Progress:

In preliminary experiments, we adopted different means to analyze features of two representative instruments (piano and violin) and five samples, and visually observe the difference for a perceptual impression of typical sound features.

Firstly we used STFT and attempted to find the pattern of spectrums in both linear and logarithmic scales. In linear scale formants are more obvious to see, but more spectral features can be observed in the logarithmic scale. However, it is non-trivial for the computer. In addition, the spectrum pattern of the same instrument varies with pitch, and becomes confusing if chords are included. Therefore we need further study with other methods.

Then we tried the cepstrum, which performs another FT (precisely IFT) on the log-scale spectrum. Immediately we noticed the peaks much sharper for violin, but no additional information can be obviously seen, so cepstrum may not be clear enough if more kinds of instruments are included in the candidate set.

The LP Coefficient method works well on the samples, and it appears clearer and more robust because the shape is not distorted much in different pitches (although the magnitude varies). Even when chords are taken into consideration, it still roughly keeps its shape. Therefore, this model is probably more promising by now.