

# A Robust Functional Logistic Regression Method for Classification

Muge Mutis<sup>1</sup>, Ufuk Beyaztas<sup>2</sup>, Gulhayat Golbasi Simsek<sup>1</sup>, Han Lin Shang<sup>3</sup>

<sup>1</sup>*Yildiz Technical University, Turkey*

<sup>2</sup>*Marmara University, Turkey*

<sup>3</sup>*Macquarie University, Australia*

## Abstract

Functional logistic regression, where the response is a binary outcome and the predictor consists of random curves, has become a general framework for classification. However, parameter estimation is mainly based on a least-squares method, which can be seriously hindered by the presence of outliers. We propose a robust partial least squares method to estimate the regression coefficient function in the functional logistic regression. The regression coefficient function represented by functional partial least squares decomposition is estimated by a weighted likelihood method, which downweights the effect of outliers in the response and predictor. The finite-sample performance of the proposed method is evaluated by Monte-Carlo simulation studies and an empirical dataset

## Keywords

Functional data, Robust estimation, Weighted likelihood method.

## Acknowledgements

This research was supported by the Scientific and Technological Research Council of Turkey with project no. 120F270.