Real-Time Sign Language Translator Hackathon Plan

Day 1: Hardware Setup & Data Collection

Objectives:

- Set up the webcam and optimize lighting conditions.

- Collect a dataset of hand gesture images for model training.

Tasks:

1. **You (Software Tasks):**

   - **Set Up Webcam Feed:** Write and test OpenCV script to capture webcam feed.

   - **Create Data Collection Script:** Write script to capture images for each gesture and save in labeled folders.

   - **Documentation:** Document process for data collection and directory structure.

2. **Hardware Team Tasks:**

   - **Member 1 (Webcam Setup):** Test and stabilize the webcam.

   - **Member 2 (Lighting Optimization):** Ensure good lighting for accurate gesture capture.

   - **Member 3 (Data Collection):** Capture at least 100-200 images per gesture, ensuring varied hand positions and angles.

Deliverables:

- Webcam feed working with OpenCV.

- Captured dataset with labeled images for each gesture.

- Data collection script with documentation.

Day 2: Model Development & Real-Time Recognition

Objectives:

- Train a simple machine learning model to recognize gestures.

- Integrate the trained model with real-time webcam input.

Tasks:

1. **You (Software Tasks):**

   - **Data Preprocessing:** Resize images to 64x64 pixels, normalize data.

   - **Model Development:** Build and train a CNN model to classify gestures.

   - **Real-Time Gesture Recognition:** Create script to predict gestures from webcam feed in real time.

2. **Hardware Team Tasks:**

   - **Member 1 (Webcam Optimization):** Adjust webcam position to capture gestures clearly.

   - **Member 2 (System Testing):** Test performance with different gestures and lighting conditions.

   - **Member 3 (Hardware Troubleshooting):** Fix any issues with webcam or data capture.

Deliverables:

- A trained gesture recognition model.

- Real-time gesture recognition system working with webcam feed.

Day 3: Text-to-Speech (TTS) & Final Integration

Objectives:

- Convert recognized gestures into speech.

- Finalize the system for the hackathon demo.

Tasks:

1. **You (Software Tasks):**
   - **TTS Integration:** Integrate gTTS to convert recognized gestures into spoken text.
   - **Final Testing:** Run the entire system (webcam feed, model, TTS).
   - **Demo Preparation:** Prepare presentation and practice demo for hackathon.

2. **Hardware Team Tasks:**
   - **Member 1 (Audio Setup):** Ensure clear sound output from speakers or headphones.
   - **Member 2 (System Stress Test):** Test the system under various conditions (users, lighting).
   - **Member 3 (Final Presentation Prep):** Set up the hardware for the final demo.

Deliverables:

- A fully functional real-time sign language translator with TTS output.
- Final demo presentation prepared.

Task Allocation Summary

Team Member	**Day 1 Tasks**	**Day 2 Tasks**	**Day 3 Tasks**
You (Software)	Webcam setup, data collection script	Data preprocessing, model training	TTS integration, final testing
Hardware Member 1	Webcam setup, data capture	Webcam optimization, performance testing	Audio setup, final troubleshooting
Hardware Member 2	Lighting optimization, data capture	System performance testing	Stress testing, final presentation prep

| **Hardware Member 3**| Data collection, labeling | Hardware troubleshooting | Demo prep, hardware setup for demo |