

## ABSTRACT

The theme: “Several applications of Bayesian methods in machine learning”.

Bachelor’s thesis: 126 p., 22 fig., 16 tabl., 4 appendix, 40 references.

The object of study – machine learning algorithms.

The subject of study – Bayesian statistical approach and its applications for machine learning problems.

The purpose of study – to analyse the use of Bayesian methods and to examine possible improvements of some machine learning algorithms.

The methods of study – artificial intelligence, probability theory, statistical analysis, discrete mathematics, linear algebra, optimization methods.

The relevance of study – today in the age of big data machine learning algorithms are extremely popular in solving a broad number of complex problems in various areas of life. It turns out that Bayesian methods can improve the performance of machine learning algorithms.

The results – using Bayesian approach, three models are designed for three machine learning problems and compared with the corresponding classical algorithms. For the linear regression problem the dependence of quality of Bayesian estimation on the accuracy of the prior knowledge is investigated. For the text classification problem quite efficient feature selection algorithm is proposed.

Further improvements – to encompass wider range of machine learning problems and algorithms, for which Bayesian approach can be beneficial. For the considered set of problems to work on more effective algorithms or their modifications.

BAYESIAN APPROACH, PRIOR, HYPERPARAMETERS, MACHINE LEARNING, LINEAR REGRESSION, MCMC, TEXT CLASSIFICATION, NAÏVE BAYES CLASSIFIER, MAXIMUM ENTROPY CLASSIFIER, SVM, DIMENSIONALITY REDUCTION, PROBABILISTIC PCA, EM.