Project Report:

This report contains the overall process followed in completing this project.

There are Six requirements in the project

1. Classification of the Pokémon.
2. Finding CP id
3. Finding HP id
4. Finding StarDust score
5. Finding the level of the Pokémon in the semicircle.
6. Finally finding the center of the semicircle.

Classification of the Pokémon:

This is done through by forming the model of the pokemon faces and this is done through the Principle Component Analysis. The steps are as flows,

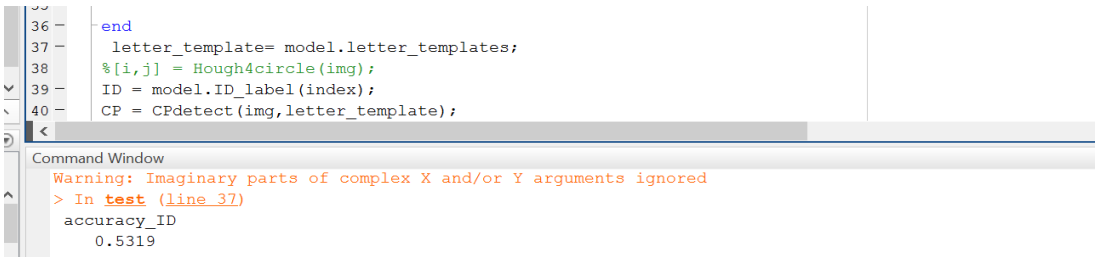
Training:

1. Resize the image to be uniform and crop the faces of pokemon.
2. Represent every image as a vector space
3. Compute the average of the vector space which will be the average face vector
4. Subtract the Mean face vector from each face image vector
5. Compute the covariance matrix using cov(image_sd);
6. Compute the Eigenvectors of the covariance matrix and find the eigen vector feature which will be stored as the model in this approach.

Testing:

1. Get each testing image crop the same way the training images were did
2. Subtract the mean from the test image vector.
3. The product of the model eigen vector and test image difference gives the near similar image from the training.
4. Now, traverse through the each image in the model and find the nearest image and its Index.
5. This index is the Pokemon's category which is our predicted value.

The Accuracy of ID classification is **53.19%.**



Finding CP id, Finding HP id, Finding StarDust

All the above three is very straight forward now. Which is analyzing the given image and using template matching find the relevant ids

1. Crop the image to the area of interest.
2. Extract the characters and see which is very closest match from the template model and take the appropriate index and derive the characters.
3. The template is formed using my own template engine which is 1*29 vector with bit sized of each interested alphabets.
4. The correlation scores are calculated over the each template and template which has the highest score is taken found its index.
5. Further manipulations are done for extracting only the id from the detection.
6. The accuracy of this is around **88.65%**

Finding the level of the Pokémon in the semicircle.

The next task which is finding the semicircle level of the pokemon. In this one, the most challenging part is finding the smallest circle which says the level of the pokemon. Image preprocessing is done like gray scale conversion, binary image change and we need to find the largest connected component and eliminate the smaller or lighter component.

The accuracy being **84.89%**

The center of the semicircle is found by using three random points (x1,y1), (x2,y2) and (x3,y3)being chosen from the semi circle arc and fining the perpendicular bisector using slope and point form.

M1M2 =-1

Find Mr and Mt.

```
x = (((mr*mt)*(y3-y1)) +(mr*(x2+x3))-
(mt*(x1+x2)))/(2*(mr-mt));

y=-((1/mr)*(x-((x1+x2)/2))) +((y1+y2)/2);
```

The points (x , y) is the center

Sample detection: