

Vocalpalm

A Gesture-Based Communication Device for Non-Verbal Users

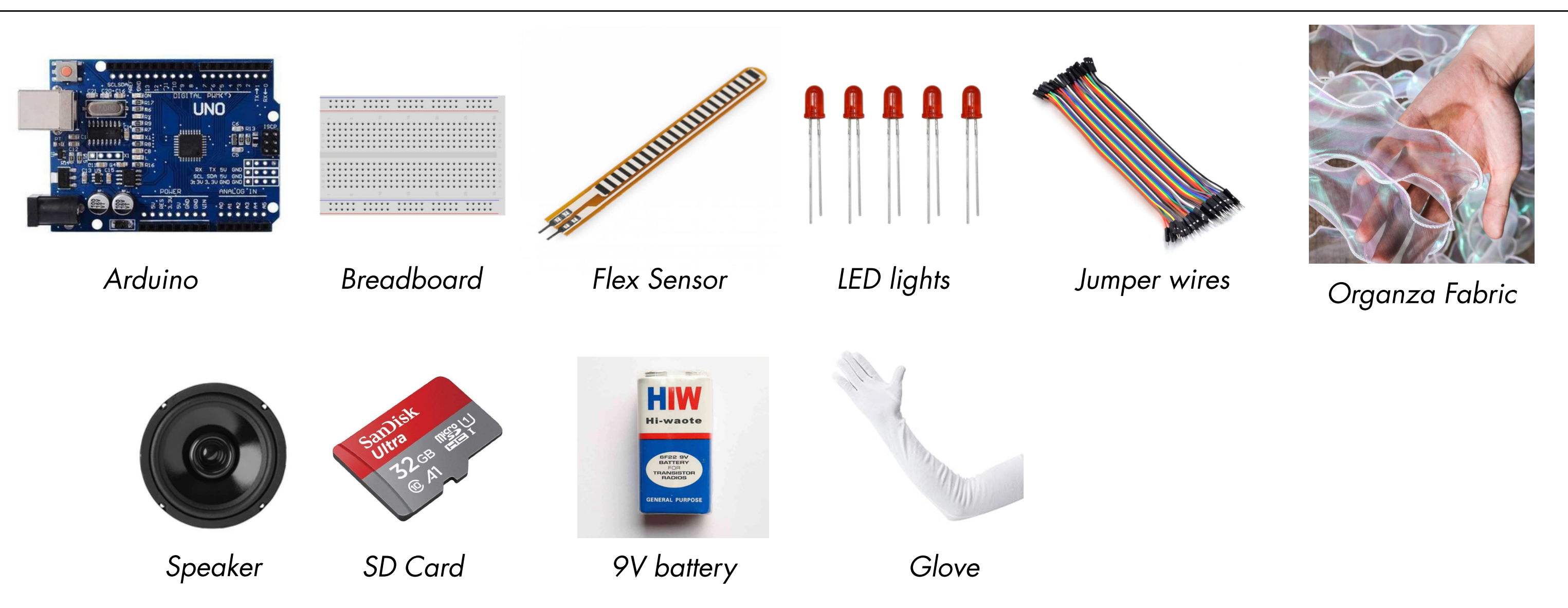


Vocalpalm is an interactive Arduino-based device that transforms **hand gestures into voice**. Designed to support individuals who face **barriers in verbal communication**, the project uses finger movements to trigger spoken messages through a speaker. Two contrasting hands symbolise social and physical differences, highlighting how connection and empathy can bridge divides. When the hands meet, they activate light, representing **unity and shared understanding**. By enabling expression through touch and movement, HandSpeak promotes inclusion, accessibility, and equal voice, aligning with the United Nations Sustainable Development Goal of **Reduced Inequalities (SDG 10)**.

