ARYAMAN SINHA

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EDUCATION

Indian Institute of Technology Bhubaneswar 2017 - 2021
B. Tech in Electrical Engineering. CGPA : 8.80/10

Rishikul Vidya Niketan 2016 - 2017
CBSE, Class XII, Percentage: 88.8%

Gwalior Glory High School 2014 - 2015
CBSE, Class X, CGPA : 10/10

EXPERIENCE

Research Intern, TCS Research & Innovation May 2020 - Jul 2020
Team Member, Embedded Systems and Robotics *Kolkata, West Bengal*
3D Face Reconstruction

- Developed a pipeline for reconstruction of 3D Face Meshes using 2D images.
- Studied two papers and integrated them to improve the current local facial reconstruction over the selected leap areas of 3D Face Mesh. Developed an objective function for the same.
- Implemented the proposed pipeline methodology using Python & C++, integrated by creating python binding for the C++ library.

Summer Research Fellow, IIIT Bangalore May 2019 - Jul 2019
Guide: Prof. Uttam Kumar, Assistant Professor *Bangalore, Karnataka*
Evaluation of different machine learning algorithms for multi-spectral satellite image classification.

- Worked with the multi-spectral satellite data of Bangalore captured by Landsat 8 OLI.
- Built 7 different classifiers and did their comparative evaluation based on their users, producers, overall accuracy and kappa statistics.
- Built an ensemble classifier to get best error-corrected classified map. Achieved an overall accuracy of 96.06%. Analysed % land cover use for the resultant classified map.

KEY PROJECTS

Adversarial Example Attack and Defense [GitHub] Aug 2020

- Implemented three adversarial example attacks and one defense using *MNIST* dataset using PyTorch as framework.
- Achieved ∼**70% reduction** in test accuracy during the attacks, namely **FGSM, I-FGSM and MI-FGSM.**
- Used **Defensive Distillation** method as countermeasure to these attacks and achieved with only ∼**2% reduction** in test accuracy during the attacks.

Fundamental Brain Wave Extractor [GitHub] Apr 2020

- Brainwaves can then be categorised based on their level of activity or frequency.
- Implemented a **Multi-Band Filtering Design System** using MATLAB which can extract the five fundamental brain waves.
- Filter Design is based on **Chebyshev Type-I approximation (analog)**, used **Bilinear Transformation** to convert analog filter to digital filter.

Time Series Satellite Image Classification Map Jul 2019 - Present

- Working with Prof. Uttam Kumar. The methodology in the study, "Evaluation of different machine learning algorithms for multi-spectral image classification" are being extended for historical data analysis.

Multimodal Brain Tumor Segmentation [GitHub] Apr 2019 - Dec 2019

- Segmentation of gliomas in pre-operative MRI scans. Used the provided clinically-acquired training data to produce segmentation labels.
- Pre-processed the provided training data and applied **U-Net** as semantic segmentation model and **Dice Coefficient** as metrics.
- Achieved dice coefficient score of **0.9950** for lower grade glioma (LGG) and **0.9814** for glioblastoma (GBM/HGG).

Dog vs Cat Classification [Kaggle Kernel] Apr 2019

- Classification between dog and cat. Used the Dogs-vs-Cats (redux) dataset from kaggle competition.
- Designed own model using Keras, achieved **F1 score of 0.9150 & log loss of 2.97**.

PUBLICATION

1. Aryaman Sinha,"Evaluation of different machine learning algorithms for multi-spectral satellite image classification", Summer Research Fellowship Programme report no.19930, Indian Academy of Sciences, www.reports.ias.ac.in, 2019.[Link]

TECHNICAL PROFILE

Programming Languages: C, C++, Python
Web Applications: Jupyter Notebook, Google Colaboratory, Kaggle Kernel
Software Suites: MeshLab, GRASS GIS, MATLAB & Simulink, Vivado
Frameworks and Libraries: PyTorch, Keras, Tensorflow, Scikit-Learn, Scipy, OpenCV, Pandas, Matplolib, Ceres-Solver, GLM
Simulation Tools: Logisim, PSpice
Hardware Tools: Arduino (Uno,Due), Basys3, Intel 8085
Document Preparation System: LaTeX

ACHIEVEMENTS

- Currently ranked **5th** in the Department, in Electrical Engineering batch of 60 students.
- Awardee of **Summer Research Fellowship 2019**, sponsored by the IASc, INSA & NASI.
- Contributed 2 repositories in the 2020 GitHub Archive Program.
- Current Codechef rating of **1793 (3 star)**. Bagged **Bronze Medal** in Week of Code 36 (HackerRank).
- Secured **All India Rank 4764** (**Top 2%** of 2,20,000 students) in **JEE Advanced 2017**.
- Secured **All India Rank 4840** (**Top 1%** of 12,00,000 students) in **JEE Mains 2017**.
- KVPY Scholar, **All India Rank 764** out of 50,000 candidates in KVPY 2016 (SX Stream), **1stin District**.

EXTRA CURRICULAR ACTIVITY

- **Participated in 7th Inter-IIT Tech Meet** organised by IIT Bombay, on-spot event, Star Cluster Identifier, related to Data Analysis and Astronomical Theory.
- Attended the workshop on Computer Vision conducted by IEEE Student Branch.
- Core member of **Neuromancers - Programming Society** and **Nakshatra - Astronomy Society**.
- Acted as **coordinator** for the event of Star Cluster Analysis of IIT Bhubaneswars Innovation Challenge'19.
- **National Service Scheme (NSS) Volunteer**, taught Science and English in local villages and volunteering in Digital India Campaign, Blood Donation Camp.
- **Former Associate member** in Events and Management team of **Alma Fiesta (Annual-Cultural Fest)**, successfully conducted National level Aptitude-cum Talent Exam in Home town.