

# BADRINATH SINGHAL

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## EDUCATION

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- **Indian Institute of Technology (IIT) 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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- U. Upadhyay, **B. Singhal** and M. Singh, "[Spinal Stenosis Detection in MRI using Modular Coordinate Convolutional Attention Networks](#)," 2019 International Joint Conference on Neural Networks (IJCNN), Budapest, Hungary, 2019, pp. 1-8, doi: 10.1109/IJCNN.2019.8852085.
- S. A. Huddedar, M. Kagliwal, **B. Singhal** and F. C. Rhee, "[Performance Analysis of a Novel IT2 FCM Algorithm](#)," 2018 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Rio de Janeiro, 2018, pp. 1-7, doi: 10.1109/FUZZ-IEEE.2018.8491457.

## WORK EXPERIENCE

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**Machine Learning Scientist** March 2020 - Present  
[Embodyme](#), Tokyo, Japan

- Working on 3D face reconstruction and expression and movement transfer in real time. Work involves literature search about similar work and innovating and implementing existing research.
- Prepared documentation of [Xpression App](#) for Embodyme.

**AI Scientist** Oct 2018 - August 2020  
[Synapsica](#), Bangalore, India

- 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 - December 2020  
[Data Structures and Algorithms Nanodegree](#), 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, Seoul, South Korea

- 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**.

## 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 (or Libraries):** C/C++, Python, OpenCV, Matlab, Git, Docker,  $\text{\LaTeX}$ , Pytorch, ONNX, CoreML, Swift
- **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.