



WatChair: AI-Powered Real-time Monitoring of Sitting Posture and Corrective Suggestions using Wearable Motion Sensor System

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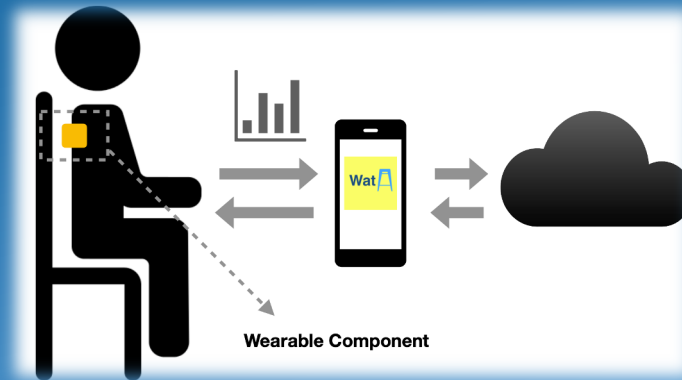


Introduction

- People spend a considerable amount of time seated.
- Preventing the negative health impacts of improper sitting is an essential matter.
- The sitting posture and activity-level are important factors



In this study, we proposed WatChair, a framework for remote monitoring of sitting habits and tracking user posture history while seated.



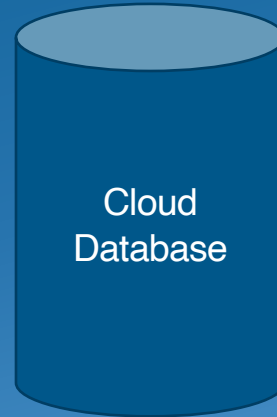
- A single wearable component is positioned on the subjects' back
- The component's position is flexible, and the algorithm is not sensitive to small displacements
- Information will be read and relayed to the WatChair's Mobile application



- The application retrieves the data, and directly performs the categorization using a fast inference pipeline



- The data and extracted information will be pushed to the Cloud Database for the authenticated user.

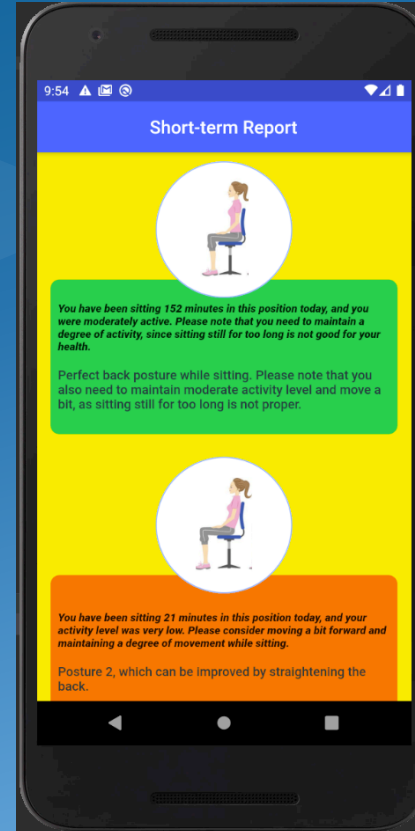


Firebase

- Users have access to the statistics of their sitting habits at any point.
- Both Long-term and Short-term history is retained in the system to assist subjects with progress tracking
- The application provides corrective suggestions to deal with each improper sitting habit
- The application allows custom labeling for the activities as well

Progress tracking

- The presence of short-term and long-term information on subject's sitting behavior helps with the ease of progress tracking



- The recognition algorithm is based on Support Vector Classification concept
- Our dataset cohort is composed of 6 subject in the age range of 24-27

| F1-Score (Micro) | F1-Score (Macro) |
|-------------------------|-------------------------|
| 72.12 | 75.09 |

Conclusion

WatChair makes tracking sitting habits easy by providing a flexible platform to track and monitor subject's status while seated.

It also allows researchers to easily obtain labeled data to leverage for their analyses and to build machine learning pipelines.

Thank You