CS483 Project 2 – Clustering Analysis, Motion and Face Capture.

CS483 – Topics in Computer Science, Machine Learning

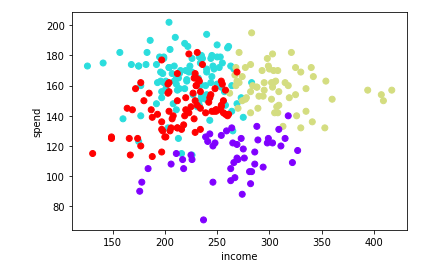
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Introduction

The purpose of this project was to implement some clustering algorithms as well as to implement machine learning techniques to detect motion and faces in photos.

Problem 1

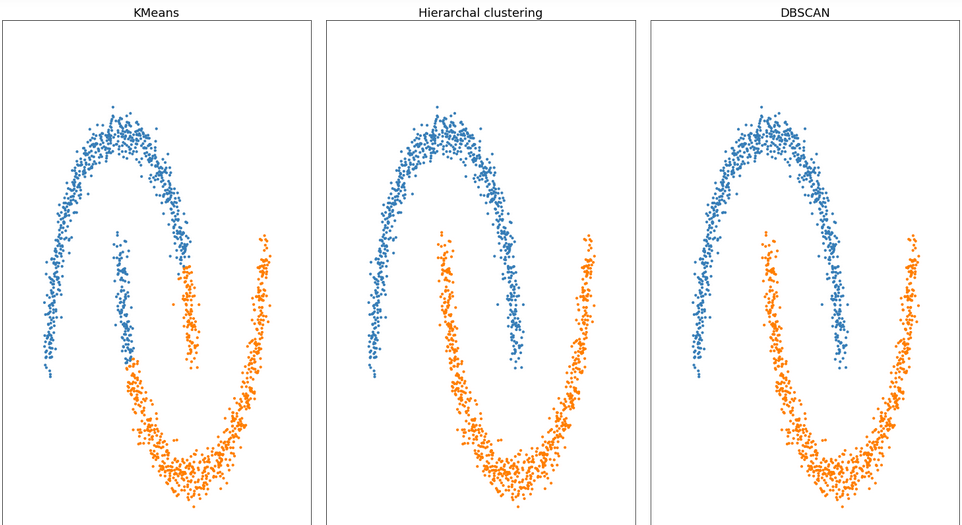
The first problem was to implement a clustering algorithm to a set of data. The data that was used is in a .CSV file provided in the .ZIP archive. It is a dataset based on income and spending. Our group used K-Means clustering, as it was the first and memorable method that came to us. The final results are embedded below.



This scatterplot indicates four different groups of entities – one set that has moderate income, but doesn’t spend all too much (purple), one set that generally lacks income, but spends a lot (red), another set that spends way above their income (blue/teal), and the last set that has a large amount of income, and does a moderate amount of spending (pale green).

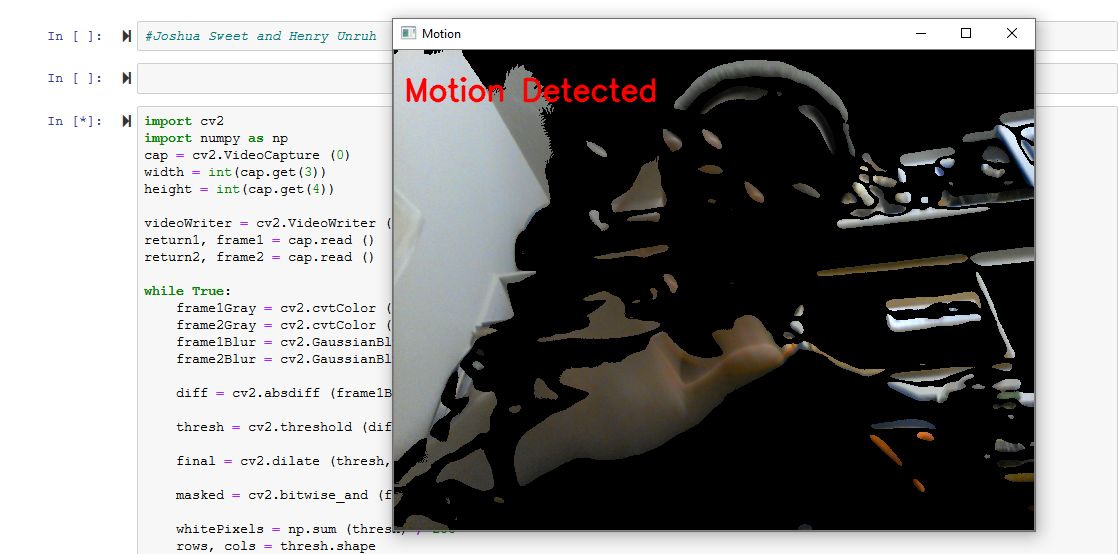
Problem 2

The second problem was to create three different moon sets with three different clustering methods: KMeans, Hierarchal clustering, and DBSCAN. The resulting image is attached below:



Problem 3

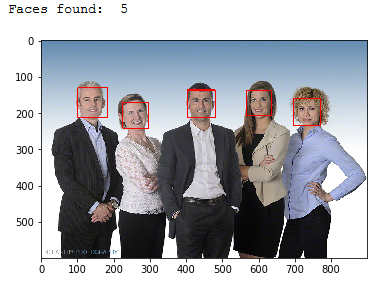
The code that we had to design was a program that utilizes a webcam to detect motion. A picture of the result is embedded below.



This program produces a low-quality video. It is completely black when no motion is detected, but will change when motion is detected.

Problem 4

The final problem was to create a program that detects multiple faces given an image. The final result of the program is embedded below:



This program detects 5 faces.