



Non-Invasive Blood Glucose Monitoring in Ears

Seminar Paper

by

Andrej Vladimirovič Ermoshkin

Chair of Pervasive Computing Systems/TECO
Institute of Telematics
Department of Informatics

First Reviewer: Eintragen
Second Reviewer: Eintragen

Supervisor: Supraja Ramesh

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Abstract

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1 Introduction (chapter)

- 1.1 Motivation
- 1.2 Drawbacks of invasive methods
- 1.3 Goal and Scope of This Paper

2 Background: Diabetes and Blood Glucose Monitoring

- 2.1 Medical Context
- 2.2 Traditional invasive measurement techniques
- 2.3 Need for non-invasive approaches

3 Photoplethysmography

- 3.1 Physical principle
- 3.2 Transmission vs. reflection method
- 3.3 Signal characteristics and challenges

4 Anatomical zones for measurement

- 4.1 Anatomical zones overview
- 4.2 Advantages and disadvantages of each zone
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5 Classical Machine Learning Models for BGL estimation

- 5.1 Support Vector Machines (SVM)
- 5.2 Random Forests
- 5.3 Properties of these models

6 Deep Learning Approaches

- 6.1 Convolutional Neural Networks (CNNs)
- 6.2 Long Short-Term Memory (LSTM) networks
- 6.3 Benefits and challenges

7 Hybrid Models

- 7.1 Architecture and workflow
- 7.2 Step-by-step process
- 7.3 Insights from recent literature

8 Comparison of Methods

- 8.1 When classical models are preferable
- 8.2 When deep/hybrid models outperform
- 8.3 State of the art and emerging trends

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