



SENSORS & TRANSDUCERS



PROJECT TITLE

EARTHQUAKE DETECTING ALARM USING ACCELEROMETER & AURDINO

SUBMITTED BY GROUP: 6

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COMPONENTS USED

Component	Unit
Arduino Uno	1 Piece
Accelerometer (ADXL345)	1 Piece
Buzzer	1 Piece
LED (Optional)	1 Piece
Resistors	220Ω (1 Piece)
Jumper Wires	As required



OVERVIEW

The earthquake detector alarm is designed to sense vibrations using an accelerometer sensor ADXL345 and trigger an alarm if the vibrations exceed a predefined threshold.

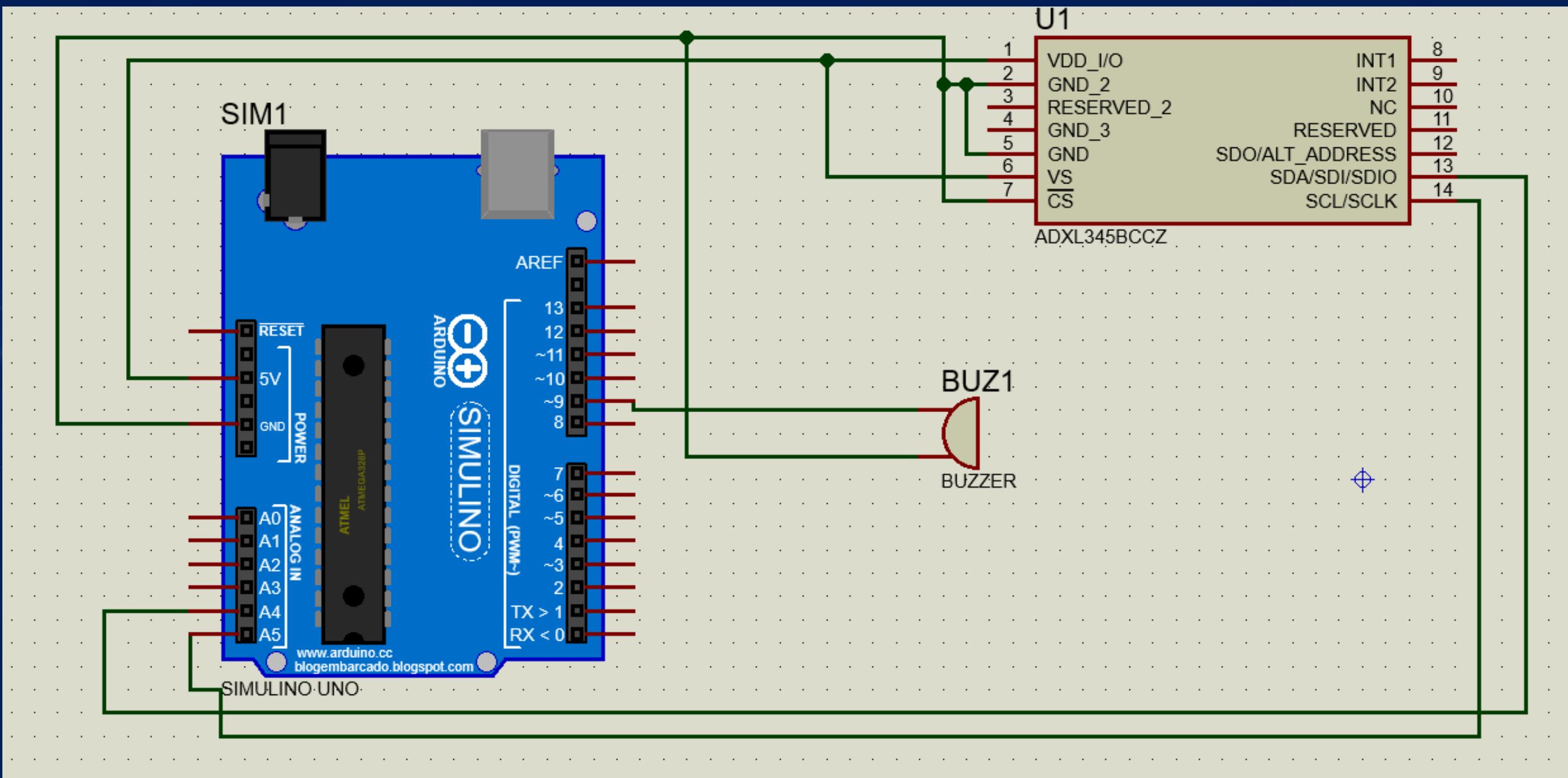
The system processes real-time acceleration data from the sensor and activates an alert mechanism (buzzer and LED) when abnormal movement is detected.



