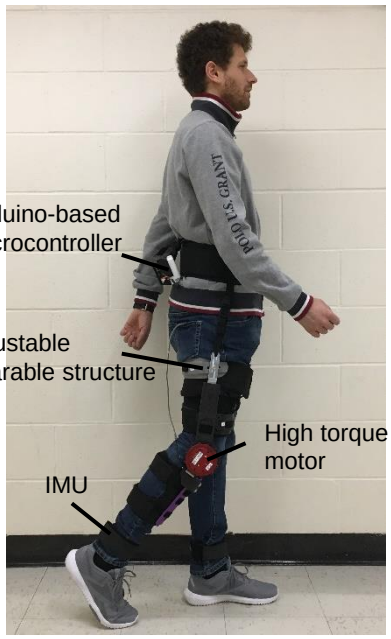
Lightweight Knee Exoskeleton



System Overview

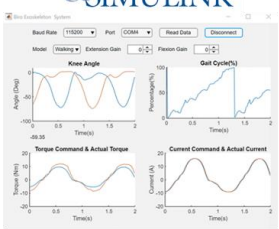
Portable Exoskeleton Specifications	
Unilateral Mass	2.5 kg
Bilateral Mass	3.9 kg
Size	570x200x180mm
Motor Voltage	42V
Motor Continuous Torque	6.6 Nm
Motor Speed	250 RPM
Output Peak Torque	20 Nm
Output Speed	26.2 rad/s
Gear Ratio	6:1
Range of Motion	0-160°
Battery Life	2 hours
Wearable structure	Small, Middle, Large
Actuation type	Portable

Sensor and Control Description

Master Computer

Software GUI

MATLAB & SIMULINK



1.Visualization interface
2.Tune parameters

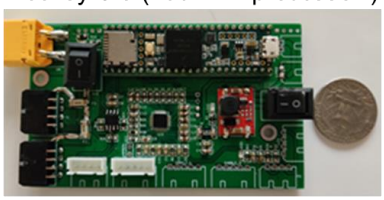
RS-232

Bluetooth
64 Bytes

Arduino-based Microcontroller

IO manipulation

Teensy 3.6 (180MHz processor)



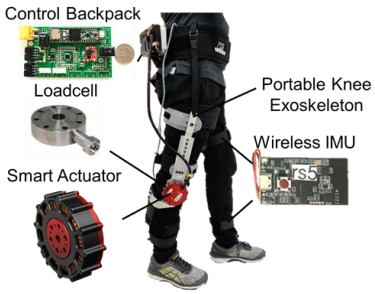
1.Motor Control
2.Encoder Read
3.IMU Read
3.Torque Sensor Read

42 I/O Interface

CAN
RS-232
SPI
I²C

Human & Robot

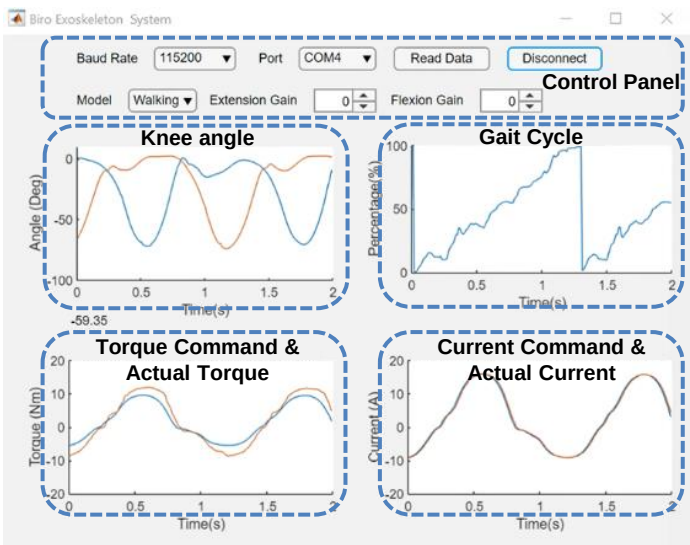
Sensor and Actuation System



1.Motor Controller (CAN)
2.Motor Encoder (CAN)
3.IMU (RS232)
4.Torque Sensor (ADC)

Sensor and Control Specifications	
Sensor	Motor Encoder, 9-axis IMU, Torque Sensor
Master Computer Communication	Bluetooth, USB (RS-232)
Microcontroller Communication	RS-232, CAN Bus, SPI, I²C
Control Platform	MATLAB Simulink Real-time, Arduino Teensy
API Support	MATLAB, C/C++, Python
Control Mode	Torque/Current/Position/ Velocity Control

Software GUI



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