NISHANT JOSHI

Sionsweg 2, 6525EB, Nijmegen, Netherlands
(+31)684419750 ⋄ n.joshi@neurophysiology.nl

RESEARCH EXPERIENCE

IMBB Forth, Heraklion, GR
Feb 2024- April 2023 *MSCA Secondment*

· As a part of the MSCA Innovative Training Network, I worked with Prof. Dr. Panayiota Poirazi

Netherlands eSceience Center, Amsterdam, NL
Feb 2023- May 2023 *Research Software Engineer*

· As a part of the MSCA Innovative Training Network, I worked as a Research Software Engineer in the eScience center for my secondment. Through this experience, I intend to learn research software development and best practices. Also, gain expertise in machine learning.

Donders Institute for Brain, Cognition and Behaviour, Nijmegen, Netherlands (Biophysics of Neural Computation)
May 2021- Now *PhD Candidate*

· Working under the guidance of Dr. Fleur Zeldenrust (Radboud University) and Dr. Tansu Celikel (Georgia Tech, USA)

· I am working as a part of the SmartNets consortium to understand network computation with a fellowship from Marie Sklodowska-Curie Actions Innovative Training Network (MSCA-ITN). My research is focused on understanding the effect of single-neuron non-linearities in somatosensory processing in layer 2/3 in mice brain. This work includes analyzing single unit recordings and modelling the behaviour extracted from these recordings.

Forscungzentrum Jülich (INM6/IAS6 Neural Circuits Group)
Feb - Dec 2020 *Research Assistant(Master thesis)*

· Worked in collaboration with the Institute of Neuroscience and Medicine (INM6) and Institute of Advanced Simulation (IAS) under the guidance of Prof. Dr. Abigail Morrison.

· This project aimed to study the Universality and Individuality in the dynamics of RNNs and extend it to biologically motivated networks, inspired by Maheswarnathan et. al. This involves training and ensemble of recurrent networks using Jülich supercomputing cluster to see if the representational geometry and dynamics vary between different types of networks for the same task to a better understanding of the similarity between RNNs and biological networks.

PREVIOUS PROJECTS

Neuroscience

Controllability Of Brain Networks Using Targeted Stimulation:

In this project we analyze the controllability of different sections of the brain by selectively stimulating it and understanding the effect on the entire brain using the AAL Parcellation dataset. The node dynamics were modeled using non-linear control and the behavior is compared with a linear model. It was seen that a linear model can successfully predict the behavior. **Language:** Python, **Packages:** Numba, Numpy, Matplotlib, Pandas, SKlearn

Robotics

Autonomous Warehousing Project: In a group of six students, we designed a completely autonomous warehousing system using MORSE and ROS. Our system consists of 8 agents who can recognize when a new packet enters the warehouse and can smartly assign the closest robot to fetch it and take it to its storage location. I designed the path planner for the system. I implemented two algorithms for this purpose, a simple A* and Conflict Based search for resolving path conflicts between agents. **Language**: C++, **Packages**: ROS, Boost, MORSE

Design and Analysis of an AUV: A completely new hull design and control system was created using CAED tools and Simulink which was then taken up for rigorous testing such as CFD analysis using various software tools such as FlowExpress and OpenProp. Results were published in ICCE Asia-2017. **Packages:** FlowExpress, SolidWorks, OpenProp, Simulink

Design of Robotic Swarm for AGVs: Worked on designing a swarm robotic coordination system which uses various swarm algorithms to make a decentralised AGV system. Demonstrated the swarm behaviour using various simulation platforms such as Net-Logo, ARGoS and built a simple prototype for the same. **Language:** C++, **Packages:** NetLogo, ARGoS

TEACHING EXPERIENCE

Brain Bee: I am a part of the Dutch Brain Olympiad, which is the Dutch Chapter of the International Brain Bee, an annual competition for high school students to test their knowledge about Neuroscience. We develop study material for the students and help organize the event at the national level.

Mathematics for Biologists: I tutored the Mathematics for Biologists course at Radboud University for the year 2022-23.

Master/Bachelor thesis supervision: Supervised 2 Bachelor and a Master Thesis in the span of the PhD

Rio + 22: Educator and facilitator for RIO + 22 Power India program by the UN.

TECHNICAL SKILLS

Modeling and Analysis	SolidWorks, MATLAB, NetLogo, FlowExpress, ANSYS, OpenModellica
Software & Tools	MS Office, LaTeX, MS Excel, Stata
Languages and Packages	C++, Python(*Sklearn*, *Numba*, *Numpy*, *Pandas*, *Keras*, *Tensorflow*, *Pytorch*), Scala, ROS, Java(elementary), R, ARGos
Relevant Courses	Robotics(RBO), Machine Intelligence I, Descrete Event Systems, Hybrid Systems, Scalable Machine Learning, Reinforcement Learning, Applied Statistics, Artificial Neural Networks Statistics for Decision Making, Linear Algebra

ACADEMIC ACHIEVEMENTS

Won the Best Department Project award and nominated for most innovative project award in the college.

Recipient of EIT Digital Excellence Scholarship in the form of tuition waiver and a monthly allowance.

EDUCATION

KTH Royal Institute of Technology (Dual Degree year 2) ***Aug 2019 - Nov 2020***
M.Sc Computer Science & Engineering **9.1/10**

Technische Universität Berlin (Dual Degree year 1) ***Oct 2018 - Jul 2019***
M.Sc Autonomous Systems **1.7/1**

Thesis: Universality and Individuality in Recurrent Networks extended to Biologically inspired Networks **10/10 (1.0/1.0)**

RV College of Engineering, Bangalore ***Aug 2013 - May 2017***
Bachelor of Engineering ***First class with distinction***
Department of Mechanical and Industrial Engineering