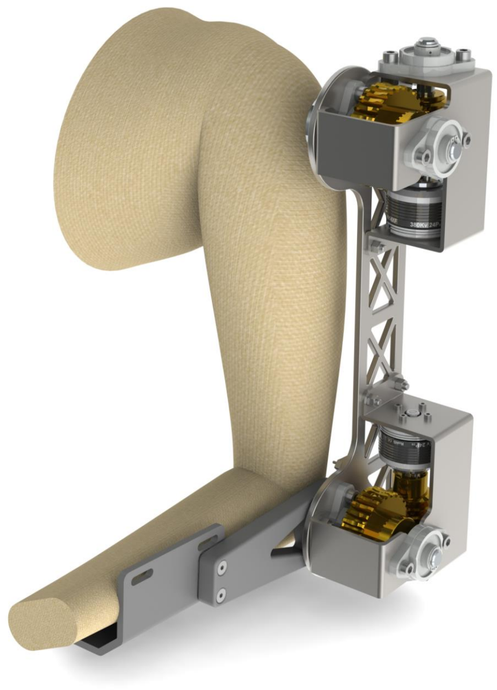
Assisted Function Exoskeleton

Sebastian Ahlström, Albin Gustafsson, Irini Provatidis,
Moritz Schmidt, Jalal Taleb

Objective

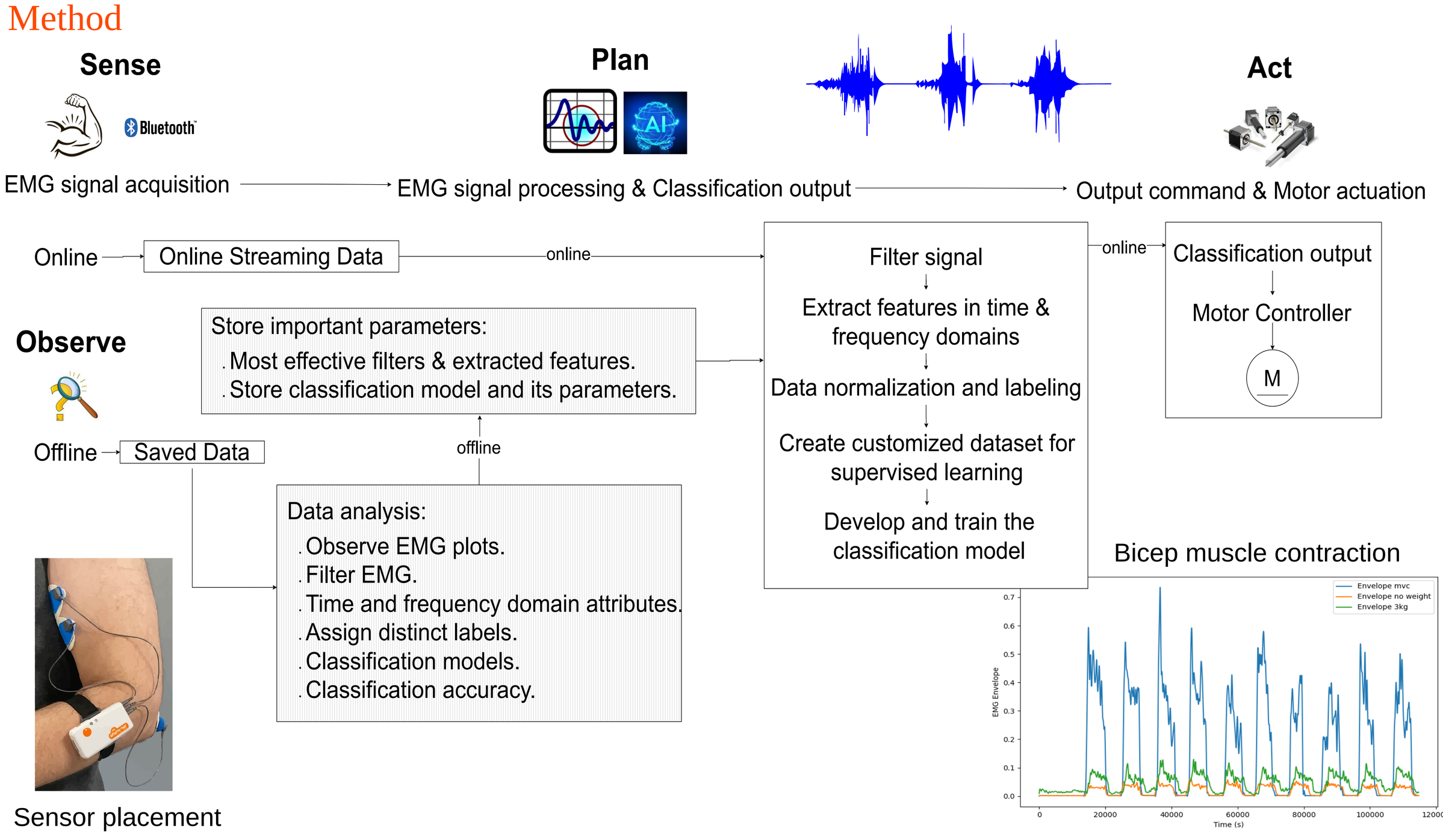
Develop a sophisticated prototype for the Assisted Function Exoskeleton, integrating electromyography (EMG) signals to carefully regulate motor rotation and torque, with the primary objective of facilitating the assistive lifting of objects through targeted activation of the bicep muscle.



Motivation

To enhance support for individuals in diverse sectors, including agriculture (e.g., fruit and berry picking), industrial applications (e.g., aiding in heavy lifting), and healthcare technology (e.g., providing support during surgeries or heavy lifting tasks and decrease muscle fatigue).

Method



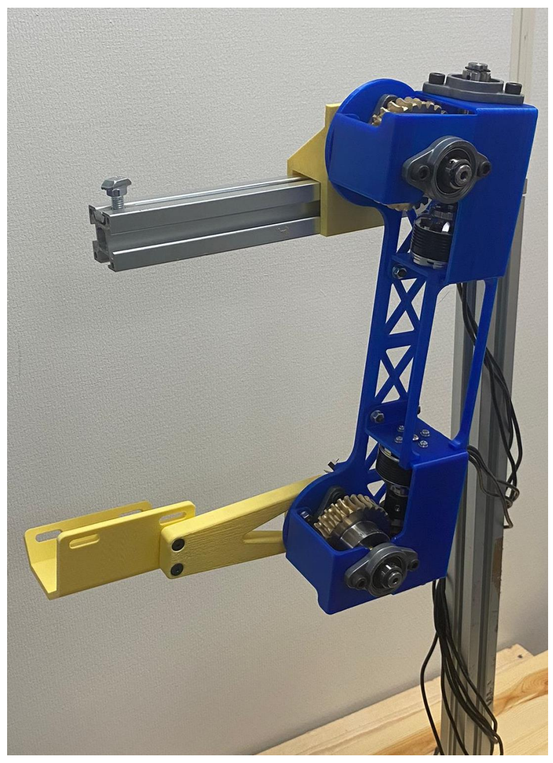
Sensor placement

Bicep muscle contraction

Result

Hardware Highlights

- Mechanical design to control elbow and shoulder joints.
- Built-in operative safety.
- Provides maximum lifting support up to 24Nm.
- Ingeniously engineered to optimize strength and durability.



Software Highlights:

•EMG-Controlled Motor Torque**:** Enables precise motor control through EMG signal classification.

•Results: Distinguishes Muscle Contraction vs. No Contraction.

•Accuracy:
Offline SVM: ~98%,
Online SVM: ~93%.

Detected muscle contractions