Proposal of Oil Painting Classification Project

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INTRODUCTION

Paintings are of great value of art, especially in the era of early modern Europe, a lot of talented painters emerged and gave the world a great amount of fortune. It was probably not too much later that art forgeries emerged after the art value has been discovered [1]. It becomes obviously important for art experts to identify various paintings of different painters. The traditional ways of doing so include identifying the signatures of painters, the expected date of the paintings, the canvas producers, and brushwork of the painters.

However, with even growing number of counterfeits, it is becoming more difficult to distinguish the authentic works by human experts. Fortunately, based on the differences among painters in terms of canvas textures, pigments used, and brushstroke styles [2], it has been discovered that the mathematical analysis of the digital representation of paintings could assist the art experts in this recognition process [3], [4]. Recently, the painting identification by digital image processing techniques has become popular and various approaches have been proposed [4] - [6].

Although the ultimate goal is to distinguish the forgeries, in this pilot research work, I will develop an approach to distinguish each painting (all from van Gogh) from each other by building a feature space with four features: Fourier Transform, Wavelet Transform, Statistical Approach, and Covariance Method, a method employing neural network will be introduced to address the painting-based recognition task [7], [8].

SCHEDULE

The whole procedure will be roughly divided into three time periods. Preparing the project proposal and the abstract of the work will be limited to 1 week; the feature extraction and the training/testing environment build will be accomplished within 3 – 4 weeks; achieving a satisfactory result and finishing the final project report will be done in 1 – 2 weeks.

METHODOLOGY

The data set is built by roughly 60 X-ray paintings (or parts of a painting) from different painters. Patches will be randomly selected from these paintings. Then, four basic feature selection methods – Fourier Transform, Wavelet Transform, Statistical Feature Selection and Covariance Matrix – will be used to extract the feature space from raw data [9]. After a proper feature space being established, neural network algorithms will be used to build proper classification networks, and a test set will be used to test the performance of the network.

EXPECTED RESULTS AND CHALLENGES

A classification rate of at least 50 percent is expected. As a result of the proof, the differences among different methods will be shown at the end of the project, different performance
(classification rate) will also be shown and hopefully, a best solution would be found according to the factors mentioned above.

The challenges lie in the unknown factors that would be introduced during the experiment, e.g., the size and numbers of patches we need to use to build the raw data space, the proper features of building a satisfactory feature space, and the neural network methodologies will give us the best performance, etc. Furthermore, even the proposition is reasonable, the results cannot be guaranteed for now.

REFERENCES: