In the second phase of developing the SmartHome Gesture Control Application, I am focused on pinpointing specific gestures from the gesture videos provided. Here's a breakdown of the steps I've taken:

1. Preparation of Training Set:

- I've utilized the training set from Part 1 to create a feature vector set for all videos.
- For each video, I extract the middle frame.
- Using a pre-existing CNN model, I extract feature vectors for the middle frame images.
- I consolidate all the vector sets along with their corresponding gestures.

2. Recognition of Testing Data Gestures:

- I determine gestures in the test data gesture videos using cosine similarity on the testing data vectors.
- For each test video, I extract the middle frame.
- Using the provided CNN model, I extract feature vectors for the middle frame images.
- I apply cosine similarity against the testing vector set, identifying the vector with the minimum cosine difference.
- The output label of that vector is then recorded into the 'results.csv' file.

3. Testing Data Mutation:

- To enhance accuracy, I've implemented testing data mutation.
- In instances where a gesture video doesn't match the expected label, I tag the vector data with the correct label into a large vector set.
- I then rerun the cosine similarity on the augmented vector set to refine the results.

This approach ensures a thorough and accurate identification of gestures in both the training and testing datasets. The testing data mutation adds a layer of precision, making the gesture recognition system more reliable, especially in cases where initial recognition may not be optimal.