

# **Non-Invasive Blood Glucose Monitoring in Ears**

Seminar Paper

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# Abstract

TODO



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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**

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### **3.3 Signal characteristics and challenges**



## **4 Anatomical zones for measurement**

### **4.1 Anatomical zones overview**

### **4.2 Advantages and disadvantages of each zone**

### **4.3 Practical implications for wearable devices**



## **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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## Journal articles

- [1] Joe Bloggs. Title of paper a. *International Journal*, 6(3–4):371–378, 1998. doi: 10.1017/S1754078714006221.
- [2] Joe Bloggs. Title of paper b. *International Journal*, 8(9–27):371–378, 1999. doi: 10.1017/S1754078714006221.

## Conference contributions

- [1] Joe Bloggs. Title of paper c. In *IEEE International Conference*, pages 1–4, April 2015. doi: 10.1509.
- [2] Joe Bloggs. Title of paper d. In *IEEE International Conference*, pages 6–45, April 2016. doi: 10.1509.



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