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Gesture Recognition & Wireless Alerting System Using Micro:bit

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Abstract-
In today's era safety is a very important aspect of our life. And security of any object is at risk when a person moves object without the owner's permission. So how would it be if we get an alert whenever the object moves? .This system will make it possible. Aim of this device is to give an alert when someone tries to move the object which has to be protected. This system is a combination of 2 Micro:bits which will be connected wirelessly with each other and whenever the Micro:bit placed near the object will move, it will send signal to the host Micro:bit and the owner will get an alert by means of buzzer and led display
Keywords-*Micro:bit(*open source hardware*),Buzzer.*

I. Introduction To Micro: Bit

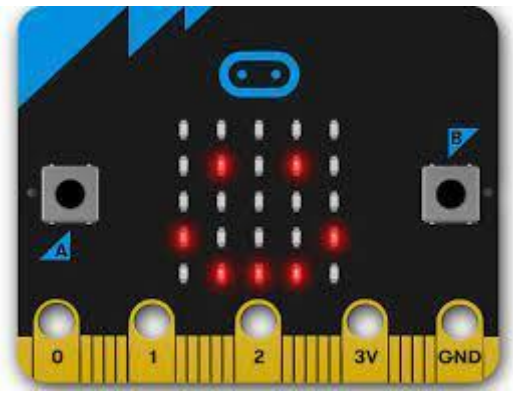
Micro:bit(fig. 1) is a small sized ARM based programmable open source hardware that combines hardware and software to make creative things . Mainly used for educational purpose.

Features:-

- In built Programmable push buttons
- Supports Bluetooth Communication
- In built radio transmitter and emitter which enables it to communicate wirelessly with other Micro:bits.
- In built LED display
- In built gesture detection , temperature and light sensing.

Using all these features Micro:bit becomes the most suitable and main hardware of this system. Micro:bit can be programed by Python, java script and scratch languages.

II. Circuit



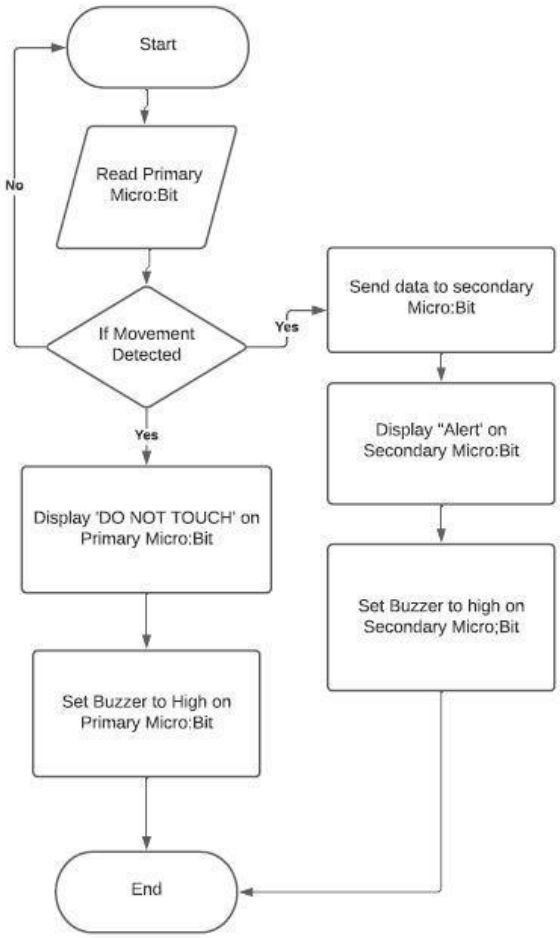
III. Proposed System

The basic aim is to implement a gesture recognizing and alert system. This system requires both hardware and software setup.

a) Software setup-

Software setup consists of coding
Creating the code for Micro:bit code on
https://makecode.microbit.org/

Hardware setup-
There are 2 Micro:bits with buzzers in this system . the primary and host Micro:bit
The Task of Primary Micro:bit is to sense any kind of movement in object. If the primary Micro:bit senses any kind of gesture in the object it immediately sets buzzer to high which is connected to it and also displays 'Do not touch' Message on the in built Led display it also send radio signals to the host micro:bit.
The host Micro:bit on receiving radio signal starts buzzing and displays Message 'Alert' on the led Display as shown in flowchart(fig 2.1).

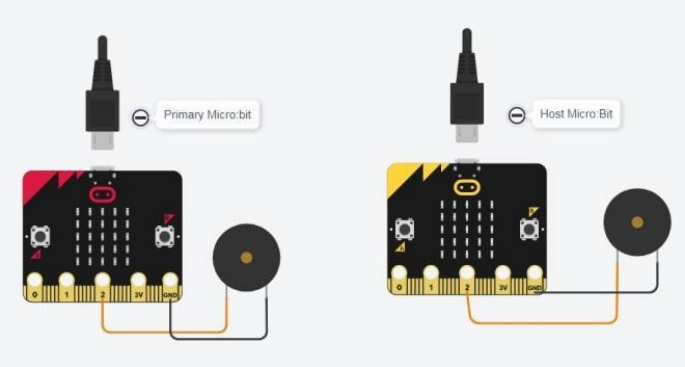


Parts used in circuit are 2 Micro:bits and 2 buzzers with some wires.