OVERVIEW



CIRCUIT DIAGRAM



■ Components in action

Accelerometer (ADXL345/MPU6050) - Vibration Detection

The accelerometer detects movements along three axes (X, Y, Z).



In normal conditions, the sensor readings remain stable.

During an earthquake or sudden movement, the readings change significantly.

If the change exceeds the predefined threshold, the Arduino recognizes it as an earthquake.

Arduino Uno - Data Processing

The Arduino constantly reads values from the accelerometer.

It compares these values with a preset threshold.

If the threshold is exceeded, Arduino activates the alarm system.

Alarm System (Buzzer & LED) - Alert Mechanism

If an earthquake is detected:

The buzzer sounds loudly.

The LED blinks rapidly as a visual indicator.

Optional: An LCD display can show real-time values of vibrations.



■ Connections in Brief

The ADXL345 Accelerometer is powered by connecting its VDD_I/O (Pin 1) and VS (Pin 6) to the 3.3V pin of the Arduino Uno, while GND (Pins 2 and 5) are connected to the GND of the Arduino. The CS (Pin 7) is grounded to enable I2C communication mode. The communication lines SDA (Pin 13) and SCL (Pin 14) are connected to A4 (SDA) and A5 (SCL) of the Arduino, respectively, allowing data transmission. The buzzer is connected to one of the digital pins of the Arduino, which is programmed to activate it when seismic activity is detected. These connections enable the Arduino to receive real-time acceleration data from the ADXL345 and trigger an alarm when vibrations exceed a set threshold.

■ Working Principle

The ADXL345 Accelerometer is a highly sensitive sensor capable of detecting motion and vibrations in three axes (x, y, and z). It continuously measures acceleration and transmits the data to the Arduino Uno via the I2C communication protocol. The Arduino processes this real-time data and compares it with a predefined threshold value. If the detected acceleration surpasses this threshold, indicating a possible earthquake or strong vibrations, the Arduino immediately activates a buzzer to produce an audible alarm. This alarm serves as an early warning system to alert people about potential seismic activity. The system operates in a continuous loop, ensuring it can detect even minor tremors and aftershocks, making it useful for earthquake detection and safety applications. Additionally, the sensitivity of the accelerometer can be adjusted in the Arduino code to fine-tune its responsiveness to different levels of vibrations.



■ Advantages of the System

Automatic Detection & Response: No need for manual intervention.

Faster Emergency Aid: Reduces response time, increasing survival chances.

GPS Location Sharing: Helps rescue teams find accident locations instantly.

Prevention of False Alarms: Only triggers when impact is above a threshold.

Scalable & Affordable: Can be implemented in any vehicle at a low cost.

Works in Remote Areas: GSM-based alert system functions anywhere with mobile coverage.

Reduces Fatalities: Helps in faster first aid, reducing life-threatening risks.



■ Conclusion

- This Airbag-Triggered GSM Alert System enhances road safety by providing an automated accident detection and emergency response system.
 - The integration of sensors, airbag circuits, and GSM alerts ensures rapid assistance, reducing fatalities.
 - Future improvements include AI-driven analysis, mobile app integration, and automated emergency service notifications.
 - Implementing this system in all vehicles can save thousands of lives every year.
- ◆ Thank You!





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YOUR ATTENTION**