# 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 |