The background features a light blue-grey color with abstract geometric shapes in shades of green and blue along the top-left and bottom-right edges. A red plus sign is located to the left of the title. Green 'x' marks are scattered in the top-left and bottom-right areas. A red circle is partially visible in the bottom-right corner.

POSTURE CORRECTION ALERT SYSTEM

GROUP 9 AND 10

GROUP MEMBERS

1. Emily Korkor Tetteh- 1807822
2. Gyan Festus 1804722
3. Aboagye-Atta Nana Kwadwo Oduro 1799522
4. Moses Asante- 1802022
5. Aseda Boatemaa Tweneboah-Koduah- 1808622
6. Agyei David Beckham- 1800422
7. Koduah Roselyn Akua Ohenewaah - 180522
8. Opoku Asare Millicent - 1806522
9. Michelle Veronique Quainoo- 1807122
10. Josephkerry Edinam Kwadzokpo - 1805422

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01 PROBLEM STATEMENT

- ❖ Prolonged sitting, especially in front of computers, has become common in today's digital age.
- ❖ Poor posture can lead to chronic back pain, neck strain, and musculoskeletal disorders.
- ❖ Posture correction is essential for long-term health and well-being
- ❖ Innovative solutions are needed to help individuals maintain proper posture.





02

METHODOLOGY

APPROACH TO SOLVE PROBLEM

- Create a posture monitoring system which uses an MPU6050 sensor to track body tilt, with an Arduino Uno processing the data.



KEY COMPONENTS

01

BUZZER

Emits sound to alert user when posture deviates from normal range.

02

OLED DISPLAY

shows real-time tilt angle values

03

LED

Emits light to alert user when posture deviates from normal range.

