CVIP PROJECT PROPOSAL

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1) Description of the System

Introduction

The System will use Bag of Words technique for identification of currency using Image Classification. Given an image of a currency note, the system should be successfully able to label the denomination of the note and as an extension, we are also planning to add multiple currencies so it should be also able to identify the country/system to which the note belongs.

We will be experimenting with different methods for feature extraction using combination of different filters and or SIFT. We also plan to implement multiple algorithms for histogram intersection / matching. If time permits, we would like to implement another algorithm for comparison which would likely have more accuracy along the lines of CNN or Random Forest.

We are planning to extract the data set using web scraping. Since the number of labels are limited and exhaustive, we can afford to download data set manually.
For Training, Validation, Testing, currently we are planning on a 8:1:1 split for the entire data set.

Future scope

Use of different algorithms like Random Forest, Convolutional Neural Networks and SVM can be tried for better accuracy.

The system can be implemented on a user friendly UI like an android application and this can largely be of help to blind people in identification of note denominations and also to interested users who would like to know about unknown currencies.

2) Project Task Breakdown

1. **Preparing Dataset:** Our first task will be to create a suitable dataset consisting currency at various scales, dimension and variant.
2. **Extracting Data:** This stage refers to extracting the images from the corresponding dataset.
3. **Training Model:** In this stage, the data is trained based on classification algorithm. We will use different algorithms (Random Forest, Bag of Words, Convolution Neural Networks) and compare the accuracy on the validation set.
4. **Tuning Hyperparameters:** The result obtained from the training model will be applied to the validation set to tune the hyperparameters for improving its performance.
5. **Testing Model:** The classification algorithm along with the tuned hyperparameters will be applied to test model to classify the currency.
6. **Report Formulation:** The results of the algorithm along with the accuracy will be reported in a well formatted document.

3) Software and Library:

1. **Software**: MATLAB
2. **Libraries**:
    A. TreeBagger – Random Forest
    B. Neural Network Toolbox – Convolution Neural Networks
    C. Bag of Words – Self developed

4) Task Distribution:

1. **Preparing Dataset:** Done by Sujit Singh
2. **Extract Data:** Done by Gautam Shende
3. **Training Model:** Done by Sujit Singh
4. **Tuning Hyperparameters:** Done by Gautam Shende
5. **Testing Model:** Done by Sujit Singh
6. **Report Formulation:** Done by Gautam Shende

NOTE: This has been allotted randomly and most likely will not be the order in which events would be performed. Each of the tasks will be done with co-ordination and communication

between us. We have worked on team projects before and as a practice, we are used to distributing the load evenly.

5) Estimated Timeline of the Project

Sr. No.	Subsection of the project	Expected date of completion
1	Preparing Dataset	11 / 14 / 2017
2	Extracting Data	11 / 22 / 2017
3	Training Model	11 / 30 / 2017
4	Tuning Hyperparameters	12 / 2 / 2017
5	Testing Model	12 / 3 / 2017
6	Report Formulation	12 / 5 / 2017