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*, **Radiology Society of North America (RSNA) -Artificial Intelligence**
- 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**, Frank Rhee, *"Performance analysis of a Novel IT2 FCM Algorithm"*, *Oral Presentation*, **IEEE World Congress on Computational Intelligence (WCCI) 2018**, Rio, Brazil.

WORK EXPERIENCE

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

· Developed Synapsica Spindle *(Product demo)* 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 of disc herniation and nerve root compression.
· Product is currently being used by radiology centers and going through clinical validation.

Student Mentor Oct 2019 - Present
AI Nano degree, Udacity

· Teaching, assisting and mentoring students globally for Udacity AI Nanodegree program.
· Weekly monitoring their performance in courses and assignments and providing feedback
· Providing guidance and motivation to students for completing the course.

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**.

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
  - 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
  - **Our work got published at IEEE IJCNN 2019.**
- **Listhesis evaluation from sagittal MRI scans.**
  Synapsica
  - 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.
- 5^{th} Rank in Guwahati region for AISSCE 2013.
- Offered Merit cum Means (McM) scholarship by IIT Guwahati for 3 consecutive years.
- 1^{st} in Algorithmic Trading competition during Kriti 2016, IIT Guwahati.
- 48^{th} state rank out of 80,000 students in JEE Mains 2014.