My Project

**Idea:** Fitness Application

**Problem/Reason:** Help people get into fitness by providing more useful functionalities such as the recommendations of food for users based on food preference and other factors like body weight etc. Also provide a reason/motivation for people that are already a part of diet & fitness scene to carry on using gamification.

**Environment:** Java on Android Studio using Firebase (For database)

**Literature Review:** importance of a simplistic GUI in apps, Fitness & diet apps with automated health tracking (Accelerometer), KNN & Naïve bayes algorithms, Machine learning with applications (Regression algorithm),

**Design & Requirements Analysis:** Produce a design of the application, functional & non-functional requirements

How food recommendation system will work

Will ask users a serious of questions such as what type of food would they prefer eating during breakfast, lunch & dinner then based on these preferences it will find foods that are healthier and similar and present users with recommendations.

K-NN algorithm research it will find nearest neighbour to the preferences whilst being within BMI limit

### Machine Learning In Recommendation Systems

Machine learning (ML) is a subset of artificial intelligence (AI) that provides systems with the ability to learn and improve from experience without being explicitly programmed. The way this process works is that the system is provided with some form of initial data based on real world scenarios, the system then uses this data to solve or provide solutions to problems associated with the scenario it has been modelled after. Machines learn through the provision of algorithms, these algorithms are classified into 4 different categories based on the learning approach; supervised learning, unsupervised learning, semi-supervised learning & reinforcement learning (I Portugal, [P Alencar](https://scholar.google.com/citations?user=0xzfYjwAAAAJ&hl=en&oi=sra), D Cowan, 2018).

The most common type of ML algorithms used in recommendation systems are based on supervised learning. Supervised learning is when the system is provided with a set of “training data” it uses this training data to learn and apply the knowledge it gains on real data (I Portugal, [P Alencar](https://scholar.google.com/citations?user=0xzfYjwAAAAJ&hl=en&oi=sra), D Cowan, 2018). Unsupervised learning on the other hand is focussed on finding patterns in the data (I Portugal, [P Alencar](https://scholar.google.com/citations?user=0xzfYjwAAAAJ&hl=en&oi=sra), D Cowan, 2018). Semi-supervised learning is when the system is provided with data however some parts of the data are missing or not present therefore the system still has to learn as it is not provided with the full set of data unlike supervised learning (I Portugal, [P Alencar](https://scholar.google.com/citations?user=0xzfYjwAAAAJ&hl=en&oi=sra), D Cowan, 2018). Finally, reinforcement learning is based on external feedback by either a thinking entity or environment for example, if a dog was told to sit down or jump and they performed the action correctly they would receive a cookie which would be considered positive feedback or they did not perform the action correctly hence they did not receive a cookie which would be considered as negative feedback (I Portugal, [P Alencar](https://scholar.google.com/citations?user=0xzfYjwAAAAJ&hl=en&oi=sra), D Cowan, 2018). This feedback is then used make future predictions; this is known as reinforcement learning.

A recommendation system is a system that provides suggestions to users based on the analysis of data that is automatically carried out by the system using ML algorithms. According to Baptiste Rocca & Joseph Rocca (2019) there two major methods that a recommendation system utilizes to produce recommendations which are a collaborative filtering method and a content-based method. Collaborative filtering methods use past interactions between the user and system as well as similar interactions made by other users to produce recommendations for the user. The content-based method unlike the collaborative filtering method uses additional measures to produce recommendations as it includes additional information about the user such as age, sex, gender etc.

A recommendation system incorporates specific ML algorithms with its approach-based method to produce recommendations for the user depending on the type of recommendation system it is.