

# 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**, Frank Rhee, "[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 - 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

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- **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.**

- **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.