BADRINATH SINGHAL

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EDUCATION

- **Indian Institute of Technology Guwahati**   July 2014 - June 2018
  Bachelor of Technology   CPI: 8.36/10
  Department of Electronics and Electrical Engineering
  Minor in Computer Science and Engineering

PUBLICATIONS

- **Badrinath Singhal**, Meenakshi Singh, Vivek Kumaran, *"Spondylolisthesis Grading in sagittal MRI scans using convolutional neural networks"*, *Under Review*, **Thirty-Fourth AAAI conference on Artificial Intelligence (AAAI-20).**

- Uddeshya Upadhyay, **Badrinath Singhal**, Meenakshi Singh, *"Spinal Stenosis Detection in MRI using Modular Coordinate Convolutional Attention Networks"*, *Oral Presentation*, **IEEE International Joint Conference on Neural Networks (IJCNN) 2019**, Budapest, Hungary.

- Shashank Huddedar, Mayank Kagliwal, **Badrinath Singhal**, *"Performance analysis of a Novel IT2 FCM Algorithm"*, *Oral Presentation*, **IEEE World Congress on Computational Intelligence (WCCI) 2018**, Rio, Brazil.

WORK EXPERIENCE

Synapsica Technologies - AI Scientist   Oct 2018 - Present
Meenakshi Singh, CEO Synapsica Technologies

· Developed *Synapsica Spindle* which is an AI reporting assistant for MRI Spine saving upto 80% of reporting time of radiologists.
· Used computer vision and deep learning techniques to identify vertebral levels measures patency of central canal and characterises disc herniation and nerve root compression.
· Product is currently validated by radiologists at medical institutes and radiology centers across country.

Computer Vision and Fuzzy Systems Lab - Research Intern   May 2017 - July 2017
Prof. Frank Chung-hun Rhee, Hanyang University

· Integrated `Multi-EIASC Algorithm` with `IT2 Fuzzy C-Means Clustering Algorithm` to give `Multi-IT2 Fuzzy C-Means Algorithm`.
· Instead of using the EIASC algorithm over each of the dimensions of pattern sets separately, we used Multi-EIASC algorithm for the complete pattern set which uses n-dimensionality of pattern sets as its fundamental property.
· Our work got published in **IEEE WCCI 2018 at Rio, Brazil**.

Ikegami Lab - Research Intern   May 2016 - July 2016
Prof. Takashi Ikegami, The University of Tokyo

· Worked on implementing DCGAN on celebrity faces datasets and exploring linear operations in latent vector in z space. Work consists of reading, implementing research papers as well as evaluation on test dataset.

Engineering the Eye-REDX, Hyderabad   July 2015
Prof. Ramesh Raskar MIT Media Lab

· Developed a device which helped calculating the percentage of damage suffered by Meibomian Gland. Project was developed using infrared camera, 3D printer and image processing. It was displayed at exhibition organized by `LV Prasad Eye Institute, Hyderabad`.

PROJECTS

- **Detection of Spinal Stenosis from axial MRI scans.**
  Synapsica Technologies

  – Developed a deep learning and computer vision based 2 stage architecture which measures spinal canal diameter in axial image of MRI scan.

  – Perform training and testing on 9,000 MRI axial scans and tweaked model to improve performance of the model

- **Listhesis evaluation from sagittal MRI scans.**
  Synapsica Technologies

  – Developed an approach to diagnose Listhesis in sagittal image of MRI scans

  – Detected vertebral points and integrated medical criteria to perform diagnosis.

- **Efficient VLSI Implementation of SVD**
  Bachelor Thesis Project
  Prof. Shaikh Rafi Ahmed, Dept. of EEE, IIT Guwahati

  – Used CORDIC algorithm to calculate the SVD of $n \times n$ matrix ($n > 2$) using approach proposed to calculate SVD of 2×2 matrix using operations that can be implemented in VLSI architecture.

  – Involved reading papers, implementing and tested the approach on Verilog. Achieved reduction in processing time by 2% to calculate SVD.

- **Autonomous Intelligent Robot**
  Robotics Club, IIT Guwahati

  – Built a self-navigating bot which is able to map the environment, localize itself and reach the given goal position autonomously.

  – Displayed at technical exhibition conducted by Techniche 2015, IIT Guwahati.

TECHNICAL STRENGTHS

- **Programming Languages (Libraries):** C/C++, Python, HTML, Matlab, LaTeX, Pytorch

- **Miscellaneous:** Intel 8085, Xilinx, PSCAD, Simulink, ROS

ACADEMIC ACHIEVEMENTS

- Joint Entrance Examination 2014: Secured position in top 1% among 150000 students.

- 5th Rank in Guwahati region for AISSCE 2013.

- Offered Merit cum Means (McM) scholarship by IIT Guwahati for 3 consecutive years.

- 1st in Algorithmic Trading competition during Kriti 2016, IIT Guwahati.

- 48th state rank out of 80,000 students in JEE Mains 2014.