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Human equilibrium augmentation in an exoskeleton using IMUs

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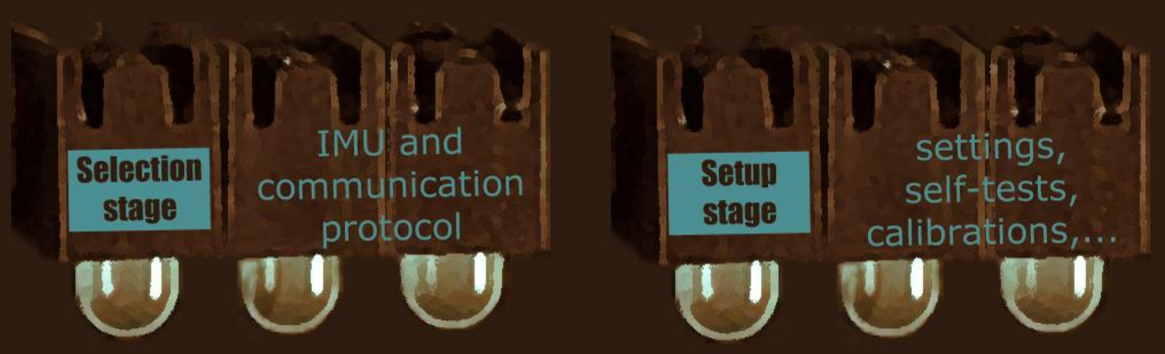
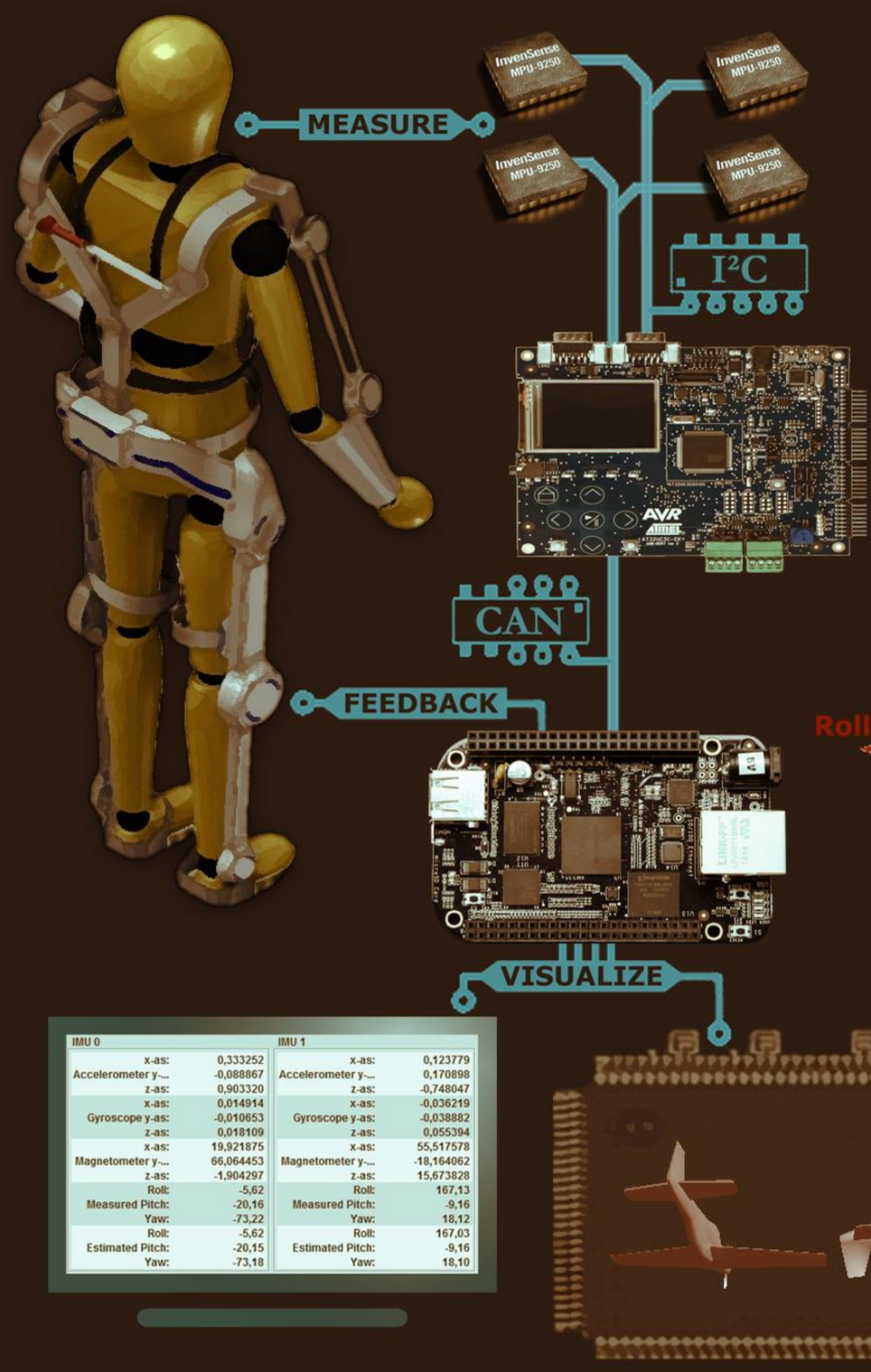
Objectives

