Shivoh Chirayil Nandakumar

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PROJECTS

• **Masters Thesis**: Design and Development of **Robotic Teleoperation** System[Franka Emika Panda Robotic Arm] using Motion Capture System [Opti Track motion Capture system] (Developed **ROS** node for visualisation in Rviz, developed mapping algorithm for teleoperation in **python**, developed ROS node for control utilising the inverse kinematics of the robot, Simulated the Robot movement in Gazebo)
•**Bachelors Thesis**: **Design** of Sensor Unit in **SOLIDWORKS** to count the Mold Rotations in the Electronic Pinhole Testing Machine. (Project approved in Central Engineering Division at HLL Lifecare Limited, India)
•**Side Projects**: Design and Development of a multi-segment trajectory for the end-effector and **feedback controller** to drive the wheels and arm joints of the **mobile robot manipulator**(KUKA YouBot) (Development using **Python** and **matlab**,Simulation in **V-Rep**)
• Development of **Neural Network** and **Fuzzy Logic controller** in **MatLab** to guide a robot to reach a particular point while avoiding Obstacles.
• Development of **Deep Reinforcement Learning** (DQN) Agent for Banana collection game.
•**Fault Detection** and Isolation in a **controller** for Heading Motion of an UAV using Matlab and Simulink •Matched Filter in Python for heartbeat detection from ECG signal •Development of **ROS packages** in **C++** for a robot to chase a white ball. • Implementation of **Deep Reinforcement Learning** (**DDPG**) Agent for control of 4 DOF Robotic Arm.
•Development of Trajectory and Control for a **Autonomous Vehicle Guidance System** (Rotorcraft Slalom Manoeuvre).

EXPERIENCE

RESEARCH ASSISTANT (ROBOTICS) University of Glasgow
August 2020 – present | Glasgow,UK

•Working as a **Mechatronics engineer for developing telerobotic applications** for humanoid Robots (Pepper and Nao Robots) .
•Worked on the project **Wireless Control and Coordination of Assembly Line Robots** in the 5G test bed of University of Glasgow
•Developed teaching material for the **Humanoid Robot application development** lab. Graded the Robot Programming Project for the course ENG3043 (total strength- 130).
•Worked with IT department to set up the remote accessing of the Pepper robot at University.

GRADUATE TEACHING ASSISTANT University of Glasgow
Sept 2019 – June 2020 | Glasgow,UK

•**Engineering Mathematics ENG2086** : Tutored and corrected assignments of 512 Under-Graduate students under Prof. Trevor Davies. Course includes – Multi-Variate Calculus, Differential Equations, Fourier Series, Vector Calculus and Laplace Transforms
• **Dynamics ENG1062** : Demonstrated and supervised the laboratory work of 30 undergraduate students per session.
• **Introduction to Computer Programming, UESTC 1005** :Diligently corrected the C programming answer sheets as per the guidance within the allotted time.

EDUCATION

UNIVERSITY OF GLASGOW
Masters Degree in Mechatronics
sept 2019- Sept 2020 | Glasgow,UK
Grade : Distinction

UNIVERSITY OF KERALA
Bachelors Degree in Mechanical Engineering
Jun 2014- Aug 2018 | Kerala,India
Grade : First Class

SKILLS

PROGRAMMING
•Python • C++
•Matlab • Bash

TECHNOLOGY
•ROS • GitHub• Linux •OpenAI
•Gazebo • V-Rep • SolidWorks
•ANSYS • Simulink• CES

COURSEWORK

GRADUATE
• Robotics • Auto Vehicle Guidance Systems•Digital Signal Processing• Control Systems Analysis and Design • Advanced Control • Advanced Manufacturing • Engineering Systems Fault Detection Isolation and Recovery.

UNDERGRADUATE
• Mechatronics • Computer Aided Design • Computer programming and numerical methods • Machine Design • Dynamics of Machinery • Mechanics of Solids • Engineering Mathematics

ACHIEVEMENTS

• J N Tata Endowment for Higher Education[Masters]
• Central Sector Scheme Of Scholarship For College And University Students[Bachelors]
• Graduate Record Examinations(GRE): [321/340]
• Robotics Course,NPTEL - Gold Medalist[94%]

LINKS

Github:// **Shivoh**
LinkedIn:// **Shivoh-Chirayil**

EXPERIENCE (CONTINUED)

TECHNICAL PROJECT MANAGER RoboCET
Jul 2017– Jun 2018 | College of Engineering Trivandrum, India

•Developed the team and timeline for the tasks and diligently completed the robotics projects within the scheduled time for the Technical Exhibition at the University. • Successfully coordinated National wide Robotics competition named 'Transporter'.

CERTIFICATES

• Due to my insatiable curiosity in the relevant fields , i continuously pursue online certifications apart from my academic courses at University. Some of them are provided below. e-verifiable through my LinkedIn

DEEP REINFORCEMENT LEARNING Nano Degree
dec 2020 – March 2021 | Udacity

•Obtained a good **theoretical** understanding of Deep reinforcement learning and exposed to various Value based methods (SARSA, DQN) , Policy based methods (REINFORCE, PPO) and Actor critic methods (A2C , A3C, DDPG and D4PG). Finally, the need and methods of Multi-Agent reinforcement learning were explained.
•The concepts were reinforced by multiple mini projects throughout the course. The understanding was tested using three **DRL agent training projects** with increasing difficulty, and were evaluated by Udacity reviewers.

MACHINE LEARNING Stanford University
dec 2019 – Jan 2020 | Coursera

•Good exposure to Linear and Logarithmic regression,neural networks, SVMs, PCAs, Big Data Analysis and various other methods through lectures and programming assignments.

MODERN ROBOTICS: MECHANICS, PLANNING AND CONTROL SPECIALISATION
Northwestern University , USA
March 2019 – September 2019 | Coursera

•Successfully completed 6 courses in the specialisation
• Course1: Foundations on Robot Motion
• Course2: Robot Kinematics
• Course3: Robot Dynamics
• Course4: Robot Motion Planning and Control
• Course5: Robot Manipulation and Wheeled Mobile Robots
• Course6: Capstone Project, Mobile Manipulation.
• With intense programming and simulation assignments and projects, i was able to improve my skills in Python, Matlab and V-Rep.

PYTHON 3 PROGRAMMING The University of Michigan, USA
Jan 2019 – March 2019 | Coursera

•Successfully completed 5 courses in the specialisation
• Course1: Python Basics
• Course2: Python Functions,Files, and Dictionaries
• Course3: Data Collection and Processing with Python
• Course4: Python Classes and Inheritance
• Course5: Python Project: pillow, tesseract, and opencv.
• Obtained a Fundamental understanding of the python 3 through conceptual videos and challenging programming projects.

COLLABORATIVE ROBOT SAFETY: DESIGN AND DEPLOYMENT University of Buffalo
Aug 2018– Oct 2018 | Coursera

•Obtained a good understanding of Cobots. Exposed me to the methods to assess the safety of a collaborative robot workcell and prevent the chances of injury or harm. It also provided Key design techniques for reducing collision forces and a methodology for safety testing.

ROBOTICS Indian Institute of Technology, Kharagpur
Jul 2018– Oct 2018 | NPTEL

•Provided a solid mathematical understanding of Robot Kinematics, Robot Dynamics, Robot Motion Planning, Robot Control. **Secured Gold medal (94%)**. The final examination was proctored.