Assisted Function Exoskeleton
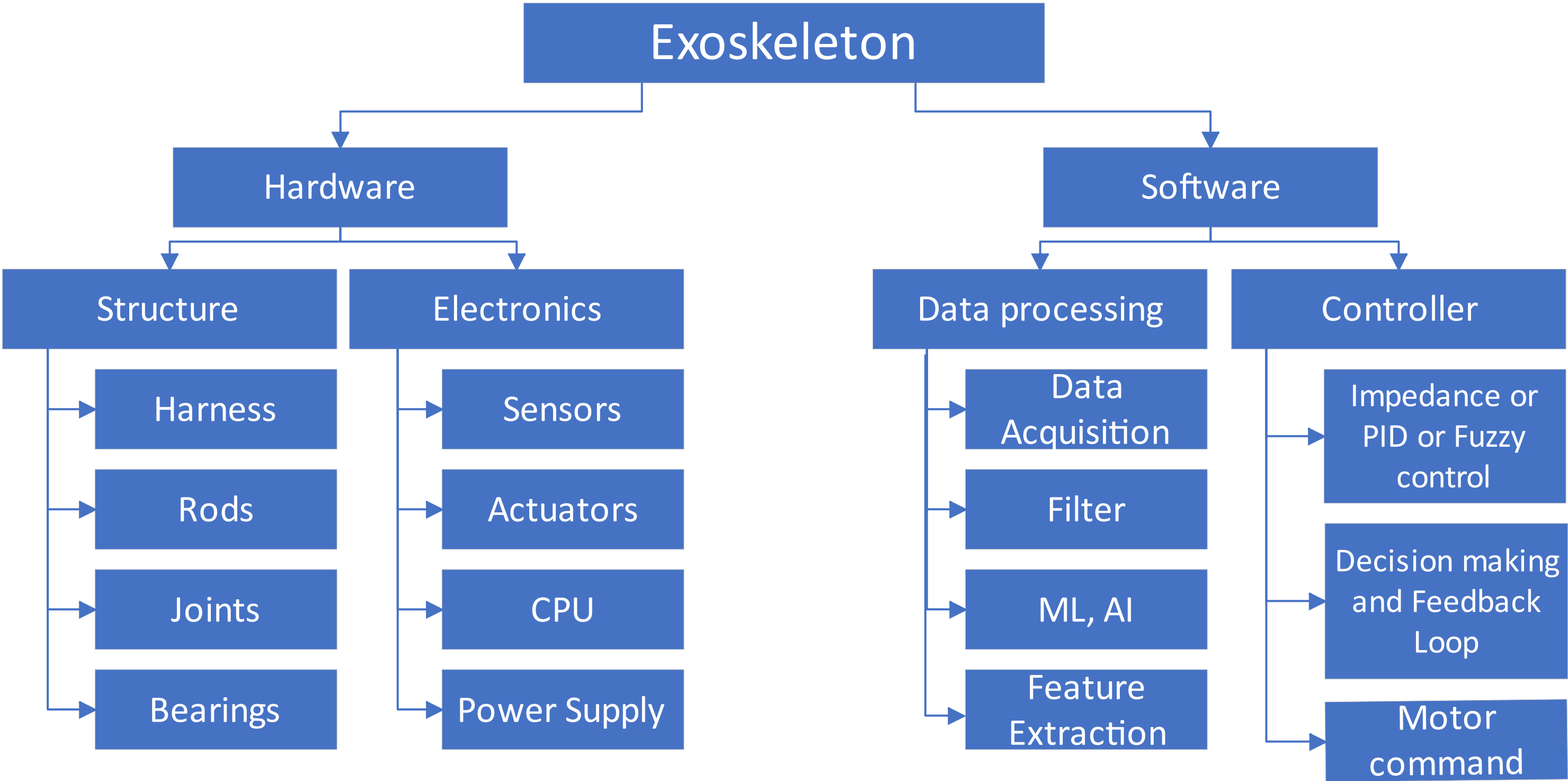
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Overview

- Assisted Function Exoskeleton (AFE)

- Designed to assist healthy individuals in physically demanding tasks

- Applicable in various sectors, including agriculture, construction, and more

- Control system based on muscle activity, measured by EMG sensors

Exoskeleton → Hardware (Structure: Harness, Rods, Joints, Bearings; Electronics: Sensors, Actuators, CPU, Power Supply) → Software (Data processing: Data Acquisition, Filter, ML, AI, Feature Extraction; Controller: Impedance or PID or Fuzzy control, Decision making and Feedback Loop, Motor command)

