Aalto-yliopisto
Perustieteiden
korkeakoulu

Solving the Diet Problem Using Neural Networks

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27.08.2021

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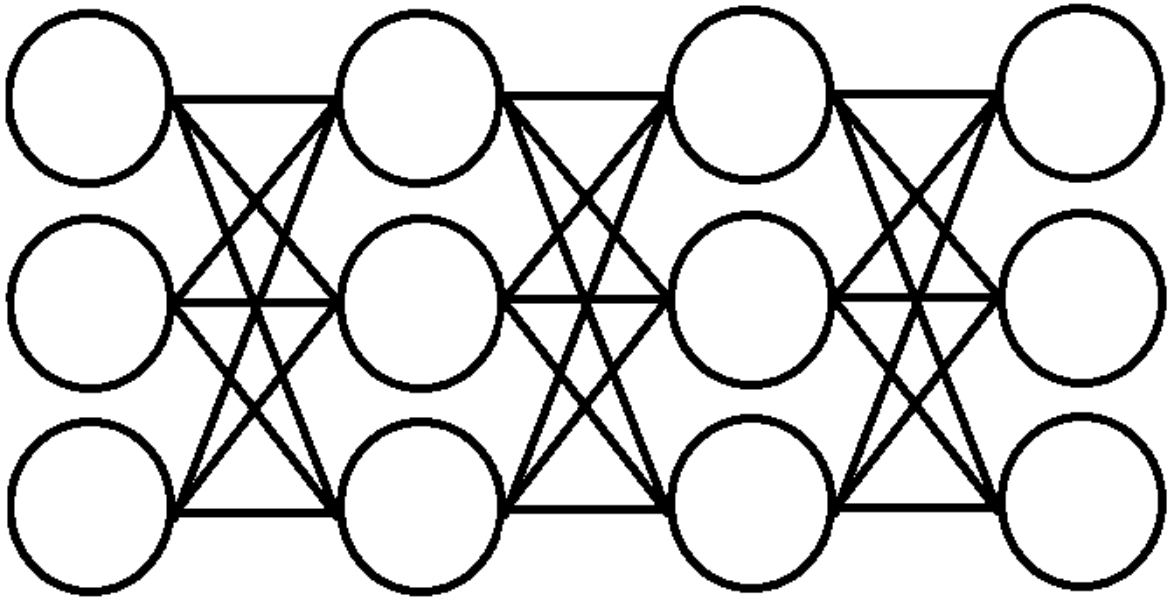
Neural Networks



Background

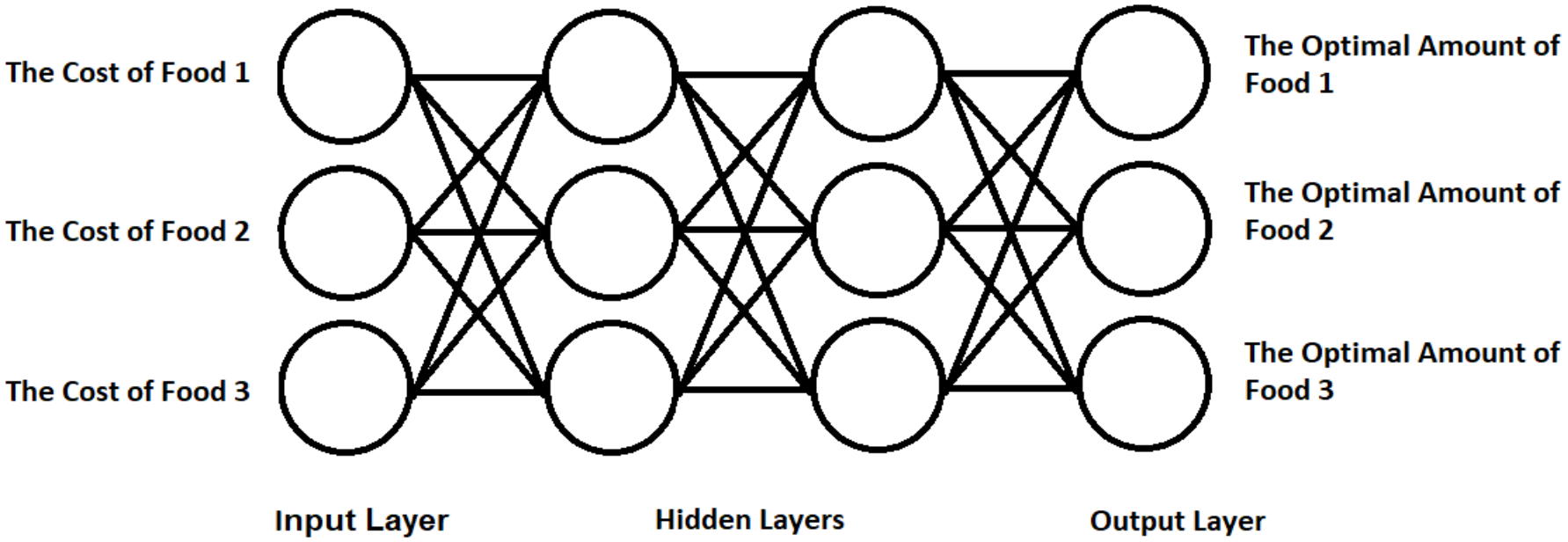
- There is a need to solve optimisation problems in real time
- Solving optimisation problems can be slow and computationally expensive
- Neural Networks are expensive to train, but efficient when they have been trained
- There is very little/no literature on solving optimisation problems using Neural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