Connections-
Micro:bit has 5 main pins 1,2,3,3v and GND.
Out of which 1,2 and 3 pins are used to connect both analog and digital devices. And 3v and GND are power pins.

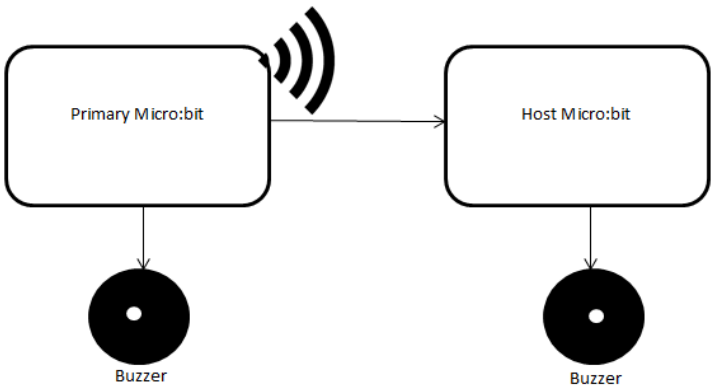
Buzzer in both the Micro:bits has same connections .
Positive pin of buzzer is connected to 3 no. pin of Micro:bit and negative pin of buzzer is connected to GND in both the cases.

IV. Specifications



- Operating voltage– 3.3 to 4.5V DC (per Micro:bit)
- Total voltage required- 9V Max
- Connectivity- Radio waves (2402 MHz to 2480 MHz)
- Radio connectivity range- 230 feet/ 70 meter
- Size- 43 mm × 52 mm(Per Micro:bit)+ 12mm(per buzzer)

V. Block Diagram



As shown in fig. 5.1 , The primary Micro:bit is the main hardware component as it has 3 tasks
First it is a processor, secondly it works like a gesture sensor, and it is a radio transmitter.

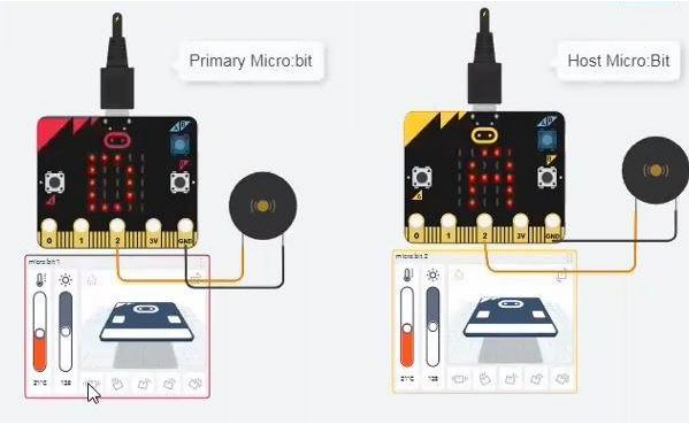
- In built gesture sensor in primary Micro:bit looks for any movement.
- If movement is detected it sends these signals to connected buzzer and also to led display.
- Via radio waves all this data is sent to host Micro:bit.
- Now host Micro:bit sets conne2cted buzzer to high and also sends all this data to led display.

VI. Result

Result –
We tested this system with many kinds of gestures like-

- Free fall
- Shake
- 3g
- 6g
- 8g, etc.

We observed that our system is working properly with all type of gestures and wireless alerts to the host Micro:bit are sent in very less time (As shown in fig. 6.1).
Project simulation- https://www.tinkercad.com/things/lYAR9JnclLc



VII. Advantages

- Secures objects from theft and gives quick and wireless alert to the owner.
- Easy to handle and cost- effective system.
- Small in size and gives a wide wireless connectivity of 70 meters.
- Senses 10 types of gestures without any external gesture sensor.
- Light weight and portable operates in all weather conditions and all parts of the days.
- Low power consumption.

VIII. Conclusion

- We are able to develop a Gesture Recognition & Wireless Alerting System Using Micro:bit and Buzzer.
- This recognizes 10 types of gestures and sends alert in both text and sound form.
- Which can be used for multiple proposes mainly for security purposes.

IX. Future Scope

- This system has a range of 70 meters this can be increased by adding some more communication equipment.
- Also fire alert can be added to this system to make your object more secure.
- Voice interaction between primary and host Micro:bits can also be added if microphones on both the ends are installed.
- This system can be connected with automatic doors so that if risk of theft is recognized by system the doors will automatically lock.
- Some more sensors like PIR, Thermal body detector and cameras can be added to this system to increase its efficiency.

Acknowledgement

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