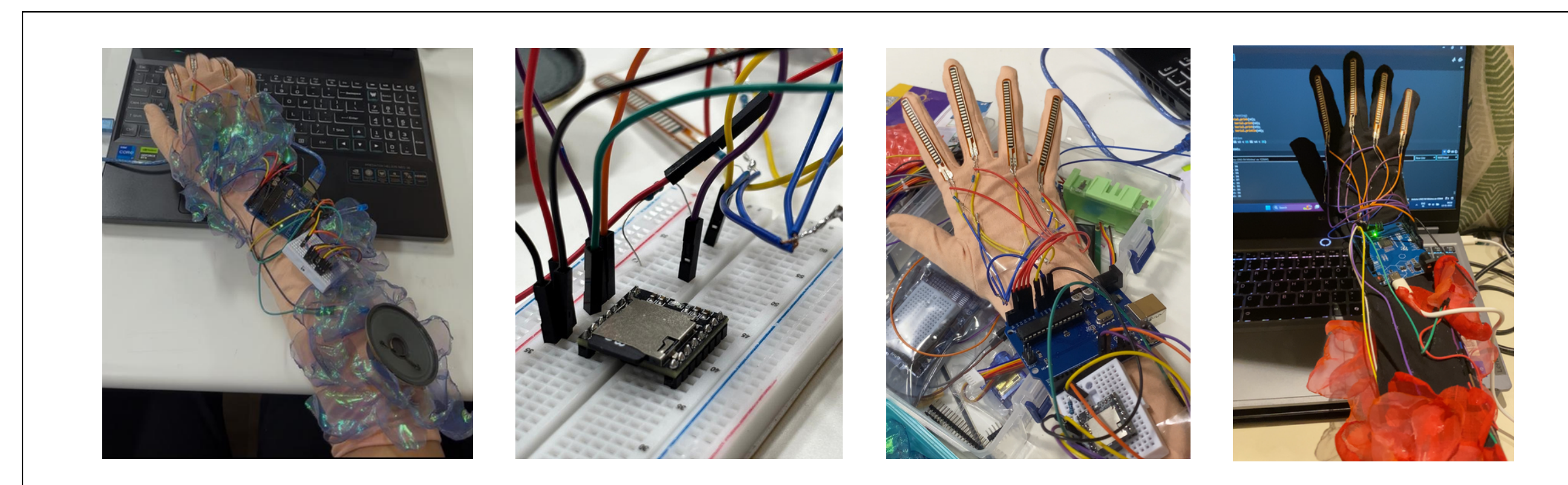
Concept & Working Principle:

Vocalpalm works by converting hand movements into spoken output using electronic sensors and programmed responses. Flex sensors placed on the fingers detect bending and send signals to an Arduino microcontroller. These signals are matched with pre-recorded audio files stored on an SD card, which are played through an attached speaker when a gesture is made.

LED lights embedded in the hands turn on when both hands come into contact, indicating interaction and connection. The system is powered by a rechargeable battery, making it portable and easy to use in different environments. Organza fabric is used for the flower elements to allow light to pass through and enhance visibility. The combination of these components enables a functional, responsive, and accessible communication system.



Hardware Configuration



Signal Processing & Audio Output process

Device Structure & Setup

The device consists of two hands placed on opposite sides- one black and one white, connected to an Arduino microcontroller through flex sensors, LEDs, and wiring. Each hand is fitted with electronic components that detect movement and interaction. When the two hands are brought together, the LEDs turn on, indicating an active connection. The system is powered by a rechargeable battery, making it portable and suitable for use in various environments. This simple and low-cost structure supports practical implementation in different social and educational settings.

Gesture-Based Communication System

One hand is equipped with flex sensors and a speaker that enable users to communicate through finger movements. When a finger is bent, the sensor sends a signal to the Arduino, which plays a corresponding audio message stored on an SD card. These messages allow users to express basic needs, emotions, and responses without speaking. By providing an accessible and affordable method of communication, the system supports independence and social participation, contributing to inclusive design and aligning with the United Nations Sustainable Development Goal 10: Reduced Inequalities.



"When Hands Speak,
Inequalities Fade."

Watch our project video on X:

https://x.com/khyatidharmik/status/2091105786013647092?s=46&t=UYq_iphqdd6ns00GxLiHfA