04

ARDUINO UNO

processes sensor data and checks posture deviation

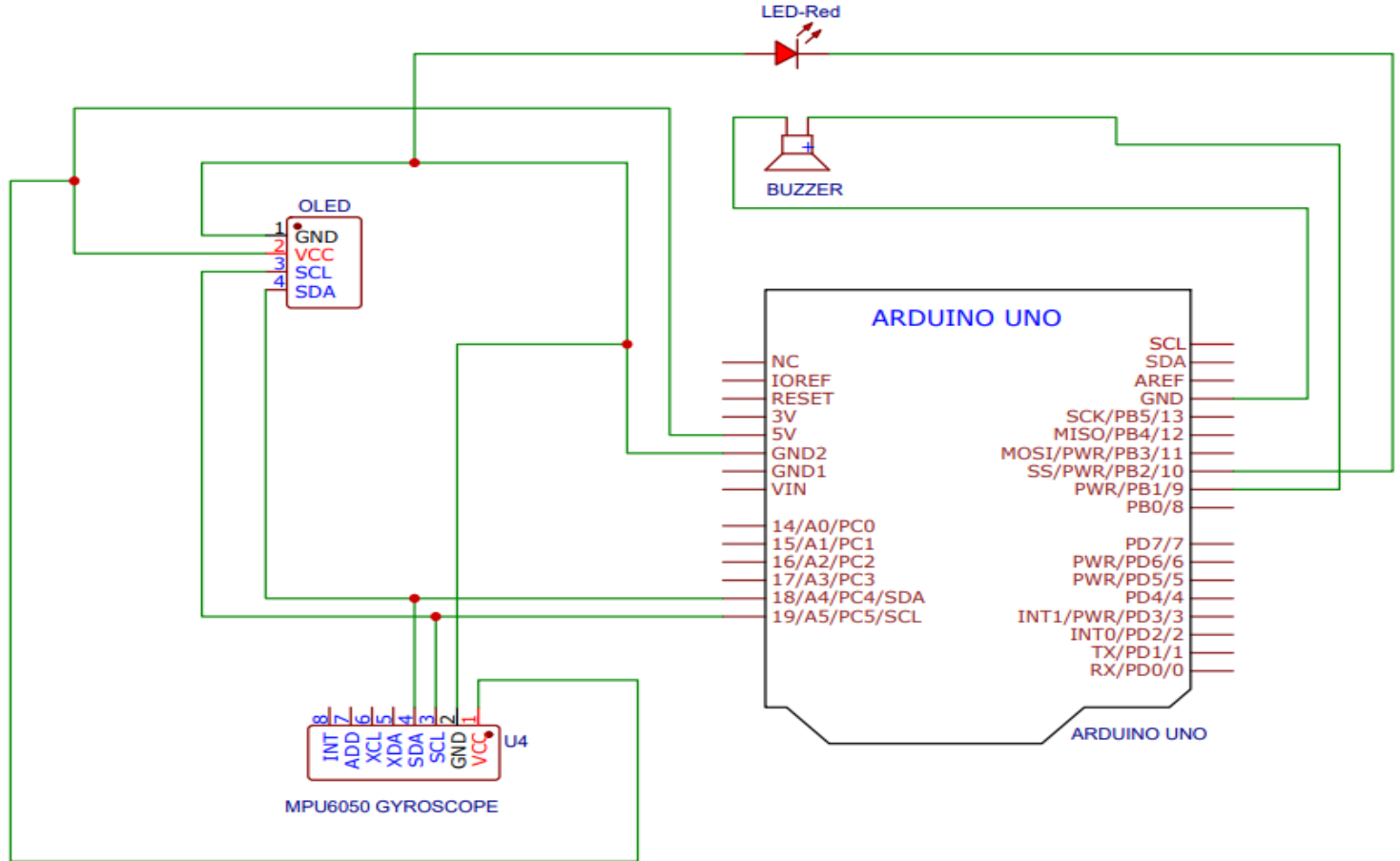
05

MPU6050 ACCELEROMETER

monitors user posture in real-time

OVERVIEW OF SCHEMATIC

● The Schematic represents a PCAS designed using Arduino Uno as the main microcontroller ●



CODE OVERVIEW

LIBRARIES AND SETUP

- Libraries such as `<Wire.h>` , `<MPU6050.h>` , `<Adafruit_GFX.h>` and `<Adafruit_SSD1306.h>`
- `<Wire.h>` enables I2C communication
- `<MPU6050.h>` manages and reads data from the MPU6050 sensor
- `<Adafruit_SSD1306.h>` For displaying information on the OLED screen

PIN ASSIGNMENTS

- Buzzer connected to pin 9
- LED connected to pin 10

CODE OVERVIEW

SETUP FUNCTION

- Initializes serial column for debugging
- Initializes the MPU6050 sensor and checks if it's connected
- Initializes OLED display and checks if its working
- Sets the buzzer and LED pins as outputs

LOOP FUNCTIONS

- Main loop reads real time data from MPU6050 sensor.
- It calculates the tilt angle using the accelerometer data
- Tilt angle is displayed on OLED display and printed to the serial monitor

CODE OVERVIEW

If Tilt Angle is:

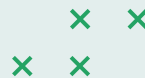
Greater than 15 degrees or less than 5 degrees +

- It considers it as Bad posture
- Buzzer and LED turn on
- "Bad Posture!" displayed on OLED

Within the range 5 to 15 degrees

- Buzzer and LED turn off
- "Good Posture" displayed on OLED

The loop repeats every 1 second



KEY FEATURES

01

TILT ANDGLE CALCULATION

$$\text{Float angle } X = \text{atan2}(ay, az) \times \frac{180}{PI}$$

02

MPU6050 SENSOR

MPU6050 sensor: Measures
acceleration and tilt in 3
axes (x,y,z)