The exoskeleton gives automated assistance to improve the equilibrium of the exoskeleton and its user



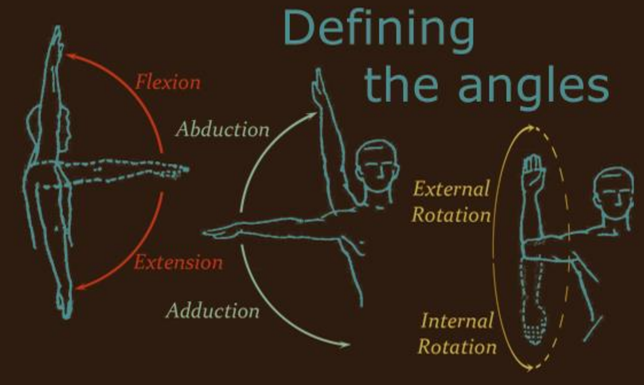
Materials and Methods

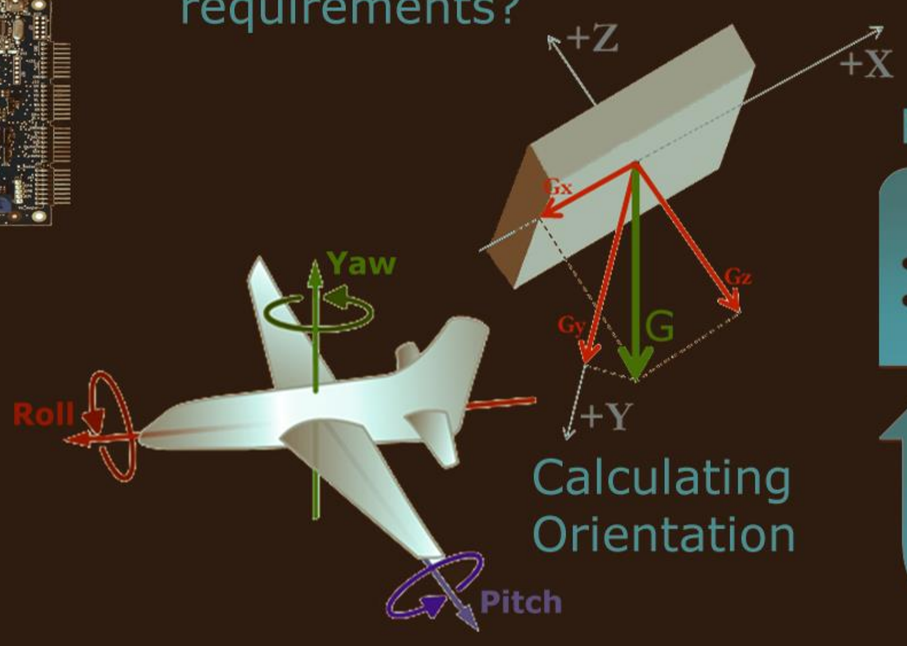


IMUs as Wearable Orientation sensors

Human body kinematics?

IMU requirements?





Estimating Orientation

Time Update:
- Predict the State
- Predict the Error Covariance

KALMAN FILTER

Measurement Update:
- Calculate Kalman Gain
- Update State with Measurement
- Update Error Covariance

Results & Conclusion

- IMU and communication protocol are selected
- Self-tests, calibrations and setup stage are realized
- Sensor data is captured and forwarded to BBB
- BBB collects, processes and analyses data
- Analysed data is represented in an algorithmic structure and visualized in for human interpretation.

Promotoren / Copromotoren: Prof. Dr. Nele Mentens
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COMmeto UHASSELT KU LEUVEN