swing of the arm was made and counted this as one step. Using this method we were able to send the data of number of steps to the Zigbee(transmitter).

Detection of Sound

The test subject is made to speak into the sound sensor. The sound waveform in digital form(1's and 0's) is sent to the Arduino Lilypad which sends this data directly to the transmitter Zigbee module.

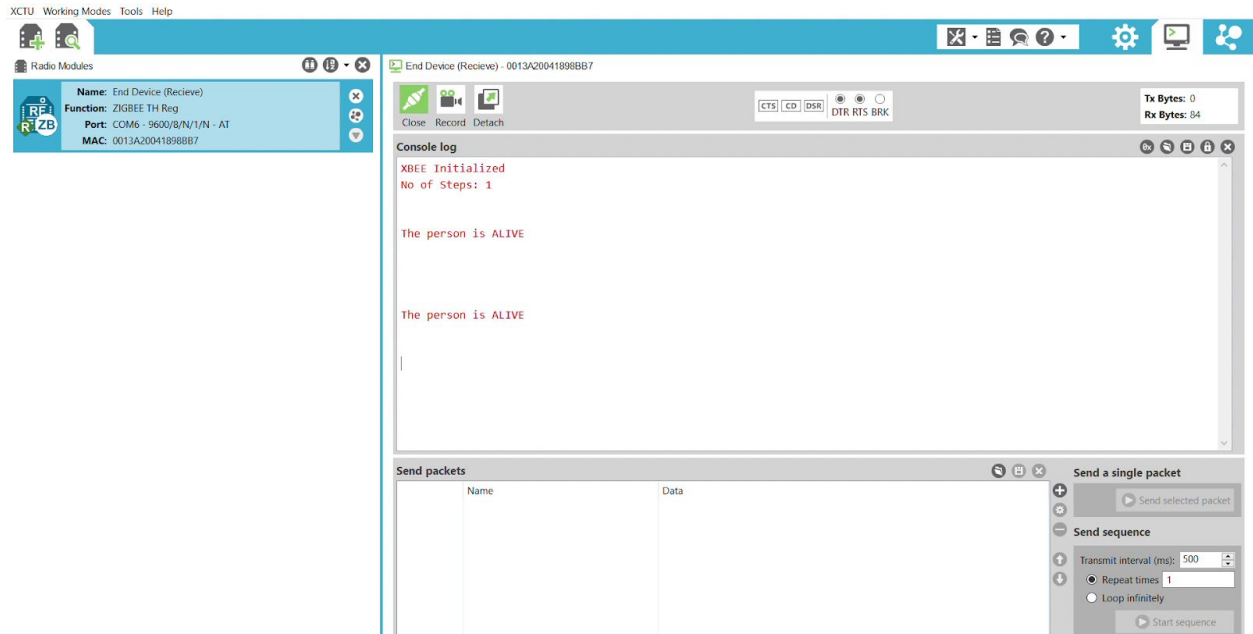
Wireless transmission of data

The data of arm movement as well as the digital sound waveform now needs to be transmitted to some other location wirelessly to be processed. This is done by the 2 Zigbee modules where one of them acts as a transmitter and the other acts as a receiver.

This is done by configuring both Zigbee modules to have the same PAN ID's and each others MAC Address. This way the data coming into the transmitting Zigbee is pushed into the receiver.

The receiver Zigbee module is connected directly to the PC using a USB connection. Using the XCTU software on the PC, we are able to see the result, whether the person is dead or alive.

Test results



During our test runs, we were successfully able to extract data from the user and display it on our PC using the XCTU software as shown above.

The data from the sound sensor was collected in a form of digital signal where '0' represents No Sound is Present and '1' represents Presence of Sound.

The accelerometer provides us raw data of pitch which was converted to no of steps using certain algorithms on the given raw data.

Using the data of both accelerometer and sound sensor we have managed to predict that person is died or alive with a large percentage of correctness.

Data of sound, no of steps and whether person is died or alive was send to the receiver where the data is displayed in the XCTU software.

Conclusions

Using our test results we were able to conclude that our setup was successfully able to identify whether a person is dead or alive. If the person is not moving and not speaking for a while then the person is determined as dead.

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