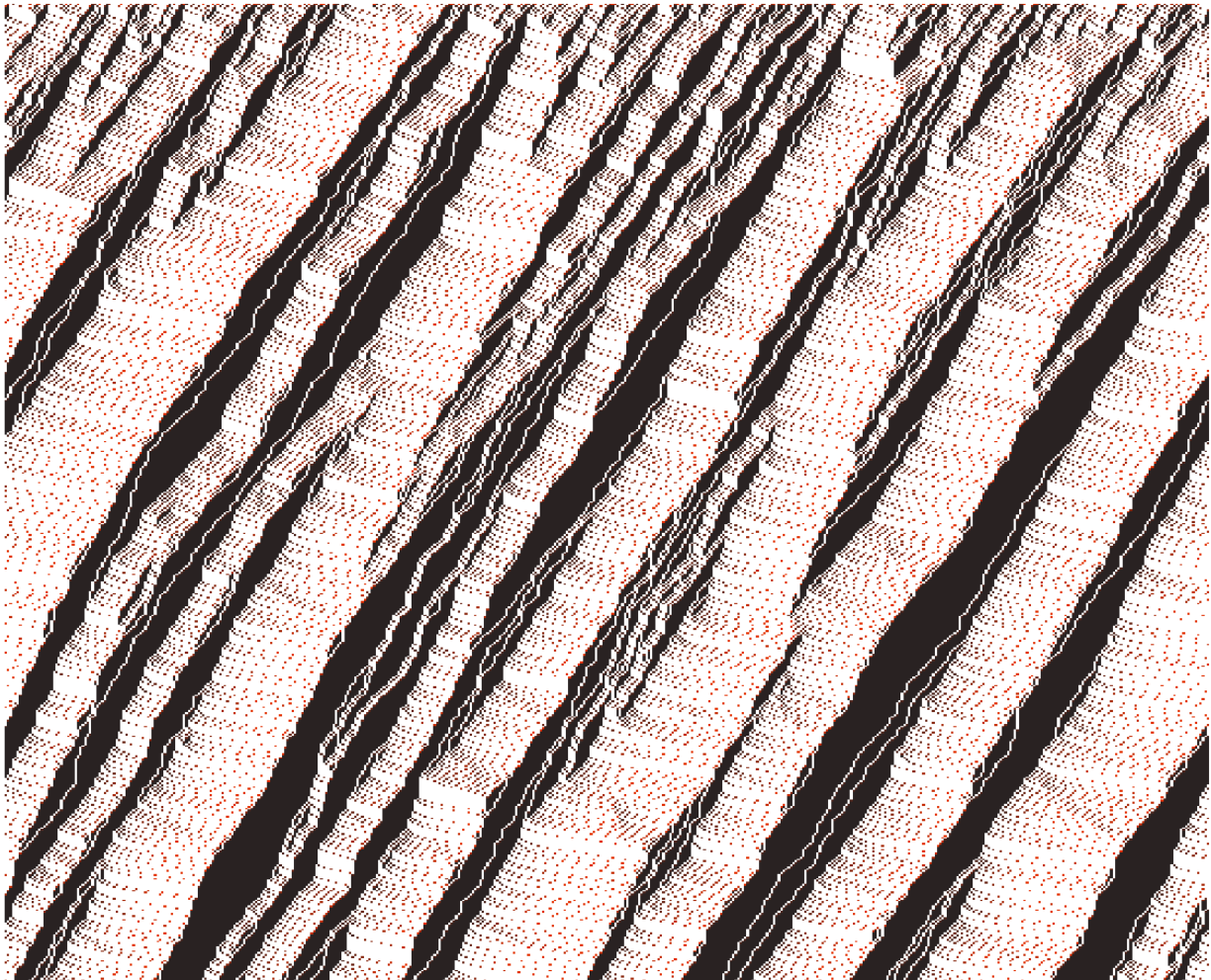# Ergonomic Posture Detection

Business model documentation

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Abstract

Test[1]

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Chapter 1

Introduction

During the COVID-19 pandemic, a lot of people startet to work remotely from their homes instead of working in their offices. Their new workplaces were not ergonomically designed for long-term work. This can lead to health problems.

Chapter 2

Solution: How to adress this need?

The first goal of this project is to develop a software that helps people to work ergonomically correct. We will develop an application that will be able to detect the user's posture in real-time and give feedback to the user. The feedback should be given in a way that users can correct their posture if necessary. The software should be easy to use and should be able to run on different platforms and devices. It should be available and easily accessible to businesses and private users. Ideally, the user can just use the webcam of their device to use the software. The application will be able to run in the background and give the feedback in a subtle way. We propose a traffic light colored-scheme that will be displayed as a frame around the users screen. This means that the frame will be green if the user's posture is correct, yellow if the posture is not optimal and should be changed soon and red if the posture is bad and should be changed immediately. We will also provide an option to display the feedback as sound. There will be no sound if the posture is correct, a beep from time to time if the posture is not optimal and a continuous sound if the posture is bad.

As data privacy is an issue with real-time video analysis, we will develop the software in a way that the raw video data will not leave the user's device. It will be processed locally in a first step on the user's device and only the processed data will be sent to the server.

To further develop our application we will (optionally) also analyse the data over time and give the user feedback about their posture in the form of a dashboard. This dashboard will show the user for example how much time they spent in a good, bad or neutral posture and which is their most used bad posture, etc. It will also show the user how much time they spent sitting in total.

As further step the application will be extended to optionally also give the user advice on how to compensate for long sitting periods. This will be done by suggesting the user different exercises once in a while after they have been sitting for a long time.

Chapter 3

Technology: Why is it unique?

Additional thoughts: We need to ensure that the privacy of our customers is kept safe. Therefore we propose a preprocessing of the videofeed within the app to so that only privacy-preserved data leaves the users device and ends up in the cloud where it is inserted into the machine learning model.

Privacy-Preserving Machine Learning with Fully Homomorphic Encryption for Deep Neural Network: https://arxiv.org/pdf/2106.07229.pdf

or alternatively: YOLO runs live within the app on the device of the user, outputs the keypoints and we only classify on those, meaning only the keypoints are sent to the cloud, which is probably a decent abstraction...

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References

[1] Dummy. *Dummy.*