**Chapter 4**

**SYSTEM DESIGN**

Systems design is the process of defining the architecture, modules, interfaces and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development.

**4.1 Machine Learning System Design**

In general, the principles of machine learning system design should follow two basic requirements:

* The model selection and creation.
* The learning algorithm selection and design.

In addition, different models can have different learning systems. On the other hand, the objective function is also different in different learning models. Moreover, the accuracy and complexity of different algorithms would be the most important factor of the learning system. If the chosen algorithm is not very adaptive to the learning system, then the efficiency and result of the learning system would be reduced. The selection of training data set can have an influence on learning performance and feature selection.

**4.2 Python**

Python is a programming language created by Guido van Rossum in 1989. Python is an interpreted, object-oriented, high-level programming language (Python Software Foundation 2013). The programming language style is simple, clear and it also contains powerful different kinds of classes. Moreover, Python can easily combine other programming languages such as C or C++. As a successful programming language, it has its own advantages:

* **Simple and easy to learn:** The concept of this programming language is as simple asit can be. That makes it easy for everyone to learn and use. It is easy to understand the syntax.
* **Open source:** Python is completely free as it is an open source software. Several ofopen source scientific computing storage has the API for Python. Users can easily install Python on their own computer and use the standard and extend library.
* **Scalability:** Programmers can write their code in C or C++ and run them in Python.

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