

# BADRINATH SINGHAL

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## EDUCATION

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- **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

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- 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

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**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

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- **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
- The product is going through clinical validation by radiology centers and medical institutes across the country.

- **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.
- Product is at the stage of clinical validation by radiology centers and medical institutes across the country.

- **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  $2 \times 2$  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

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- **Programming Languages (Libraries):** C/C++, Python, HTML, Matlab,  $\text{\LaTeX}$ , Pytorch
- **Miscellaneous:** Intel 8085, Xilinx, PSCAD, Simulink, ROS

## ACADEMIC ACHIEVEMENTS

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- Joint Entrance Examination 2014: Secured position in top 1% among 150000 students.
- 5<sup>th</sup> Rank in Guwahati region for AISSCE 2013.
- Offered Merit cum Means (McM) scholarship by IIT Guwahati for 3 consecutive years.
- 1<sup>st</sup> in Algorithmic Trading competition during Kriti 2016, IIT Guwahati.
- 48<sup>th</sup> state rank out of 80,000 students in JEE Mains 2014.