DIVYANSH GUPTA

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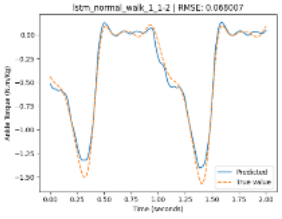
Ankle Exoskeleton *(Master's Thesis)*

- Prototyped hardware, and implemented PID controller with state machine architecture on RaspberryPi
- Experimented with ML control (LSTM, TCN, FCNN) and deployed on NVIDIA Jetson Orin (<10% RMSE)





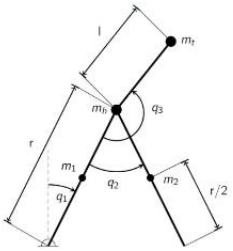
b: Normal walk 1.2 m/sec - LSTM

Medtronic – (Surgical Robot Team)

Software Engineer – Controls Intern, Instrument Control

Increased iterative development & failure debugging speed by 50% by reducing dependency on physical system

- Designed KPIs to test joint articulation performance
- Created automated testing scripts to run pool of HWs
- Prototyped SW interface to replay field log in simulation (Shell scripting, C++, Simulink)

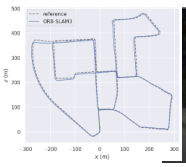


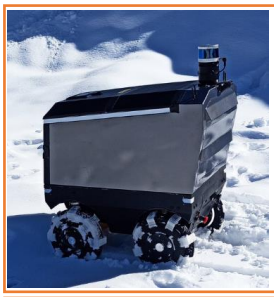
Biped Controller

- Modeled using DH Parameters and Lagrangian mechanics
- Used hybrid-zero dynamics and Lie algebra to model contact dynamic relations
- Optimization based trajectory generation

V-SLAM and Road Sign Detection

- Implemented & tuned parameter for RTABMap(KITTI)
- Road-sign detection pipeline on camera feed YOLO-v5

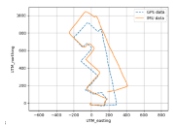


Autonomous Delivery Robot OttonomyIO - *Robotics Engineer*

- Developed sensor suit (Lidar, IMU, Cameras, and GPS), improving modularity 40% and field of view 15%
- Created script and GUI for streamlining camera calibration

Analysis of Sensors in Autonomous Vehicles (IMU, GPS, Lidar, Camera)

- Create custom ROS drivers for IMU and RTK GPS with signal filtering
- Conducted IMU Sensor Noise Analysis with Allan Variance
- Sensor fusion for dead-reckoning
- Image stitching, camera calibration

Redesigned crutches *(2018-2019)*

(Won 2nd position- Biomedical Challenge)

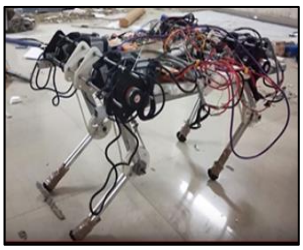
Redistributed user weight from forearms to pelvis to reduce risk of crutch palsy

- Lagrangian Mechanics to model dynamics (double inverted pendulum)
- Optimized design parameters

Chitrak - Quadruped

(Robocon Competition 2018)

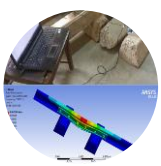
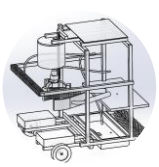
- Prototyped a Quadruped
- Programmed Inverse Kinematics for single leg
- Generated Optimization foot trajectory with Bezier Curves

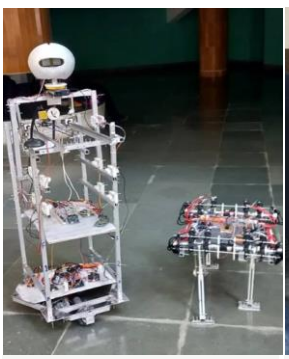


Other Projects

- Low-cost wearable device for predicting knee osteoarthritis
- Automated Toilet Cleaning robot (3rd prize in Inter-IIT Tech Meet)
- Butler Robot – Restaurant the future
- External sole to minimize risk of falling among geriatrics (Reimagine Health Hackathon – 1st position and cash prize of $150)
- Omni directional platform with manipulator arm




Butler Robot and Quadruped (2018-19)


Autonomous Toilet Cleaning Robot (2017)