Professor Chai's Comments and Evaluation:

Overall Grade: A-

Abstract: (+)
Good Abstract write-up by providing clear problem statement and the reason why you want to work on the project.

Project Scope and Deliverables: (+)
Clear and easy to follow plan for achieving the goal of divination tool leveraging DB and Machine Learning techniques.

Team Info: (+)
Nice projection of team division of labor providing a more convincing argument that your team can complete this project

Project activities diagram: (-)
it is a start but the flow and detailed design could be improved to add design clarity.

Project Schedule: (-/+)
Project schedule has some level of tasks but do you have an estimates of each task to be able to tell that they will complete in time and not push everything out to the right. Using freely avail tool or even as crude as MS Excel could help to provide a big picture of how you will accomplish the work in the next few weeks.

Reference: (+)
Good list of references to provide support for the project idea

Team Popeyes Project Proposal

Table of Contents:

Abstract:

Since ancient times, people believe in multiple ways of divinations, includes constellation, Chinese Zodiac, palmistry and physiognomy, etc. Traditionally, people tend to visit different augurs face to face for practise divination, and the augur predicts those people fortune based on experience or specific rules. This project is going to provide a new and reliable way for people who believe in divination and desire for quickly accessing to any kinds of divinations or combined fortune. It aims to integrate most of traditional ways of divination by building a database, which stores all specific rules of divination, and also a pattern recognizing model to replace augur's visual method. By integrating, digitalizing, and formulating these information, a precise way of divination without human error will surely change the way people's way of divination or even belief.

Project Objective, Scope and Deliverables:

Project objectives:

Create a new divination method, that is more precise, more convenient, and more diverse.

Project scope:

The project scope will be focused on divination methods, which have clear and collectable attributes, like: palmistry, physiognomy, and constellation etc. Because these data can be collected and digitalized easily, but other divination methods like: Tortoise shell divination, Tarot Divination. Their attributes are somehow random, so that is out of our scope, we only focus on the divination which can be solved mathematically.

Key deliverables:

1. A database that stores digitalized data about existing attributes of main divination methods.
2. A pattern recognition model grading the fortune based on pictures of face or palm.
3. An integrated recommendations system that gives suggestions based on the predicted fortune.

Comparative analysis of existing solution:

1. Precision: Traditional palm or face divination might have human error, because augur use visual method. Picture recognition technique of computer vision nowadays can acquire higher grade than human when the patterns are constant. Furthermore, augur give suggestions based on their experience or book, which has higher possibility to have error comparing to a database.

2. Integrity: Most of augur only focus on one of the divination fields. However, our application is interdisciplinary, which has the database that stores data about many main methods of divination. So it can not only provide the specific way of divination that people want, but also give the combined result of different divination ways.

3. Convenience: Digitalize all these information helps people access to this application anywhere, anytime. Even though some of websites provide divination services online, those websites are not as functional as our application. First of all, they do not integrate different ways of divination. Secondly, they don't have the function of face or palm features recognition.

Information helping validate the possibility of the application:

1. Divination data:

   There are some of attributes of divination already put online by others, if it was possible, we would refer to these data and fill them into our database. For the offline data, like: book of constellation, we can digitalize them. So data source is sufficient for us to build an integrated database.

2. Pictures data

   Besides the divination data, pictures of faces and palms are also not difficult to collect, even if there is no sufficient palm and face picture online, we can collect those type of data by our own camera to enrich our database.

3. Picture Recognition Technique:

   To build a good model, sufficient data and well-designed architecture are necessary. Picture recognition is a relatively mature machine learning technique by now. we have high possibility to build an accurate supervised-learning pattern recognition model.

Team Information:

Tsung Yen, Yeh:

tentative role: Organizer

responsibilities: Integrate team members' opinions and information; Build model for patterns recognition of face and palm

key background: Currently working toward becoming a data scientist. Second years graduated student majoring in Data Analytics. Having NLP internship experience, as well as data mining and feature engineering. Familiar with most of the modern machine learning models' architecture and statistical theories behind them.

expertise: Using Python or R processes different types of data; Using Tensorflow builds varied types of models, and perform the statistical analysis to increase model performance

YiFan, Lu:

tentative role: Member

responsibilities: I will implement classification plus localization for object detection and train it so that the network can accurately detect the face and palm in the input image.

key background: member of Lab for Infrastructure Sensing and Data Science. I have successfully designed and implemented Long-term Recurrent Convolutional Network architecture for video compression task. It is now able to achieve 64 compression rate while processing faster than the traditional methods.

expertise: python, swift, machine learning, network pruning

Chun Wang:

tentative role: Member

responsibilities: Finding experimental sample, testing the project, collecting user experience and optimize our model.

key background: I am a first year graduate student in Information System. (Not have much experience.)

expertise: be professional with java, C++. Also, be able to utilize python, JS, PHP to design projects.

