

# 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

## WORK EXPERIENCE

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**Synapsica Technologies, Bangalore** Oct 2018 - Present  
*AI Scientist*

Developed Synapsica Spindle which assists radiologists to diagnose Spinal Stenosis by measuring spinal canal diameter, detecting vertebrae, lumbar discs in MRI scans using computer vision and deep learning.

**Computer Vision and Fuzzy Systems Lab** May 2017 - July 2017  
*Hanyang University*

Integrated Multi-EIASC Algorithm with IT2 Fuzzy C-Means Clustering Algorithm to give Multi-IT2 Fuzzy C-Means Algorithm.

**Ikegami Lab** May 2016 - July 2016  
*The University of Tokyo*

Worked on implementing DCGAN on celebrity faces datasets and exploring linear operations in latent vector in z space.

## 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.

## 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. Achieved accuracy of 85.5% which was further enhanced to 97.9% after further work. The product is going through clinical validation in hospitals.
- **Listhesis evaluation from sagittal MRI scans.**  
*Synapsica Technologies*  
Developed an approach to diagnose Listhesis in sagittal image of MRI scans by first detecting the vertebrae and evaluating it's borders. We achieved accuracy of 97% for vertebare segmentation model which was then further enhanced to 99% after further work. Product is at the stage of clinical validation by hospitals.

- **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 ( $n \leq 2$ ) using approach proposed to calculate SVD of  $2 \times 2$  matrix using operations that can be implemented in VLSI architecture. Tested the approach on Verilog which shows reduction in processing time by 2% to calculate the 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 using Dijkstras algorithm. The bot was implemented using Robot Operating System (ROS). The bot was displayed at *Techniche 2015*, the annual techno management festival of IIT Guwahati.

## TECHNICAL STRENGTHS

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- **Programming Languages:** C, C++, Python, HTML, Matlab, LATEX
- **Miscellaneous:** Pytorch, 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
- 1<sup>st</sup> in Algorithmic Trading competition during Kriti 2016, IIT Guwahati.
- 48<sup>th</sup> state rank in JEE Mains 2014.