

Thesis Title

Thesis submitted in partial fulfillment
of the requirements for the degree of
"DOCTOR OF PHILOSOPHY"

by

First Name

Last Name

Submitted to the Senate of Ben-Gurion University
of the Negev

October 13, 2026

Beer-Sheba

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Approved by the advisor: **Supervisor Full Name** _____

October 13, 2026

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This work was carried out under the supervision of **Supervisors Full Name**

In the School of Electrical and Computer Engineering

Faculty of Engineering

Research-Student's Affidavit when Submitting the Doctoral Thesis for Judgment

I Full Name, whose signature appears below, hereby declare that
(Please mark the appropriate statements):

___ I have written this Thesis by myself, except for the help and guidance offered by my Thesis Advisor.

___ The scientific materials included in this Thesis are products of my own research, culled from the period during which I was a research student.

___ This Thesis incorporates materials produced in cooperation with others, excluding the technical help commonly received during experimental work. Therefore, I am attaching another affidavit stating the contributions made by myself and the other participants in this research, which has been approved by them and submitted with their approval.

Date: _____

Student's name: _____

Signature: _____

ABSTRACT

Keywords:

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DEDICATIONS

ACKNOWLEDGMENTS

ABBREVIATIONS

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Appendix A

QoE Prediction Methods

A.0.1 Linear Regression (LR, [1])

Linear regression is a statistical and machine learning (ML) method used to model the relationship between a dependent variable y and one (or more) independent variables x_i , assuming a linear relationship between them. Mathematically, a linear regression may be expressed as:

$$y = \beta_0 + \beta_1 x + \varepsilon \quad (\text{A.1})$$

where β_0 is the intercept of the line with the x axis, β_1 is the slope of the line, and ε is the error term added to account for the noise in the data. In the multivariate case, the eq. (A.1) turns into:

$$y = \beta_0 + \beta_1 x_1 + \cdots + \beta_n x_n + \varepsilon \quad (\text{A.2})$$

The goal of this model is to minimize the Mean Squared Error (MSE) of the predicted and the true values, expressed as:

$$MSE = \frac{1}{n} \sum_n^{i=1} (y_i - \hat{y}_i)^2 \tag{A.3}$$

making this model very simple to comprehend and analyze. Albeit this simplicity is also its main weakness, as few real-world models follow such a simple rule, though in many cases it serves as a good baseline model. Another disadvantage of this model is its sensitivity to scale and outliers.

Bibliography

- [1] George AF Seber and Alan J Lee. *Linear regression analysis*. John Wiley & Sons, 2003.

הקדמה

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