Jianghao Ju:

tentative role: Member

responsibilities: Apply the physiognomy and Palm divination theory in both classic Eastern and Western books to our models

key background: Currently working as NPI scientist in environmental company, Second year graduate student in Industrial Engineering. Working on applying scientific theories to practical engineering problem, building models to predict and analyze data, optimize the process to improve the system performance.

expertise: Using R processes different types of data; Interested in Eastern and Western classic culture and history.

Rui Han:

Tentative Role: Member

Responsibilities: Implement the front end, back end and deploy the application.

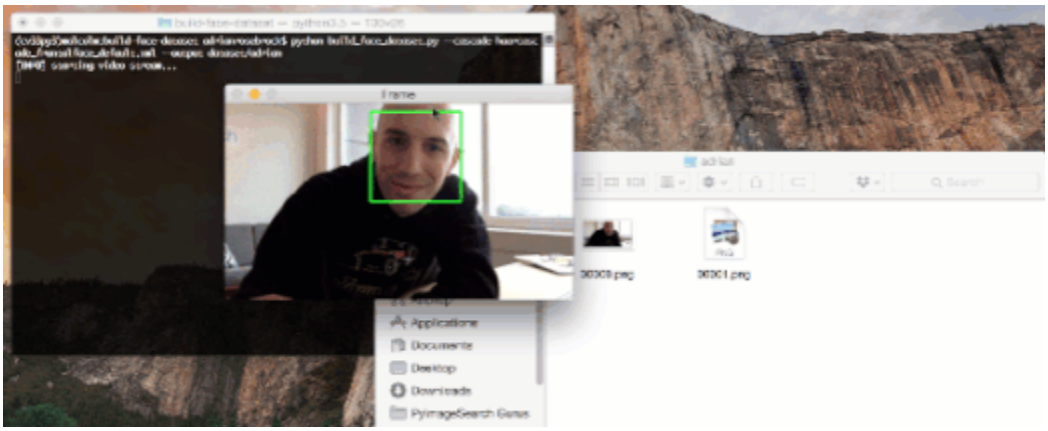
Key Background: Familiar with data structures and algorithms. Developed a full stack web app on AWS Cloud 9 that allow users to share good old movies using Node, Express, Bootstrap4, MongoDB etc. Currently studying more frameworks such as React.js, Angular, Spring Boot.

Expertise: Python, Java, Javascript.

Other items to include:

Sample list of data attributes to be considered

Using OpenCV and webcam, we can detect faces in the video stream and store the samples on disk. This process can be used to create a local face recognition dataset.



To collect samples of these people's faces, we may need to place them in a special room with a video camera for :(1) detecting the (x, y) coordinates of the face in the video stream;(2) write the video frame containing the user's face to disk.

