**NBA Shooting Analysis**

**Motivation**

* I completed a couple courses on Python [data analysis](https://www.codecademy.com/learn/paths/analyze-data-with-python) and [machine learning](https://www.codecademy.com/learn/paths/machine-learning) from Codecademy and wanted to test my hand at a project that was interesting to me.

**Description**

* This project has two segments: Clustering of players based on shot selection, and analysis of players based on isolation offense and defense. The data is from a [Kaggle database](https://www.kaggle.com/dansbecker/nba-shot-logs) of the 2014-2015 NBA season. The work was done in Python.

**Methods**

* Clustering
* An affinity propagation clustering algorithm was used to classify players into different groups or “shooting styles”.
* The algorithm iterates through every shot taken and clusters the players based on three features of their shots: distance from the basket, distance from the nearest defender, and number of dribbles taken before the shots.
* The results were graphed in a 3D plot, and I attached a writeup for the different clusters.
* Isolation Offense & Defense Analysis
* The database contains who the nearest defender was on every shot, as well as how long the player had possession before shooting.
* Isolation was defined as having possession for two or more seconds in order to eliminate catch and shoot plays and focus on shots players create themselves.
* I calculated every player’s points per possession on iso shots, points per possession allowed when defending iso shots, as well as quantity of shots taken and defended.
* After that process, every shot was weighted based on the quality of the offensive and defensive player.
* This was used to calculated Iso Offensive and Defensive Value Added.

**Visuals**

**A close up of a map

Description automatically generated**

* Here is the graph of the plot generated by the clustering algorithm. If you run it yourself in Python, the plot will be interactive and can be rotated however you like to add clarity. I’ve also attached screenshots of the graph rotated against all of the different axes.

A screenshot of a cell phone

Description automatically generated

A screenshot of a cell phone

Description automatically generated

A close up of text on a black background

Description automatically generated

* Here are screenshots of a couple players’ isolation metrics as they appear when you enter a name into the program, as well as the top 15 players by offensive value added.

**Installation**

* Any version of python past version 3 will work.
* Additional addons required can be found at the top of the iso.py or shots.py files
* The csv of the database used is found in the data folder. You must download it to run the program.

**Sources**

The data was used from Kaggle user [DanB](https://www.kaggle.com/dansbecker)’s database. It can be found here or in the data folder.