SUSHRUT THORAT

CONTACT INFORMATION

ADDRESS:
106, Convitto A. Barelli, via Della Gora 9
Rovereto, TN 38068, Italy

MOBILE: +39-380-376-4733
EMAIL: sushrut.thorat94@gmail.com
WEBPAGE: http://novelmartis.github.io

INTERESTS

Artificial Intelligence, Cognitive Neuroscience & Neural Networks

EDUCATION

Masters in Cognitive Sciences (CNS track) *Ongoing*
CIMeC, University of Trento, Rovereto, Italy

B.Tech. in Engineering Physics *August, 2015*
Indian Institute of Technology - Bombay, Mumbai, India
Cumulative Performance Index of **7.64** *on a scale of 10.00*

PUBLICATIONS

Arithmetic Computing via Rate Coding in Neural Circuits with Spike-triggered Adaptive Synapses (*paper*)
Co-author: Bipin Rajendran *June 2015*
Conference: International Joint Conference on Neural Networks, Killarney, Ireland
We presented spiking neural circuits with spike-time dependent adaptive synapses capable of the arithmetic operations - addition, subtraction, multiplication and division, as well as other non-linear transformations - exponentiation and logarithm, for time dependent signals in real-time.

WORK EXPERIENCE

Content Developer
Employer: Avanti Fellows, Delhi *Summer 2013*
Researched about and developed ConceptTests as required by Avanti's Learning Centre Curriculum. The Curriculum is based on Eric Mazur's *Peer Instruction* model which he successfully employed at Harvard University.

PROJECTS

Implementing a Reverse Dictionary using a Node-Graph Architecture
Collaborator: Varad Choudhari *Autumn 2015*
We are designed a method to process any forward language dictionary to build a reverse dictionary, using a n-level reverse tree search through word definitions. The reverse dictionary takes any input phrase and outputs a set of words with high semantic correlation to the input. **We submitted a paper describing the approach to ACL'16**.

Predisposition to towards-gravity periodic motion in chicks (*report*)
Guide: Sang Ah Lee *Autumn 2015*
A predisposition to biological motion, in chicks, has been demonstrated. We presented a hypothesis which points to a towards-gravity periodic motion as the fundamental predisposition, of which biological motion is a subset. We ran a short experiment with newborn chicks to test the same. The results look promising but would take a complete experiment to be deemed significant.

Senior Thesis: A Spiking Neural Network as a Quadcopter Flight Controller (*thesis*)
Guide: Bipin Rajendran *Spring 2015*
We developed a model-based control scheme for velocity-waypoint navigation in the presence of wind, noisy and delayed IMU data, for a quadcopter. We built small spiking neural networks with simple spike-triggered adaptive synapses for implementing arithmetic operations. **We wrote a paper explaining these networks, which has been published in the proceedings of IJCNN'15**. We outlined a method of developing a spiking neural network for quadcopter Control to analyse the gain in computational power and stability provided by spike-based networks.

Non-Linearity in Neural Systems (*presentation*)

Course: Non-linear Dynamics   *Autumn 2014*

Studied Korn's review papers *Is there chaos in the brain?*, which presented a summary of the field of chaotic systems and discussed the indications and usefulness of chaos in the human brain. Studied the Hodgkin-Huxley Neuron model, and carried out a non-linear analysis of the same to describe the existence of action potentials, and the system's behavior in a variety of conditions.

Junior Thesis: On Quantum Computation (*report*)(*presentation*)

Guides: Tathagat Avatar Tulsi and Suddhasatta Mahapatra   *Autumn 2013*

Wrote a report on, and presented the basics of Quantum Computation viz. Quantum Circuits and Quantum Algorithms, and their applications, primarily based on the first two parts of the book 'Quantum Computation and Quantum Information' by Nielsen and Chuang.

Gesture Lock (*report*)

Guide: Pradeep Sarin   *Autumn 2013*

Designed and implemented a Gesture Lock using a matrix of Light Dependent Resistors in conjunction with an Arduino microcontroller to sense fluctuations in light intensity and thereby analyse a gesture and verify it with a predefined pattern. Designed a unique method of distributing feedback from one ambient ldr circuit to multiple input ldr circuits. Designed a 9-to-4 bit encoder as required for optimisation of the hardware. Demonstrated the prototype and wrote a report.

SUMMER SCHOOLS | **Computational Approaches to Memory and Plasticity (CAMP)**   *June, 2015*
NCBS, Bangalore, India

SCHOLASTIC ACHIEVEMENTS

- Ranked **721 among 450,000 students** in the Joint Entrance Examination **(JEE, 2011)** conducted towards admission to the IITs.
- Awarded the **KVPY scholarship** (2010), awarded to **150 promising young researchers** throughout India, by the Dept. of Science & Technology, Govt. of India.
- **Winner** at the **Annual All India Web-Design Contest** (2008) hosted by SJIIT, Pune (India).
- Awarded the **NTSE scholarship** (2007), awarded to **1000 students** throughout India with **excellent all-round skills**, by the National Centre for Educational Research and Technology, Govt. of India.

TECHNICAL SKILLS | **Programming:** C++, Python, MATLAB, PsychToolbox, OpenSesame

Web-Design: HTML5, CSS3, PHP, JavaScript