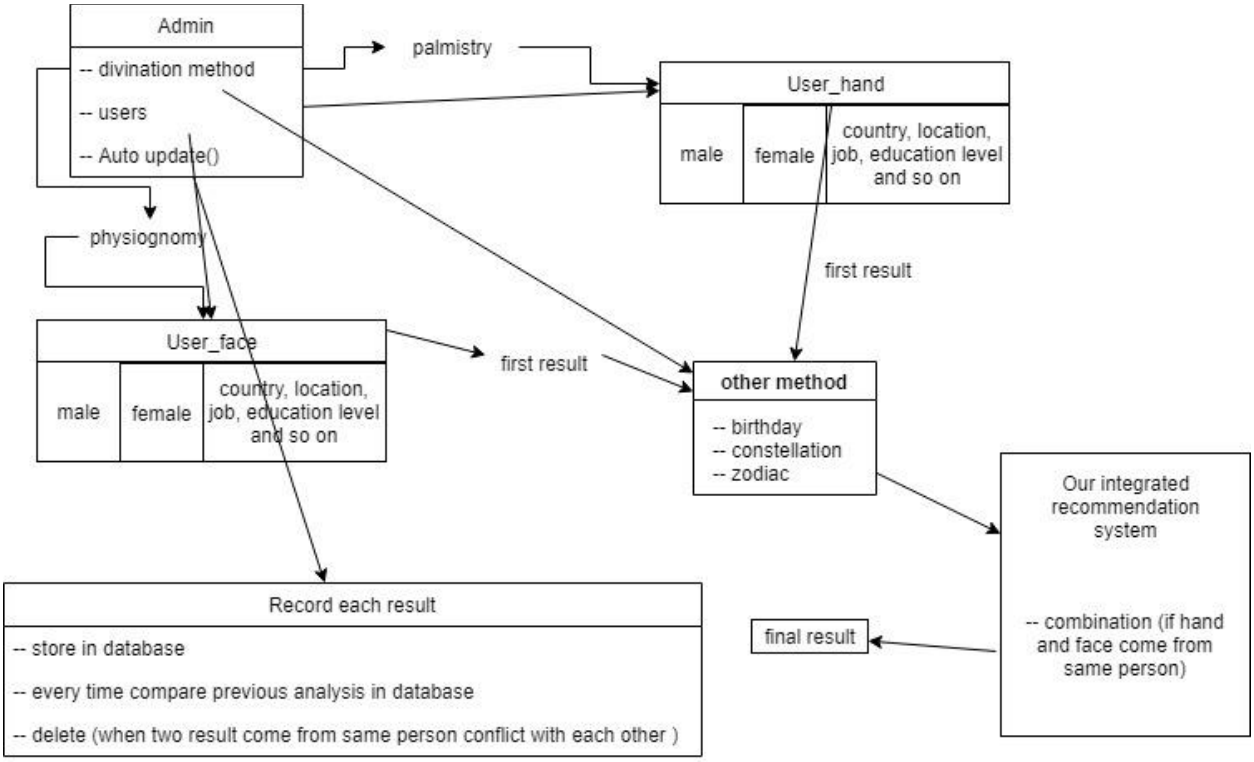
It may even take days or weeks to do this to collect face samples in the following situations: different lighting conditions, different times of day, different emotions and emotional states.

After we get the image, convert it into digit form and store them to database.

We need diversified face image to represent facial features, convert them into digit form and store them to database.

Then we also need users' birthday with specific time, blood type, constellation, sex, location, education level and their name as other attributes to be stored in database.

Top level activity diagram (hand sketch/visio/other tools) and/or sequential statements



Data ERD/EERD is optional at this time

Assumptions and Constraints:

This project is not working for people who merely come from one race or one region. It serves all kinds of humans on the world. Thus, we will encounter our first conundrum which will constrain our project scope. Since there are thousands of people on the earth who have different face contour shape, geometric features of the human eye, proportions between eyes and nose and ration among mouth, forehead and chin, so it's difficult for us to set up a great model which can find a very suitable analysis for each unique face.

Also, we will get into trouble in many other different possibilities. Take an example, when someone suddenly hurt his palm in recent few days, lines on his hand becomes different. In this situation, we don't know whether our app can prove accuracy analysis and whether after wound healing of this person's hand, he can get a totally same analysis as before or not. We cannot make sure the app will become 100 percent accuracy, but we will try our best to optimize it.

In addition, we will evaluate each kind of divination method. For example, when test same experimental prototype like our teammates, we have to pick up and combine methods which

have similar results as much as possible and eliminate few methods which have the totally opposite result.

Integrated Master Schedule/Milestones:

List key schedule tasks and major milestones

Due date	**Task**
Sep 27	Storyboard
Oct 07	Data collection
Oct 20	Data preprocess
Oct 25	Create database (first milestone)
Oct 27	Mathematical divination model for face formulation
Oct 27	Mathematical divination model for palm formulation
Oct 31	Building Localization model for face feature
Nov 07	Training Localization model for face feature
Nov 10	Building Localization model for palm feature
Nov 15	Training Localization model for palm feature (second milestone)
Nov 20	UI design
Nov 25	App design based on trained models
Nov 25	User instruction (final project milestone)

References:

Rich feature hierarchies for accurate object detection and semantic segmentation, https://arxiv.org/pdf/1311.2524.pdf

Fast Facial Feature Extraction and Matching with Artificial Face Models

https://publications.waset.org/5776/pdf

A physiognomy based method for facial feature extraction and recognition

https://www.sciencedirect.com/science/article/pii/S1045926X17302008