**Facial Recognition Project**

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| **Requirement** | **Specification** |
| Training and Model Creation | Source Data Set  Case 1: Training model for all images (face) of multiple subjects in same folder, script will take input images folder location where file name is identification of subject  Case 2: Training model will take base folder path where sub-folder name is identification of subject. Each subject folder contains multiple images of same subject  Case 3: Create a separate data set to lookup age, gender, emotions and training model to provide additional information  Technical Specification: Accuracy > 99.8%  Development Environment: Python, GPU Based and CPU Based (script should allow option to choose GPU or CPU)  Training algorithm should be able to train with   1. Face with mask and without mask 2. With sunglasses and without sunglasses 3. With or without head gear or hats or caps 4. Low light images 5. Side profiles of user bending down or turning left or right 6. Different focus and altitudes and distance 7. Different skin tones and complexations, especially in low light pictures   Training model can be saved in file system, the vector/ encodings for image list (to be identified) to be saved in database Elasticsearch or Hadoop  Developer can create a data set required for training model  Developer to propose libraries / algorithms / methods to be used before the start of project |
| Detect and Align | Case 1: Image with one face  Case 2: Image with multiple faces  Detect number of faces, provide start and end coordinates of each face on picture.  Crop each faces from picture and for each face create a facial vector/ encoding.  Developer should be able to write efficient query/ function to search the identification of the provided image in the database and return all the fields along with the confidence score of match  Same image to be passed to another model to look for gender, age, emotions  Development Environment: Python or Native C (our program will call developed native C function for input and output, developer can also use C++ in backend). Native C recommended.    Technical Specification: Accuracy > 99.8%  End-to-end processing < 50ms |
| Success Criteria | Detect face, age, gender, emotion from our own dataset of 20,000 images (not provided in training) with masks, complexion etc. (include all scenarios defined above) with accuracy and speed defined in each step.  The entire solution should be maintainable, documented and customizable. Well coded with modular approach.  The developer should be available to undertake customizations and future enhancements |