Ortho Eyes

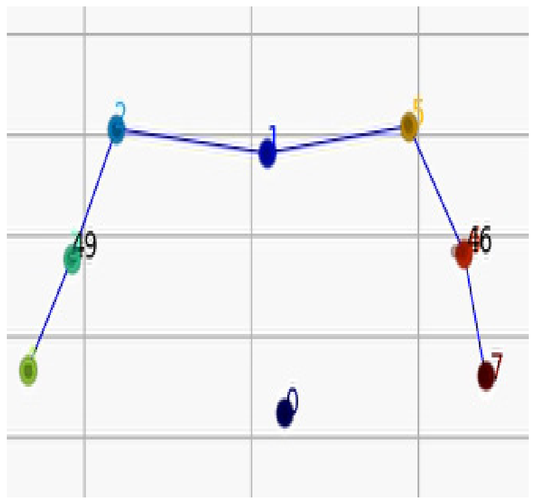
Combining Data Science & Kinematics and Neuromechanics

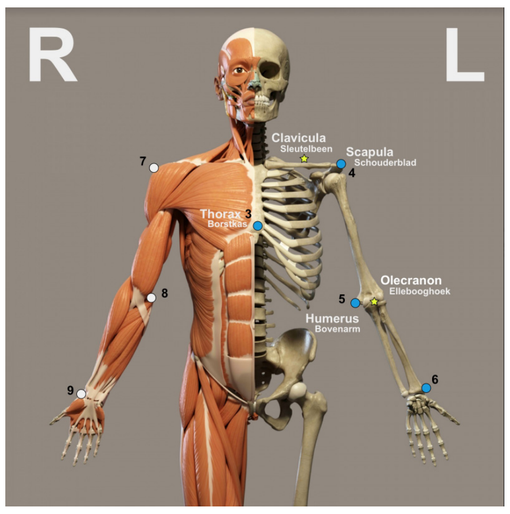
Introduction

The Ortho Eyes Group consists of seven students from **THUAS** and our tutor Tony Andrioli. We're working together with Laboratorium for Kinematics en Neuromechanics (LK&N) at the LUMC in Leiden.

The LUMC provides Euler-angles (x,y,z) of different exercises. These exercises have performed by several patients all having a **shoulder injury** with varying degrees of severity. The patients are categorized into **four** groups depending on the already diagnosed stage of the injury.

The data is recorded by the **Flock of Birds** system, which records, and later calculates the bone structure of a patient. The recorded data gets translated to Euler-angles for 4 different bones in the upper body, namely the **Thorax**, **Clavicula**, **Scapula** and **Humerus**.





3rd iteration of the project

We're now the 3rd iteration of the project Ortho Eyes. Therefore we already had a starting point, a Logistic Regression Model, which we want to finalize in this iteration. In order to achieve a correct classification. We need to clean our data as good as possible.

"If somebody tortures the data enough (open or not), it will confess anything."
– Paolo Magrassi

Data cleaning takes up to 80% of a data-scientists time, that's why we're now finally getting to the point where we have a cleaned dataset. Using this data we can start training the Logistic Regression model.

Our research question + Goal

Research question:

To what extend and in what way, can different unsupervised data science techniques be used on kinematic recordings to contribute to a more valid and more reliable diagnosis, made by a doctor, on shoulder disability.

Our goal:

At the end of the semester we want to be able to make a **classification** on the patient data from the LUMC either using a **Logistic Regresssion Model** or an **Neural Network**. If that is accomplished, Dr. Jurriaan de Groot is going to publish a research paper, using our answered research questions. This would be a leading publifications in the kinematik background where Data Science is used for a medical diagnostics.

Possible future:

We're hoping to use a AR-systems like a Kinect camera to help doctors make a diagnosis.