Solving the Diet Problem Using Neural Networks

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Neural Networks
Background

• There is a need to solve optimisation problems in real time
• Solving optimisation problems can be slow and computationally expensive
• Neural Networks are expensive to train, but efficient when they have been trained
• There is very little/no literature on solving optimisation problems using Neural Networks
Objective

• To test how well Neural Networks perform in solving optimisation problems
• A simple example will be considered (the Diet Problem)
Methods

1. Generate data
2. Train the Neural Network with the data
3. Evaluate the performance
Methods

• How to ensure feasibility of the output of the Neural Network?
• 1. Implementing the constraints as error terms in the loss function
• 2. Using Nearest Neighbour algorithm on the training data
• 3. Project the point to the feasible region
Tools

- Pyomo
- Tensorflow, Keras
Schedule

- Deadlines:
- The experimental part 1.9.2021
- The writing 31.9.2021