Computer Vision & Imaging/ Robot Vision - Formative task

April 20, 2021

This task is formative. For this task, you will need to submit the following files:

- code **username_formativetask3.m**.
- PDF answer sheet **username_formativetask3.pdf**. (Optional)

The aim of this task is to make students be familiar with Principal Component Analysis (PCA) using MATLAB built-in functions. It's not necessary to implement a custom PCA function to complete this task.

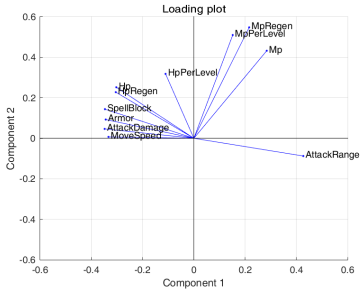
Question 1 *Load the League of Legends Champions stats data from* `data.csv`*. Normalise the data and apply principal component analysis to calculate the principal component coefficients. Visualise the first and second principal components with a loading plot, explain the meaning of a loading plot, and describe what kind of information you can obtain from the loading plot.*

Question 2 *Alternatively, use a bar chart to illustrate the principal component coefficients, and compare it with the loading plot: what's the pros and cons of a loading plot and a bar chart?*

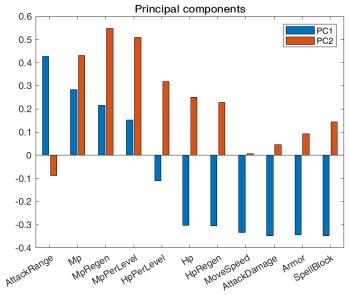
Question 3 *Calculate total variance of all principal components, and visualise the accumulative variance with each principal component. Describe how much does the first two principal components explained from the data.*

Question 4 *Perform dimensionality reduction to the data, and visualise the data on a score plot using the first two principal components. Use different color to distinguish champions with different type. Judging by the champions' types, how well does PCA explain the given dataset?*

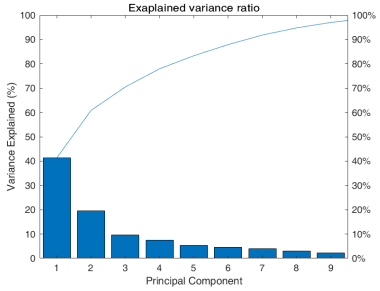
See below the expected results of each question.



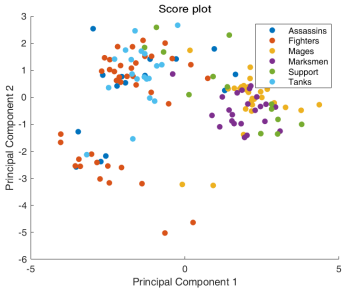
(a) Loading plot.



(b) Bar chart.



(c) Pareto chart.



(d) Score plot.