San Jose State University

Department of Electrical Engineering

EE104, Spring 2023, Pham

Laboratory Assignment 9 – Final Project

# Objectives

This lab enables you to:

* Practice Data Science analyses in different scenarios for different applications such as to identify the loan risk factors for the bank and predict the Covid-19 trend based on available historical data
* Learn different ways to code your game for two players.
* Prepare yourself some Q&A for your real-world job interviews.

# Requirements

## 1 - Data Science – Risk Factor Identification

Download a CSV file from this website: <http://www.creditriskanalytics.net/datasets-private2.html>

Write a Python program to analyze and identify risk factors that cause the loan defaults and provide a report to the bank. You will add a new column in the spreadsheet with analysis result for 3 groups: low risk, medium risk, and high risk.

If you work for a bank, you will submit your analysis to the loan processing department to recommend for:

* Approval: if the applicants are in the low-risk group
* Conditional approval, recommend for more credit checking: for the medium-risk applicants
* Reject: for high-risk applicants

## 2 - Data Science - Trend Prediction

Search for COVID-19 data in CSV file format or any format that can be converted to CSV.

This page has datasets for Santa Clara County: <https://data.sccgov.org/browse?category=COVID-19>

* Download a dataset for 6 months, say from January to June. Plot a prediction showing data from January all the way to December. Note that you only know data from January to June. Use the time\_series method that you learned from the Modeling Module.
* Download the same data, but from January to December. Plot a second curve to show the reality vs your prediction above.
* In your Documentation discuss whether your prediction is correct or not. Research and present the reasons for your data match/mismatch such as the government mandate to tighten the social distance orders, vaccinate more people, etc.

Submit source(s), code, and output screenshots to Canvas.

## 3 – Game Development:

1. Design a Dance Challenge game for two players
2. Change the music

## 4 – Interview Q&A

Prepare 30 interview questions and answers to assist you with your future job interviews. You must cite the source to your answers to earn credit. You can either compose the questions yourself or search from the internet for Python interview knowledge bases.

# Deliveries

|  |  |  |
| --- | --- | --- |
| **Program or Requirement** | **Use Case** | **Earned Score / Max Score** |
| Demonstration Video | You must submit a demonstration video or your score for this lab will be zero |  |
| Documentation |  | \_\_\_\_\_ / 10 |
| Data Science – Risk Factor Identification | Banks need to identify risk factors associated with loan applicants so that they can assign the appropriate loan interest or deny the applications. Add a new column to the original table to indicate the risk factor level of HIGH, MED, LOW. | \_\_\_\_\_ / 20 |
| Data Science - Trend Prediction | Sometimes you must make a prediction based on the historical information that you have currently. Based on the outcome of the prediction, you may have to assist the government or company executives to add measures to increase (or decrease) certain outcomes by playing what-if analyses. One of the use cases is to force the community into mandated social distance to “bend the curve” of Covid-19 infection.  Say you have data from 6 months. Use only data from the first 3 months to get a curve fit and equation. Using this equation to plot the projected curve and compare this curve to the real data from the next 3 months. Discuss it in your Documentation. | \_\_\_\_\_ / 20 |
| Game Development – Dance Challenge | Entertainment industry.   1. Design a Dance Challenge game for two players (15 points) 2. Change the music (5 points) | \_\_\_\_\_ / 20 |
| Job interview Q&A | Prepare 30 interview questions and answers to assist you with your future job interviews. (1 point for each Q&A) | \_\_\_\_\_ / 30 |
|  | **TOTAL** | **100%** |

That’s all for this lab. Hopefully you found it useful and increase your interest in the Python world! See you in the next lab.

# Laboratory Hand-In Requirements

Once you have completed a working design, prepare for the submission process. You are required to upload YouTube videos to demonstrate your working solutions. You are also required to submit an archive of your project in the form of a ZIP file. Use 7-Zip option to create the ZIP file. Name the archive lab#\_yourlastname\_yourfirstname.zip. Refer to Lab 1 for detail instructions.

You will submit your zip file to the instructor through Canvas by the due date and time. If your program is not completely functional by the due date, you should demonstrate and turn in what you have accomplished to receive partial credit. See the syllabus for the late penalty guideline