Position Yourself

Back pain is a very common issue and can, in many cases, be traced back to a bad posture. In this thesis I came closer to providing a simplistic, open source and affordable solution for this problem.

Introduction

Back pain is a very common issue and can, in many cases, be traced back to a bad posture. Technical solutions to avoid bad posture already do exist trying to tackle this issue. However, none of them seemed to be affordable, simple and open source. This is what has been inspiring my journey: trying to provide a simple and available solution, user friendly for a very common issue.

Summary

Gyroscopes or/and an accelerometer are used to determine how a user is positioned. Currently at least two sensors modules are needed to confidently analyse posture. With an ESP32 connected to a MPU6050 sensor and a vibration element such a sensor module is built. With a MQTT Broker and a simple web app the collected data is visualised in real-time and conclusion about the posture of the wearer can be made. Using elementary calculations it is possible to get the angular position of each sensor. Visualized in fig 1 are the three sensor modules XSZ, XSY, XSX. This data the enables the user to set personal target postures or postures to be avoided, which a web app visualises, and the vibration elements on the "sensor pack" tactically enforce.

Prospects

The data gathered and the acquired experience of technical implementations are a great starting point for further development to portray individual healthy posture digitally. However, much more data and interdisciplinary work, with physiotherapists and other medical experts, will be needed to achieve the quality needed for such a venture.
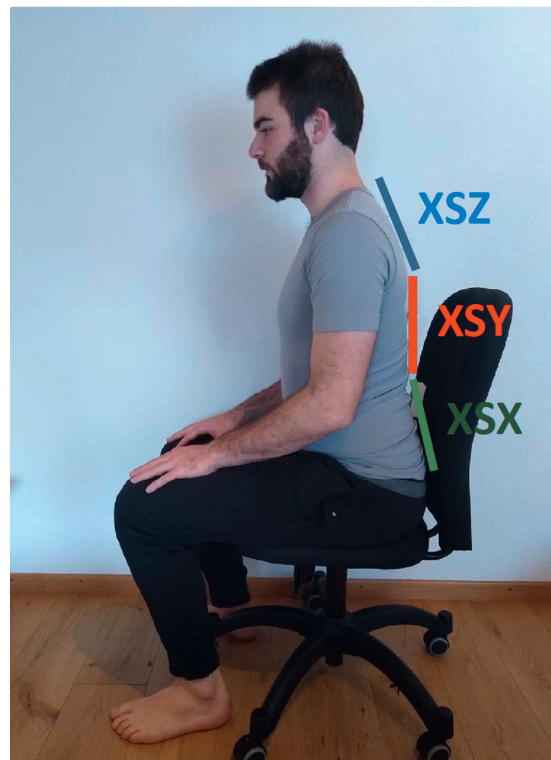
Gabriel Jeremias Frischknecht

078 721 44 35

gabriel.frischknecht@
hotmail.ch

fig 1: Positioned sensors

SENSOR-XSZ ACCX	
SENSOR-XSZ ACCY	
SENSOR-XSZ ACCZ	

current: -1.029882   133.72°
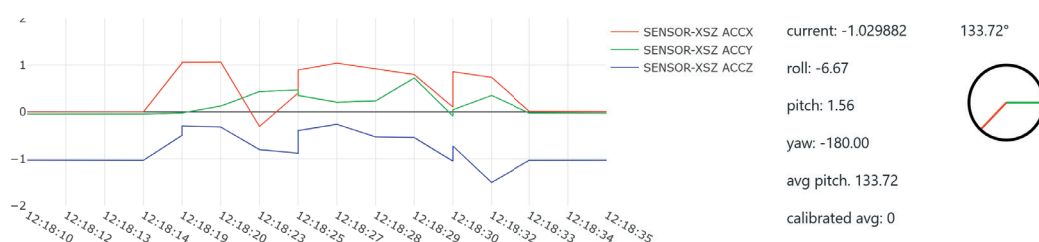
roll: -6.67

pitch: 1.56

yaw: -180.00

avg pitch. 133.72

calibrated avg: 0

fig 2: Visualised data of a single sensor