Name :-   **Anand Dhandhania**
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Project Title :-   **Hand Written Text Reader (Aryan)**
Synopsis :-

The project is a software build to read a hand-written bengali text image and read out the text in bengali. It is a combination of OCR (Optical Character Recognition) and Text-to-Speech system. A machine learning model will be generated from the hand-written bengali text (Training Examples). From this model, we will find the best match for the hand-written text.

Since the Text-to-Speech system is already there for Bengali. We can use Festival at backend to convert the text and give us a sound file. This sound file can then be played for the user.

How is your project going to benefit language computing ?

This project can really be used as an interconnection between language computing and speech technology. It can prove itself in educational sector as well as for the pysically challenged (dumb) people. They would be able to speak through their hands. I have searched through the web and i wasn't able to find anything like this. I believe, this will be a handy project to do.

Any previous experience with GSoC or, similar program ?

No, its the first time i am applying for such program.

Why would you like to do a project with us ?

I have been working on Machine Learning from last 15 months and i have figured out that i am going to pursue my career in the same domain. The algorithms and stuff also make me crazy. When i saw the list of institutions on GSOC website, i figured out that this is the only project i would like to do. With my hunger to work for an application which tests the capabilities of machine learning techniques, there is this very fact that i was born in Kolkata surrounded by lot of bengali people and i am very much interested in making something that can be used by them. One of my elder brother knows how to write in bengali but can't speak it (He couldn't get enough classes on Bengali and we had to shift). So these are the various reasons for me applying for this project.

You people are pro's in the field and i believe it would be much easier for me to complete this project with your guidance and my hardwork.

How many hours per week can you commit to the project ?

I believe i have got nothing more important to do than this project. So if get selected, everything aside, this project is going to be my first priority. Yes, i am a geek and i love to spend my time doing the small projects and i usually spend 7-8 hours on computer doing various kind of things. Yeah this time also includes me playing, chatting with friends etc. But if i get selected, i can spend minimum of four hours a day or you can say 28 Hours per week.

Within 15-20 days of the start of project, we will get a semester break and then i can stretch it upto 7-8 hours a day.

Are you comfortable with virtual communication using English as the primary language

Yes, i am very much comfortable with English.

Implementation details of the project: ?

Optical Character Recognition
Pattern Matching Algorithms
Using Text-to-Speech System
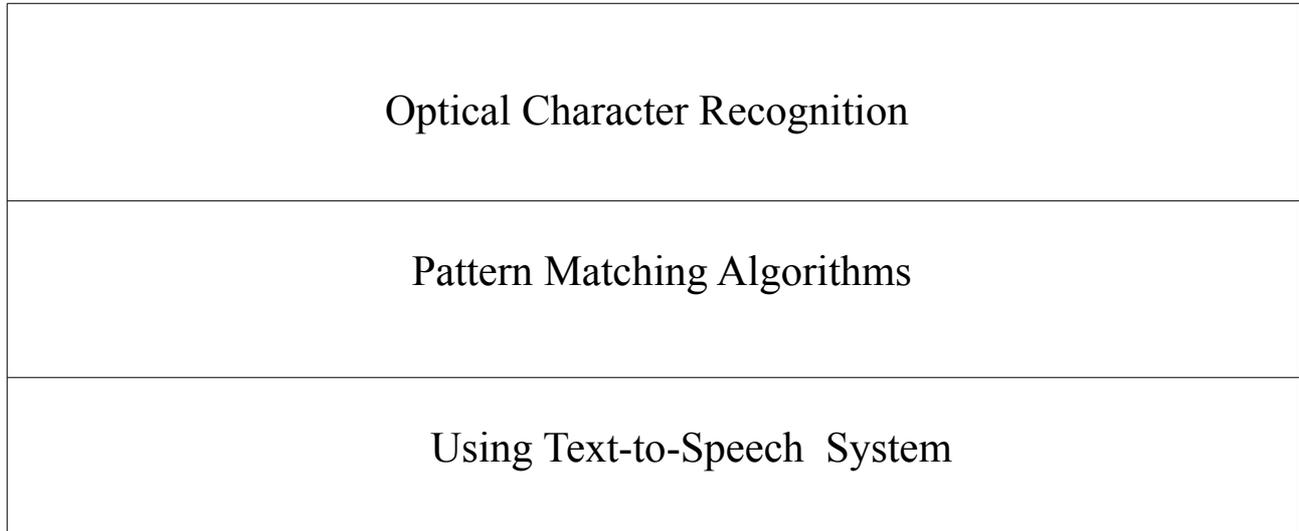
Fig: Layers of Hand Written Text Reader

Top Layer :-

We will take input an image containg the hand written text. It will be passed through low pass filter or using other filtering techniques, we will remove noise fom the image. After doing this, we will apply OCR to the hand written text and get Machine encoded text. We are not going to just implement it, we will enhance the efficieny and runtime of the system. Everything will be optimized. Then we will extract features from this data.

Middle Layer :-

In this layer, we will implement various kind of pattern matching techniques, most prominently using a neural network model to get the best match for the text from given feature vectors. We need to train our model with the large amount of data on bengali text . After implementing this phase and most importantly optimizing it to give a decent runtime, we will move to the last layer.

Bottom Layer :-

Here the machine coded text will be provided to the bengali Text-to-Speech system. A voice file will be generated and given to the user.

Basically we are trying to combine the text classification and voice generation in this project.

Phases/milestones with dates:

We will divide the project into three phases:-

1) OCR for bengali hand written text. In this part, we will focus our work to extracting the features from the hand written text. We will be writing software for the algorithms with optimal and efficient solutions. The whole input as well as feature generation step will be finished in this phase.

2) Pattern Recognition on the extracted features. In this step, we will apply various pattern matching algorithms to find out the text from the features that were an input from above step. Here we will be devoting most of our time. We will work to enhance our accuracy.

3) At the last stage, we will use Festival (Bengali TTS) to produce the sound for the text derived from step 2. I have already implemented this step so i don't think it will take much time.

As written on the web portal for GSOC, the official date to start coding is 17th June, but we will start working on the project lets say from June 1st and will try to cover up the phase 1 by the end of June. I have not done much work on OCR, so i have just an abstract idea of how it works. I believe we can work it out within a month time.

As i mentioned we will be needing lot of time in phase 2. So i think, we will spend almost 2 months building and enhancing the pattern matching system. By the end of August, we would have generated the text form the given hand-written text.

Within a week or so, i will end up making the frontend for the software giving this text to a festival server and playing it for user.

So it goes like this:

Phase1   1st June – 30th June
Phase2   1st July - 31st August
Phase 3   1st September – 7th September

We might need to share a little bit of time from phase2 to phase1.

Let us know who you are: ?

I have attached my resume with various related projects and internships, i have done so far. I have also attached the documents for related works of mine.