Summary

The human brain can be seen as an ensemble of interconnected neurons, more or less specialized to solve different cognitive and motor tasks. In computer science, the term deep learning is often applied to signify sets of interconnected nodes, where deep means that they have several computational layers. Development of deep learning is essentially a quest to mimic how the human brain, at least partially, operates. In this thesis, I will use machine learning techniques to tackle two different domain of problems. The first is a problem in natural language processing. We improved classification of relations within images, using text associated with the pictures. The second domain is regarding heart transplant. We created models for pre- and post-transplant survival and simulated a whole transplantation queue, to be able to assess the impact of different allocation policies. We used deep learning models to solve these problems. As introduction to these problems, I will present the basic concepts of machine learning, how to represent data, how to evaluate prediction results, and how to create different models to predict values from data. Following that, I will also introduce the field of heart transplant and some information about simulation.