ASL Alphabet Dataset

The American Sign Language (ASL) contains a separate gesture for each letter resulting in a total of **26** gestures. Among these 26 gestures **24** gestures are **static** or do not involve hand movement and **2** of these gestures are **dynamic** or involve hand movement. The ASL Alphabet dataset was created with the data from **1** volunteer. A brief description of the dataset is given in the table below.

Number of Gestures	26 (24 static and 2 dynamic)
Number of Participants	1
Sensors	5 Flex, 1 3-axis accelerometer and 1 3-axis gyroscope
Sampling frequency	70 Hz

The Dataglove

The dataglove has five SEN-10264 flex sensors over the five finger joints and a MPU-6050 Inertial Measurement Unit (IMU) sensor which contains 3-axis accelerometer and 3-axis gyroscope in the same package. For sensor data processing and connectivity, we used DOIT Esp32 DevKit v1 board. The processing unit can achieve maximum clock speed of 240MHz which enables real-time application with gesture detection. For portable power source, we have used a 7.4V Lithium Polymer (LiPo) battery.

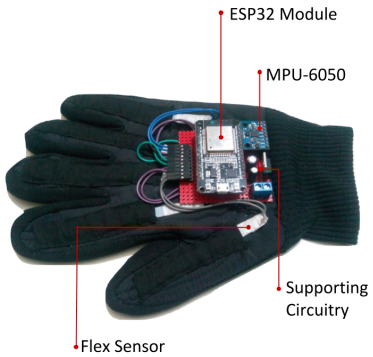

Figure 1: The Dataglove

The Gestures

The dataset contains 26 gestures corresponding to 26 the letters in the alphabet. These gestures were performed according to the standard ASL format which are shown in the figure below.

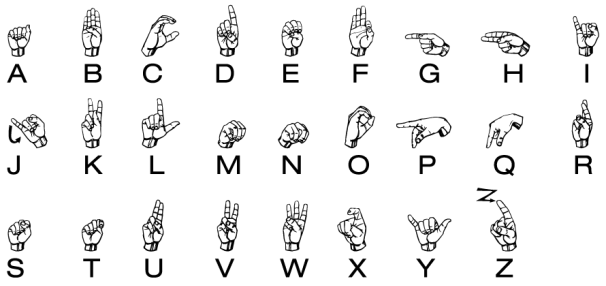

Figure 2: The Gestures

Dataset File Structure

The `Dataset` directory contains 26 data files corresponding to the 26 gestures. Each file contains only the sensor data corresponding to the gesture specified in the *filename*. For example, the file `a.csv` contains the sensor data for the *'A'* gesture in ASL. Files are structured in comma separated `.csv` format and each file contains 30 columns. Each column holds the data from a specific sensor or sensor axis. The mapping from column names to the sensors is given in the table below.

Column Name	**Sensor Description**
flex_*	Flex sensor data
Q*	Quaternions
ACC*	Total Acceleration
ACC*_real	Body Acceleration
ACC*_world	Acceleration rotated in world axis
GRA*	Gravity
GYR*	Gyroscope data
ACC*_raw	Total Acceleration without filtering
GYR*_raw	Gyroscope data without filtering

Here, '' represents the axis -*
for Acceleration and Gyroscope data : *x, y or z*
for Quaternions : *w, x, y, z*
for Flex sensors : *1, 2, 3, 4 or 5*