**Status Report**

Start by succinctly defining your task in terms of its inputs and outputs. For example, "our task is to predict the outcomes of baseball games based on previous game data." Then, briefly (2-3 sentences) say why your task is important.

Our task is to tell what kind of hand gesture a picture shows based on an existing dataset of hand gestures. It is important for its extensive application, including user interface, universal design and communication, and its utilization on 2D camera means lower technology barrier to wider implementation as an essential part of broader systems

Describe the data set you have utilized to date. What types of attributes are there, how many attributes, how many examples, and how have you partitioned the data for the purpose of development/training/validation/testing.

For the dataset, we use a set of 100x100 hand gesture pictures by writing codes (see that capture frame-by-frame pictures when taking videos. Note that we preprocess the pictures when capturing them so that the backgrounds of the pictures are black. The attributes we are using are the arrays of pictures, indicating the pixels, and a gesture ID, indicating what kind of gesture the picture shows.

So far, we have 1722 pictures of 11 gestures, with an average of 157 for each gesture. Because of the limited number of instances, we use 10 fold cross-validation for a more accurate testing.

Present your preliminary results on the task. Which learning techniques have you tried, and how have they performed? **Note:** Mention which existing machine learning software packages, if any, you are utilizing. You can use any existing packages you like for the project. Implementing learning algorithms can be, but does not need to be, part of the work you do for the project.

Based on our research, it seems that nearest neighbor is one of the most commonly used algorithms for our attributes in gesture recognition. For any given picture, we look in the training set for a picture with the most common pixels, and return the id of the found gesture.

After running the algorithm with 10 fold cross-validation, we reach 0.998 for precision, recall and F1, which indicates great performance.

Briefly (1-2 paragraphs) describe your plans for the remainder of the quarter, and list any questions or concerns you have.

We first plan to better tune the hand capturing process. Right now, the hand recognition is not very accurate and mostly based on color.

We also aim to improve the time performance of the algorithm. Specifically, the classification process needs optimization for larger dataset.

With the great results for single picture recognition, we also plan to extend the project to video recognition, meaning that we will not only identify hand gesture pictures, but also gesture videos, which are essentially sets of pictures.