MP1: metric learning

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1. Introduction

In this MP, we use the META_DATA 47*1400 vector to store the 47 features in the 1400 image base. Using the 47 features instead of the raw pixels allow us to do much less computations. In the MP we use the metric learning method and using Mahalanobis Distance to represent the similarity between different images. The algorithm will calculate a diagonal weighting matrix through the training and therefore get the best fitted data.

2. Methods

In line 212 to 229, we calculate the diagonal weighting matrix W by using

$$W(i,i) = \frac{1}{\sigma_i^2 + 0.0222}$$

Where σ_i is the standard deviation of the feature i of the feedback images. The 0.0222 is added for regularization.

In line 138 to 179, we using the diagonal weighting matrix W we calculated above using the user feedback, and get the Mahalanobis distance between each of the images and the target image by using

$$D(j) = (q_c - x_j)^T W (q_c - x_j)$$

Where q_c is the mean image-feature vector for images that represent the user's intended interest and x_j is the feature vector of a image inside the 1400 database.

3. Result

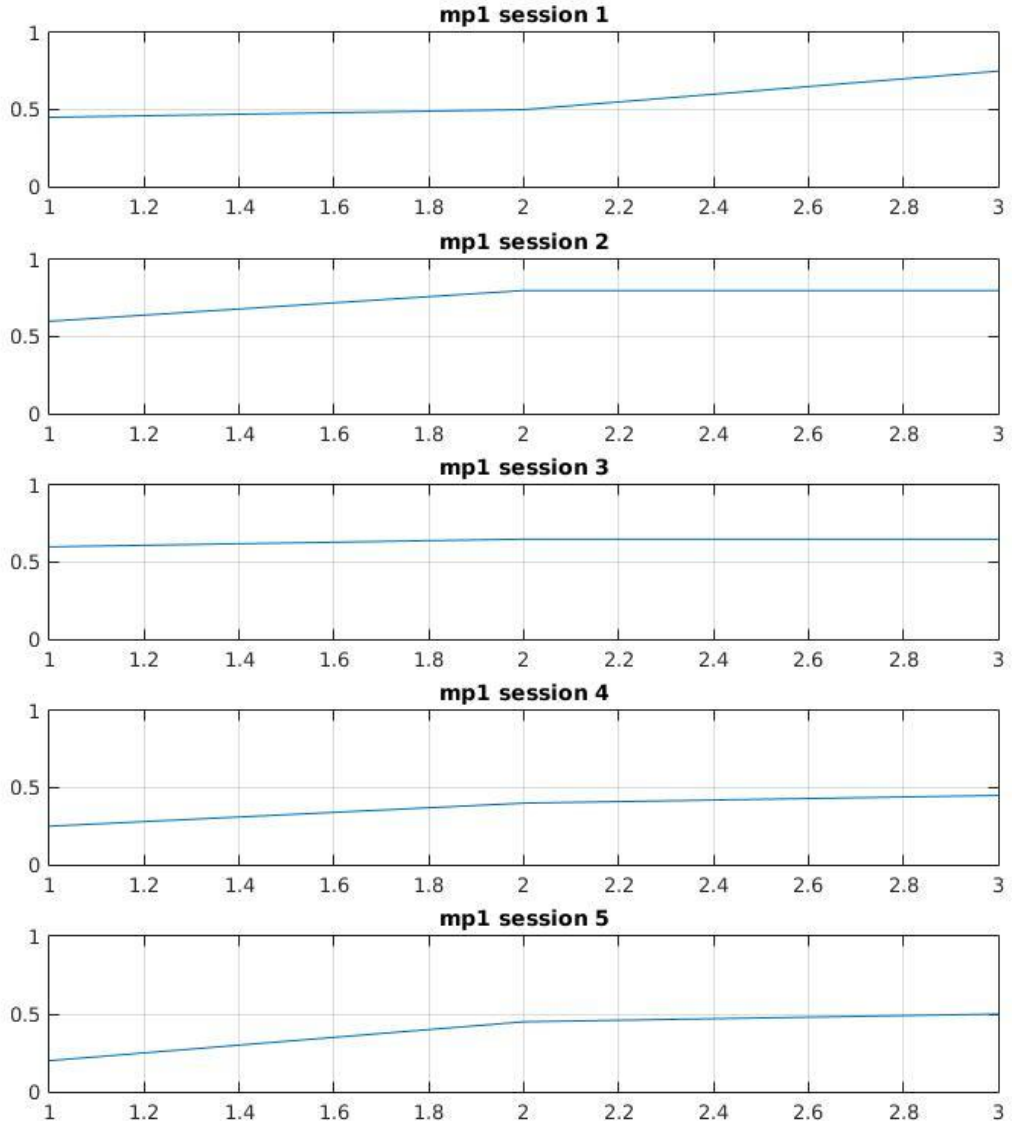

Fig 1: Precision Vs Feedback Round in 5 different sessions

4. Discussion

We can see from the result that the precision value is increase during the 3 rounds of experiments. The precision value various maybe because the different numbers of relevant pictures in the image base.