Phase 1: Planning & Background Research

1. Brainstorming and Defining Scope and Objectives
Timeframe: 03/20 ~ 03/26

- **Expected tasks:**
    - Review the project brief and any provided hardware specifications.
    - Establish the scope of the study, including limitations and assumptions.
    - Define clear objectives and measurable success criteria (e.g., model accuracy, performance on edge devices).
    - Draft an initial project management plan outlining milestones and deliverables.

2. Conducting Literature Review and Report Writing
Timeframe: 03/25 ~ 04/02

- **Expected tasks:**
    - Review recent academic publications and technical reports on sign language recognition systems, ones that leverage machine learning on edge devices.
    - Identify commonly used datasets, preprocessing methods, and model architectures.
    - Summarize findings into a structured report, highlighting research gaps.

Phase 2: Initial Setup & Experiments

1. Hardware Setup
Timeframe: 04/04 ~ 04/15

- **Expected tasks:**
    - Procure and configure hardware components (e.g., cameras, Raspberry Pi, desktop computer).
    - Install necessary software frameworks such as TensorFlow Lite, PyTorch Mobile, and OpenCV.
    - Verify hardware-software compatibility and test basic input/output functionality.

2. Gathering Sample Sign Language Data
Timeframe: 04/16 ~ 04/30

- **Expected tasks:**
    - Find a representative dataset of sign language gestures relevant to the project.
    - Preprocess data by cleaning, normalizing samples for training and evaluation.
    - Split data into training, validation, and testing subsets.

3. Building Baseline Machine Learning Models
Timeframe: 05/01 ~ 05/30

- **Expected tasks:**
    - Develop initial classification models using standard architectures (e.g., CNNs).
    - Train models on the prepared dataset using a high-performance computing environment (e.g., PC or Google Colab).
    - Benchmark baseline models for accuracy, precision, recall, and computational requirements.

4. Testing and Refining Models on PC
Timeframe: 06/02 ~ 07/04

- **Expected tasks:**
    - Conduct iterative experiments by adjusting hyperparameters, architectures, and data augmentation strategies.
    - Evaluate model performance against defined success metrics.
    - Identify bottlenecks in inference speed and accuracy.
    - Document experiment results in progress reports for transparency and reproducibility.

5. Deploying Models on Raspberry Pi and Testing Results
Timeframe: 06/13 ~ 07/17

- **Expected tasks:**
    - Optimize and compress models using techniques such as quantization and pruning to meet edge deployment constraints.
    - Deploy trained models onto Raspberry Pi and test real-time performance using live video input.
    - Evaluate trade-offs between computational efficiency and recognition accuracy.

Phase 3: Presentation & Poster Preparation

1. Expanding Experiments, Improving Accuracy, and Testing Edge Cases
Timeframe: 07/28 ~ 08/29

- **Expected tasks:**
    - Conduct additional experiments focusing on edge cases such as partial gestures, overlapping signs, and environmental noise.
    - Enhance model robustness and generalization through advanced techniques (e.g., transfer learning, ensemble methods).