Krishan Bhakta

Ph.D. Mechanical Engineering

kbhakta96@gmail.com https://kbhakt.github.io/krishan_bhakta/ https://www.linkedin.com/in/kbgt/

Experience

GameChanger Analytics *Palo Alto, CA; April 2021 - Present*

Algorithm Development Engineer - Consultant

- Lead developer for creating sensor fusion algorithms in Python from multiple IMU sensors
- Created end-to-end pipeline of reading, analyzing, filtering, and processing data to final sensor fusion output

Dynocardia Inc *Boston, MA; June 2023 – July 2024*

Algorithm Development Engineer - Consultant (Remote)

- Developed a heart level estimation algorithm based on accelerometer wearable sensors using signal processing, filtering, and analytical techniques

Georgia Institute of Technology *Atlanta, GA; Aug 2016 – Dec 2021*

Project Lead – Wearable Robotics Researcher

- Manufactured and clinically validated two powered knee and ankle prostheses [EPIC leg and Open Source Leg (OSL)] from end-to-end (full-stack) to allow for novel research studies in machine learning (ML), biomechanics, and controls
- Developed custom embedded control systems utilizing mechanical sensors (Raspberry Pi/ROS/Ubuntu) and visual graphical interfaces (Kivy/PyQT) to control the device in real-time
- Designed and validated the full-stack control architecture by leveraging expertise in electro-mechanical and embedded engineering to ensure safe and effective actuator responses
- Deployed real-time ML controller (XGBoost) embedded with a Raspberry Pi to automatically detect user intent and applied the correct control response dependent on the environment (ambulation mode, walking speed, and slope angle)
- Published 10+ papers over my graduate career ranging from biomechanical evaluations/comparisons to machine learning based control methods.

Education

Georgia Institute of Technology *Atlanta, GA; Aug 2016 – Dec 2021*

Ph.D. in Mechanical Engineering – Specialization in Mechatronics and Controls

- Exoskeleton and Prosthetic Intelligent Controls (EPIC) Lab [http://www.epic.gatech.edu]; Advisor: Aaron Young, Ph.D.
- Thesis Title: *Improving Intelligence of Robotic Lower-Limb Prostheses to Enhance Mobility for Individuals with Limb Loss*

Skills

Programming	Python, MATLAB, ROS, LaTeX, Git, AWS, SQL, Tableau, RStudio, Tensorflow/Keras/TF-Lite, PyTorch
Data Analysis	NumPy, Pandas, Scipy, Scikit-learn, Sensor Fusion, Kalman Filtering, Signal Processing, Probability/Statistics, Biosignal / Physiological Analysis (EMG, IMU, GRF), Algorithm Development, Data Visualization/Cleaning, Machine Learning, Deep Learning, AWS Cloud Practitioner Fundamentals
Mechatronics	Raspberry Pi (Ubuntu/Linux/Raspbian), Arduino, Teensy, Particle Argon, Sensors (IMUs, encoders, motor drivers, loadcells), Communication protocols (USB, RS232, UART, CAN, SPI, I2C), PCB manufacturing (Autodesk EAGLE)
Design	Autodesk Fusion, SolidWorks, basic operation of CNC, mill, & lathe
Other	Microsoft Office Tools, Adobe Illustrator, OpenSim, VICON (biomechanics modeling)
Courses	Robotics, Machine Learning (Supervised/Unsupervised, Clustering, Decision Trees, XGBoost, SVM, KNN, Regression, Deep Learning (CNN, RNN, ANN), Wearable Robotics, Intro to Mechatronics, Linear Control Systems, Computational and Locomotion Neuromechanics, Biomedical Sensing Systems, Biostatistics

Projects

Improving Intelligence of Robotic Lower-Limb Prostheses

- Developed and enhanced offline and real-time intent recognition systems for both classification and regression tasks using embedded prosthetic sensors and machine learning
- Developed intelligent real-time controllers to directly modulate assistive torque in a knee and ankle prosthetic device
- Quantified the biomechanical and clinical effects of powered prostheses compared to passive devices

Gesture Recognition using Smart Glove

- Prototyped a wearable smart glove that could distinguish between 10 different sign language gestures and display them on a mobile app. Utilized force sensing resistors (FSRs) & 1 IMU (BNO055) through a neural network to achieve 90-95% accuracy