

Smart T-shirt for Down syndrome

Problem statement

The Smart T-Shirt for children with Down syndrome provides real-time monitoring of sensory responses, heart rate, and body temperature, instantly alerting caregivers to critical changes. By detecting prolonged touch, irregular vitals, or temperature fluctuations, this innovative wearable enhances safety and enables timely interventions, improving overall well-being.

Description of the invention

The Smart T-Shirt is designed for children with Down syndrome, featuring built-in touch, pulse rate, and temperature sensors to monitor their well-being in real time. It detects prolonged touch, irregular heart rates, and sudden temperature changes, sending alerts via LEDs, buzzers, or caregiver notifications. This innovative wearable enhances safety, communication, and timely intervention.

Advantage & Novelty

- **Real-Time Health Monitoring** – Tracks heart rate and body temperature for early issue detection.
- **Integrated Safety Alerts** – Detects prolonged touch or inactivity and sends instant notifications.
- **Comfortable & User-Friendly** – Lightweight, wearable design for daily ease of use. Affordable and not expensive
- **Customizable & Adaptable** – Adjustable sensor sensitivity for personalized needs.

Future Work

- **Advanced Sensors** – Integration of EDA, GPS, and SpO2 sensors for stress, location, and oxygen monitoring.
- **Smart Alerts** – Vibration feedback for gentle notifications and reminders.
- **AI-Powered Insights** – Predicts health risks and customizes alerts using machine learning.

Experiment Procedure

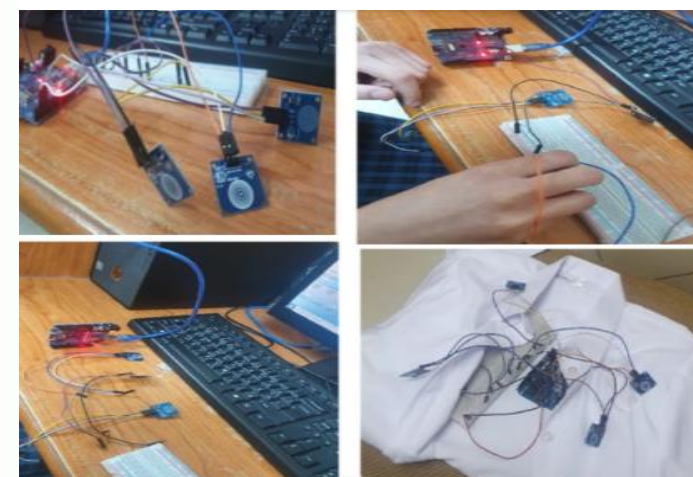


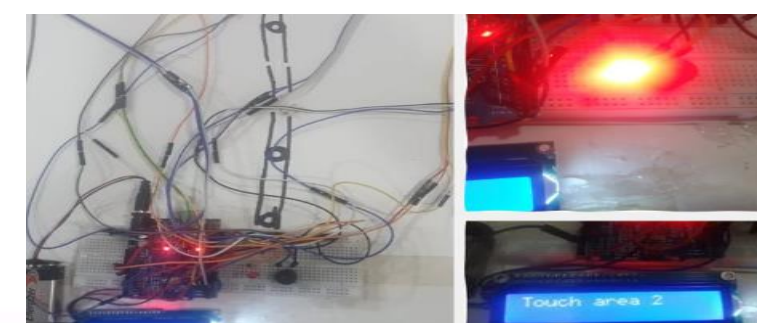
Figure 1:
Study the sensors ,
writing the code and
simulation
then test the
code with
sensors



Figure 2:
Explaining and
applying the
initiative to the
target group at the
Intellectual
Education Institute
for Children with
Down Syndrome:

Data and Results

- **Responsive Touch Sensors** – Detects prolonged touch or inactivity.
- **Accurate Pulse Monitoring** – Tracks heart rate in real time.
- **Temperature Awareness** – Alerts for sudden changes.
- **User-Friendly Design** – Ensures comfort and easy use.
- **Enhanced Well-Being** – Supports safety and health monitoring.



References

- Smith, J., & Brown, L. (2023). Wearable Technology for Health Monitoring: Advances and Applications. *Journal of Medical Devices*, 15(3), 45–62.
- Arduino. (2024). Arduino Uno and Nano Technical Resources. Arduino Documentation.