Purpose and Goal:

- Proof-of-concept

- Groundwork for prototype development

- Sensor-based control system

- Research into suitable hardware components
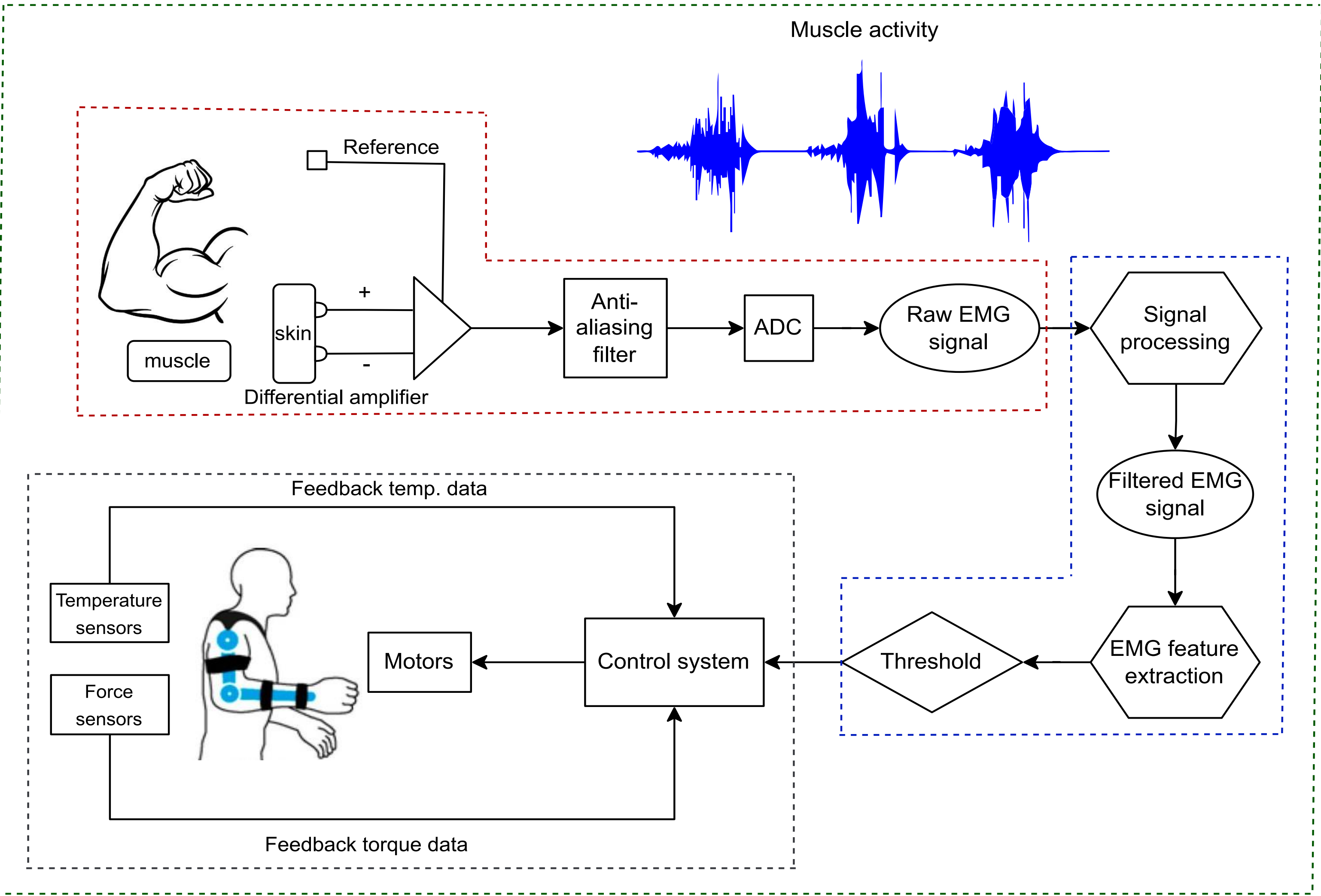
Medical Device Manufacturing Standard:

- European Union Medical Device Regulation (EU MDR)

- International Organization for Standardization (ISO)

Example requirement:
- The CPU shall have a pre-coded emergency shutdown sequence

Limitations:

- Harness and power supply are not included

- Single-arm Exoskeleton

- Only two degrees of freedom

Data Flow Diagram of the Exoskeleton.

- A Generalized Overview

- Data Acquisition

- Data Analysis, Filtering and Classification

- Control System and Feedback Information

Team members