Savyaraj Ravindra DESHMUKH

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⋆ Nationality: Indian ⋆ Age: 22 years (05.11.1997)

Education

Master in Robotics	**GPA: 5.35/6**
EPFL, École Polytechnique Fédérale de Lausanne	*2019-21 (Expected)*
BTech in Mechanical Engineering with Honours	**GPA: 8.91/10**
Indian Institute of Technology, Bombay	*2019*
(**Minor in Physics**)	
Intermediate/+2	**88.31%**
S.B. College of Science, Aurangabad	*2015*

Research Interests

- Robotics
- Nonlinear Dynamics
- Control Theory
- Computational Neuroscience

Key Projects

Neural controller design and analysis tools for locomotion   **EPFL**
Biorobotics Laboratory/ Semester project   *Sep'19-Jan'20*

- Designed populations of biological neuron models using Neural Engineering Framework and formulated the relevant encoding-decoding schemes to represent a given control system
- Demonstrated the framework through lamprey locomotion using a chain of locally coupled oscillator networks (Central Pattern Generators)
- Studied bifurcation analysis tools such as numerical continuation for nonlinear dynamical systems
- Analyzed half center oscillator - a prominent rhythm generation mechanism for locomotion using numerical continuation and characterized its dynamical regimes

Modeling and Control of 2 Dimensional Aerial Robots   **IIT Bombay**
Undergraduate thesis   *Aug'18 - May'19*

- Simulated a 2D version of quadcopter in MATLAB and developed controllers for Hovering and Trajectory Tracking using a cascade PID structure
- Used A* graph search algorithm to generate motion primitives based trajectories in cluttered environments with obstacles in 2D space
- Implemented heuristic trajectory refinement which significantly reduced the computational efforts for generating smooth trajectories
- Integrated path planning with the controller to verify its performance

Nonlinear Rubber Isolator Dynamics   **Ohio State University**

Acoustics and Dynamics Laboratory| Summer internship   *May'18-Jul'18*

- Worked on nonlinear model of rubber isolator and extended by adding a clearance element
- Analyzed significant parameters and studied effect of individual nonlinearities on the system and their interactions
- Quantified the amount of nonlinearity by introducing a new parameter in the frequency domain which calculates the differences in Power Spectral Densities
- Investigated new behaviors observed to incorporate recent experimental findings such as multiple steady states and chaos

Diversity Induced Resonance   **IIT Bombay**

Nonlinear Dynamics Laboratory   *May'17-May'19*

- Extended above idea from continuous systems to discrete system of globally coupled logistic maps
- Studied effects of parameter values and coupling strength at different diversity values and investigated new phenomena observed, for instance, multiple resonances
- Formulated a mean field reduced model for the system and performed bifurcation analysis which accurately predicted the behavior observed in previous simulations
- Analyzed robustness of the phenomenon by limiting the extent of interactions to a local coupling

Technical Skills

Languages	Python, MATLAB, C++
Tools	GitHub, ANSYS Fluent, SolidWorks, AutoCAD, LaTeX

Positions of Responsibilities

Co-ordinator, Mood Indigo   **IIT Bombay**

Asia's largest college cultural festival   *May'16 - Dec'16*

- Associated with "Informals" team of Mood Indigo, IIT Bombay
- Assisted in Idealization and Conceptualization of over 20 events in Mood Indigo 2016
- Worked with a team of 6 Coordinators and 20+ organizers to conduct 5 events in 2016 edition

Scholastic Achievements

- Awarded a certificate of merit for securing an All India Rank top 1% in the National Standard Examination in Chemistry   2015
- Secured All India Rank 404 in JEE Advanced among 0.12 million students   2015
- Secured top 99.81 percentile in JEE Mains among 1.35 million students   2015

Key Courses

Control Theory	Model Predictive Control, Legged Robots, Networked Control Systems, Geometric and Analytical Aspects of Optimal Control
Computer Science	Applied Machine Learning, Foundations of Intelligent and Learning Agents, High Performance Scientific Computing
Physics	Classical Mechanics, Statistical Physics, Nonlinear Dynamics and Chaos, Quantum Mechanics I, Quantum Mechanics II, Elementary Particle Physics