

# Analysis of mRNA data of patients with atherosclerosis<sup>1</sup>

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## Abstract

## 1 Introduction

## 2 Weighted Gene Co-Expression Analysis

### 2.1 Selection of power

### 2.2 Module Detection

### 2.3 Interconnectivity analysis

## 3 Survival Analysis

Survival analysis examines and models the time it takes for events to occur and it typically examines the relationship of the survival distribution to covariates [4]. One application of survival analysis that will be focused on is Cox Model.

### 3.1 Cox Model

Cox model, also known as Cox proportional hazards model, is an example to survival models that are used in survival analysis of patient data.

## 4 Regression

This section describes regression models used for further analysis of mRNA data of patients. Regression models were used in order to compute how essential are given set of attributes (i.e., if patient is smoking or not, blood pressure level, level of diabetes etc.).

### 4.1 Logistic regression

## 5 Experiments

### 5.1 Setup of experiments

### 5.2 Results

## 6 Conclusion

## 7 Future Work

## References

- [1] Lingxue Zhang, Seyoung Kim, "Learning Gene Networks under SNP Perturbations Using eQTL Datasets" <http://dx.doi.org/10.1371/journal.pcbi.1003420>
- [2] Langfelder P, Horvath S , "WGCNA: an R package for weighted correlation network analysis". *BMC Bioinformatics* 2008, 9:559
- [3] Storey JD and Tibshirani R. , "Statistical significance for genome-wide experiments". *Proceedings of the National Academy of Sciences*, 100: 9440-9445.
- [4] John Fox, "Cox Proportional-Hazards Regression for Survival Data", *Appendix to An R and S-PLUS Companion to Applied Regression*

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