# Machine Learning

**Implementing the neural network in Amazon EC2 Instance**

Katarzyna Zieliska
z.k.zielinska@gmail.com
Faculty of Power and Aeronautical Engineering

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# 1. Introduction

Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, and a vastly improved understanding of the human genome. Machine learning is closely related to (and often overlaps with) computational statistics, which also focuses on prediction-making through the use of computers. It has strong ties to mathematical optimization, which delivers methods, theory and application domains to the field. Machine learning is sometimes conflated with data mining, where the latter subfield focuses more on exploratory data analysis and is known as unsupervised learning. Machine learning can also be unsupervised and be used to learn and establish baseline behavioral profiles for various entities and then used to find meaningful anomalies.

# 2. AWS EC2

Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) cloud. First, the user account was created, including the security and access mode with Authy application.Then the S3 Bucket storage was created with the regulation of access permissions. Next step was to create the Amazon EC2 Instance based on Linux.

## 2.a. EC2 Instance configuration

The Amazon EC2 Instance needed some configurations before the actual use. First, the python Anaconda release was installed, and then also couple of libraries and python packages. The most important are:

- NumPy,
- SciPy,
- Pandas,
- Matplotlib,

There were some difficulties installing the Matplotlib package. It was connected to the invalid display variable - the EC2 Instance is somehow a headless device. The problem was eventually solved by editing the *matplotlibrc* file, **but the challenge was hard**.

## 2.b. Python code specification

The python code that was implemented was the neural network. It analyses the movie ratings of many different users (training set). There is the set of movies and their genre parameters like: romance, action, drama etc. based on the users rating of known movies, the network tries to evaluate each user rating of the new, ones (also parametrized).The script was created during the /textitCoursesra Machine Learning Course.

## 3. Results

To get the results from EC2 computations, the configuration of EC2 - S3 connection was carried out. The figures obtained during computations were copied to the S3 Bucked, so the access to the data was simple.

Results obtained from the code are shown below:

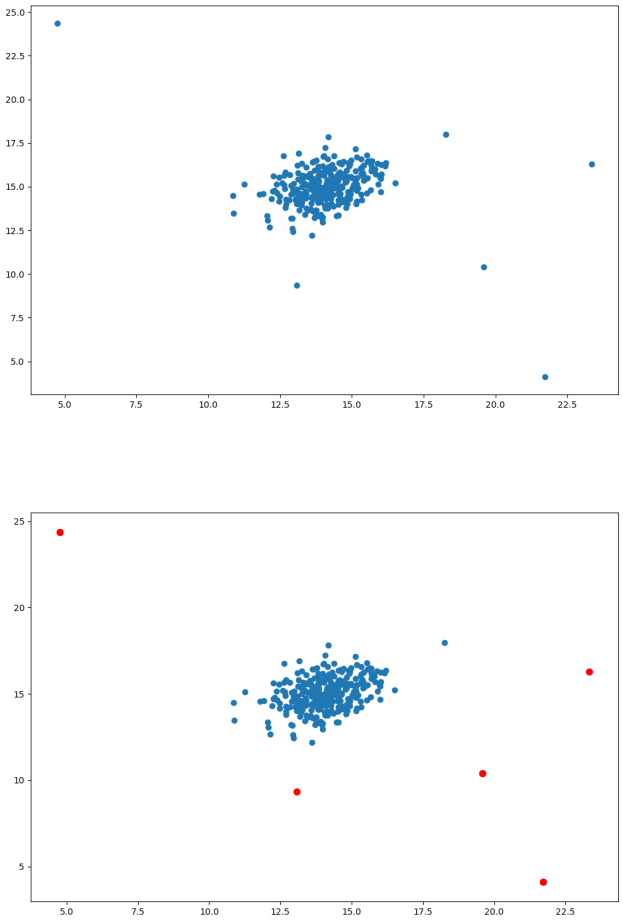


Figure 1: Anomaly detection.

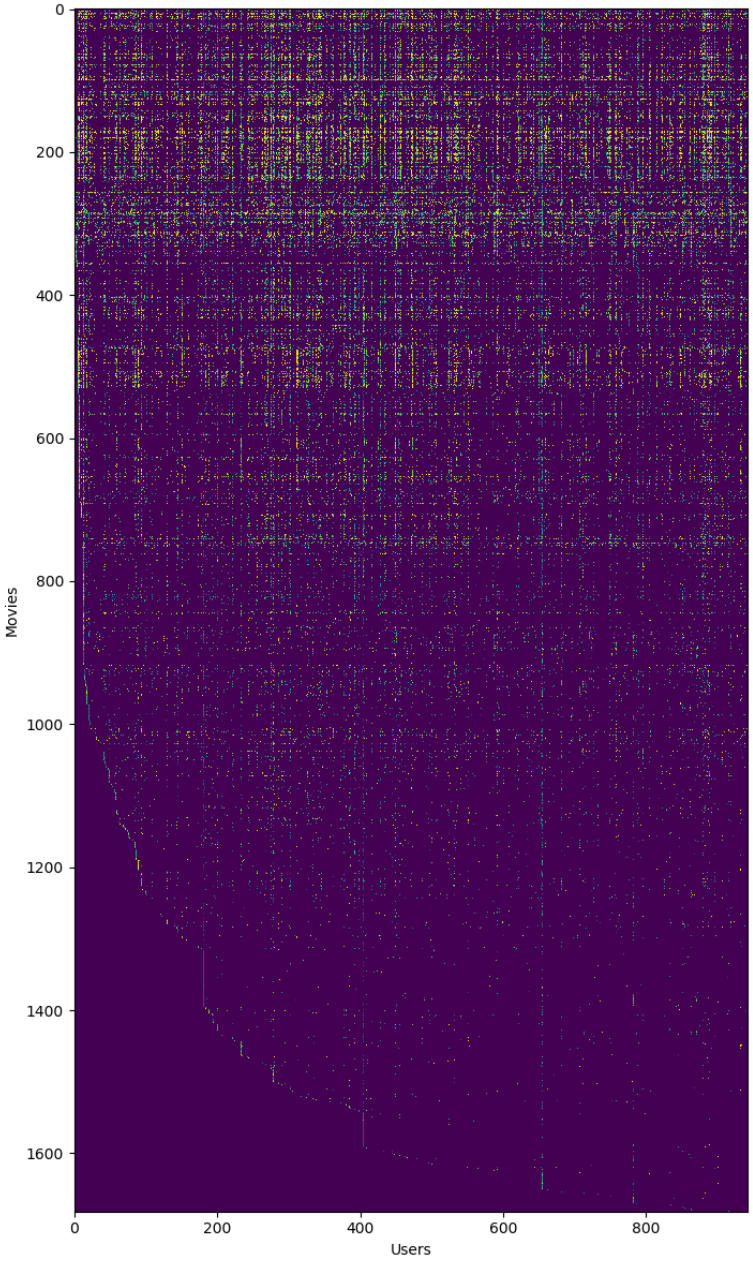


Figure 2: Tu umieszczasz opis

# 4. References

## References

[1] Coursera: *Machine Learning*,

[2] Coursera: *Deep Learning*,

[3] AWS: *AWS Documentation*,