UNIMAS
UNIVERSITI MALAYSIA SARAWAK
CENTRE FOR PRE-UNIVERSITY STUDIES

KIBAR—AI

Kenali Isyarat, Braille Automatik Respons

Problem Statement

✧ The deaf and blind community face significant challenges in communication, resulting in limited interaction and engagement with others.

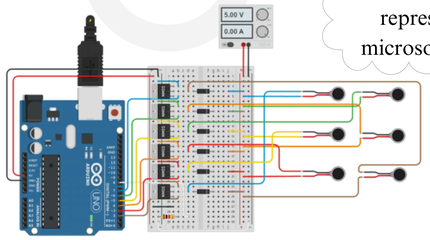
✧ Social isolation is prevalent among them, as their opportunities for connection and meaningful interaction are severely restricted.

✧ This communication gap not only affects their personal relationships but also hinders access to education, employment, and essential services.

Resolution

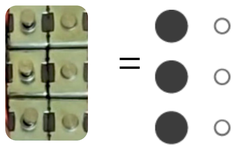
Input
Sign Language

CO PY SERIAL
ultralytics YOLO
OpenCV
Frameworks, Libraries & Pre-trained Advanced AI



Vibration motor represents microsolenoid

Arduino



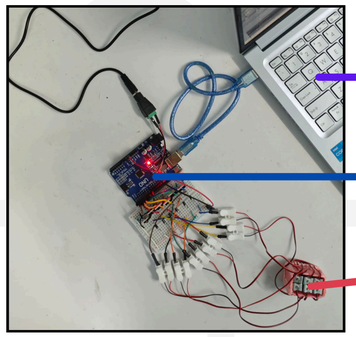
Output
Braille Cell

Objectives

✓ Providing targeted support, personalized communication methods, and adaptive technology for the deaf and blind community, ensuring they can connect, learn, and thrive more effectively.

✓ Developing a real-time system that detects sign language and converts it into tactile Braille patterns, enabling seamless communication for the deafblind community.

Ideation/Prototype



Development of the AI Model with Arduino Programming

IoT & Serial Communication

Hardware Development

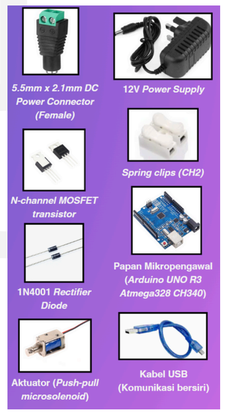
Marketability

Reasonable Pricing

Senarai Perbelanjaan (*Minimum possible cost*):

No.	Senarai item/komponen	Kuantiti	Kos per unit (RM)	Jumlah kos (RM)
1	*Arduino Electronics Kit (UNO R3 Motherboard, Breadboard, Jumper wires, 10kΩ resistors, button, data cable)*	1	-	-
2	*4mm Micro Push-pull 12V Solenoids*	6	6.91	41.46
3	*N-Channel MOSFET*	6	3.00	18.00
4	*5.5mm×2.1mm Barrel Plug (Female)*	1	0.53	0.53
5	*12V Power Supply*	1	7.90	7.90
6	*Rectifier diode* (1N4001)	6	0.20	1.20
7	*Spring clips (CH-2)*	12	0.30	3.60
8	*Craft supplies for physical braille cell*	-	-	-
			Jumlah (pada ketika ini)	72.69

Product Quality



Market Demands

- Scarcity of cost-effective assistive devices for deaf-blind community
- KIBAR-AI addresses crucial market gap
- Targets educational institutions, rehabilitation centers, and NGOs
- Provides tangible communication aid for dual sensory impairments

- Global deaf-blind population: 0.2% to 2% of world's population
- U.S. data (2021/2022): ~2,000 individuals aged 3–21 with deaf-blindness
- U.S. coverage: Under Individuals with Disabilities Education Act (IDEA)

Uniqueness & Originality

Real-Time Conversion

- Translate sign language to Braille instantly.
- Tactile feedback for the deafblind.
- Smooth communication without delay.

Unique Integration

- Combine AI-based sign recognition, Braille actuators, and 3D printing.
- Utilize the latest object detection model.
- High-performance electrical components, surpassing standard Arduino.

Hardware-Software Synergy

- Arduino translates sign language into physical Braille.
- Precise synchronization between sign recognition and Braille actuation. Hardware components perform instant Braille patterns from received signals.

Social Impact

- Reduce the communication gap for the deafblind community.
- Enhance independence in education, employment, and social interaction.
- Promote inclusivity and accessibility of assistive technology.

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