03

DEMONSTRATION
AND
SIMULATION

WORKING PRINCIPLE

01



DETECT

Slouching or
Incorrect posture
detected by
MPU6050 sensor

02



ALERT

Audible alert via
the buzzer is
triggered and LED
lights up

03



DISPLAY

OLED display
shows message
indicating poor
posture status

04

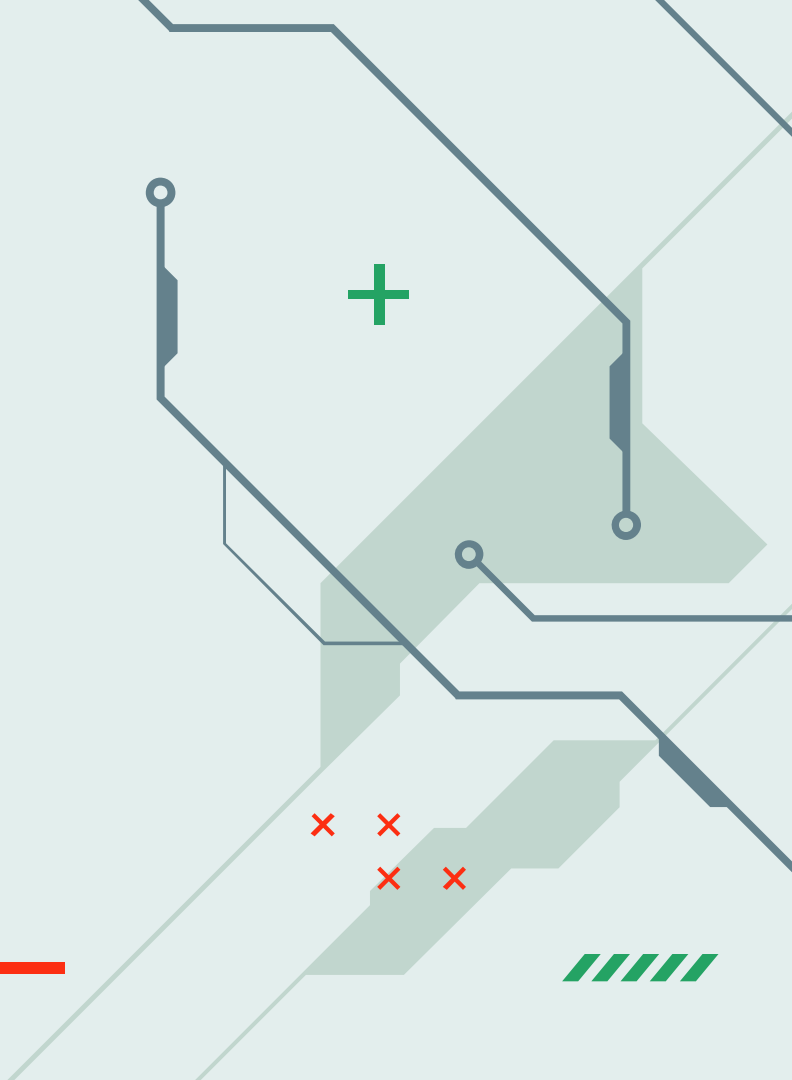


CORRECTION

User corrects their
posture and buzzer
stops

OUTPUT

- ❖ Real-time monitoring of the user's sitting posture using the MPU6050 sensor.
- ❖ Visual display of posture data on an OLED screen.
- ❖ Audible alert via a buzzer when poor posture is detected.
- ❖ Visual indication through an LED to alert the user to correct their posture.



KEY TAKEAWAYS

- Understanding the significance of maintaining good posture to prevent health issues associated with prolonged sitting
- Demonstrating the effectiveness of a reminder system in promoting posture awareness and correction
- Showcasing the integration of sensor technology and actuators to create a user friendly and effective posture correction device
- Highlighting the potential of wearable technology in enhancing user health and well being through innovative solutions

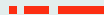


04

CONCLUSION

CONCLUSION

- Findings
- Challenges encountered:
 - Calibrating tilt angle for different range of users
 - Ensuring MPU6050 sensor provides stable readings
- Possible Improvements
 - Adding more sensors for better accuracy
 - Mobile app creation for detailed posture tracking
 - Multi-axis monitoring



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Thank you for your Attention!

Any Questions?