SOUNDARYA KRISHNAN https://www.linkedin.com/soundaryakrishnan/ | https://soundarya98.github.io/

EDUCATIONAL INFORMATION

Degree	Discipline	Institution	Major CGPA / Percentage	Anticipated Graduation Date
Master of Science (Honours)	Physics	Birla Institute of Technology & Science, Pilani	9.77	June 2021
Bachelor of Engineering (Honours)	Computer Science	Birla Institute of Technology & Science, Pilani	9.75	June 2021
Overall CGPA: **9.42** (**Branch Topper**), Scored a perfect GPA of 10.0 in the 6th semester (1/660). Receiving 100% Scholarship for excellence in academics **(Top 1% in cohort)**				
CBSE Class 12	Science Stream	Delhi Public School, Bangalore	95.2%	2016
Overall Top 1 percentile, received medal for top **0.1** percentile in India in **Physics** (99/100)				

RESEARCH

1. **ECG Signal Analysis on an Embedded Device for Sleep Apnea Detection**
   Paper Accepted and published.
   9th International Conference on Image and Signal Processing
2. **Portable Health Monitoring Device with Real-time Threat Detection**
   Abstract accepted for oral presentation
   2nd International Conference on Image, Video and Signal Processing
3. **A Case Study of Transfer of Lesion-Knowledge**
   Paper Accepted, awaiting publication
   Second Workshop on Medical Image Learning with Less Labels and Imperfect Data (MIL3ID)
4. **CovidDiagnosis: Deep Diagnosis of Covid-19 Patients using Chest X-rays**
   Paper Accepted, awaiting publication
   The Second International Workshop on Thoracic Image Analysis
5. **Network Community Analysis based enhancement of Online Discussion forums**
   Accepted, won 1st place in India
   ACM-W India Celebration of Women in Computing 2020 Student Poster Competition

INTERNSHIPS

Research Affiliate at MIT Media Lab (Current Role)

Dr. Pattie Maes, Guillermo Bernal, Fluid Interfaces Lab

FASCIA is a sleep mask aimed at facilitating sleep studies in natural settings. It records signals including EEG, EOG, EMG, heart rate, head movement, and skin temperature. Our work aims to analyse these multimodal signals and perform sleep scoring, and detect sleep-disorders. We expect our pipeline to run on a smartphone or cloud device.

Software Development Intern at Uber

Adtech Backend, May to July 2020

Used ideas in Reinforcement Learning (Bayesian Thompson Sampling for the Multi Arm Bandit problem) to solve the Explore-Exploit Problem in picking Advertising, worked on backend software development to support the same. Worked with Java, Python, Hive, Apache Spark, SQL, HDFS, Amazon AWS Lambda

- Designed workflow from scratch and wrote production level code for the enabling creative experiments of type MAB
- Caused a 3X boost in pipeline to generate parameters by using SparkSQL
- Directly caused **a 10% revenue growth** in Uber's advertising sector due to higher effective CTRs
- Wrote comprehensive tests (90% coverage), wrote rigorous Postman API requests, exported them to the codebase for ease of use for future developers
- Wrote detailed documentation to assist future users

2019 MITACS Globalink Research Internship project

Dr. Neil Ross, Dalhousie University, Halifax, Canada (May to August 2019)

Secure, fast, and efficient optimization of quantum circuits

Quantum circuits model a sequence of operations to be performed by a quantum computer. CNOT Dihedral is an important class of such quantum circuits. The project demonstrated that the cost of a quantum circuit could be optimized by reducing the # of T gates and replacing them with less expensive gates such as (S, CS or CCZ). This was shown by noting that every CNOT Dihedral circuit can be modeled by a phase polynomial, which in turn can be represented as a tensor. We can then use the Lempel algorithm to factorize this matrix, and thus reduce the T-count (more details are here).

Summer Internship Project at Council for Industrial and Scientific Research (CSIR-CEERI)

Dr. Sundaresan Balasubramaniam, Central Electronics Engineering Research Institute, Chennai, India (May to July 2018)

Learning Based Computer Vision for Leather Surface Quality Discriminant Analysis

Developed an automated defect detection and analysis system using Tensorflow in python for object detection and classification. Used heavy Image Processing in OpenCV for feature extraction, and Visual C++ for GUI, including MYSQL 5.7 for the database. Also used a uEye camera compatible with OpenCV API functions for real time classification.

PROJECTS

Diagnosing COVID-19 from X-rays

Dr. Ashwin Srinivasan, Dr. Lovekesh Vig. In Collaboration with TCS research, (March 2020 to May 2020)

Built a segmentation model in order to isolate the lung region from the rest of the X-ray, and built an interpretable model (with symptoms checking) to detect COVID-19 in chest X-Rays. Our model has an ROC of 99.8. Currently working on generating LIME-style explanation for the COVID-19 predictor in terms of the symptoms, so as to have an explainable model. This tool is expected to soon be deployed in leading hospitals in Delhi, and the Prime Minister's office is interested in using this tool for mass screening in airports and railway stations. Publication accepted.

Transfer Learning for Medical Imaging

Dr. Ashwin Srinivasan, Dr. Lovekesh Vig, In Collaboration with TCS research, (January 2020 to June 2020)

Working with an official collaboration with TCS Research, India on Tumour Classification in various organs. Evaluated the efficacy of transfer of a brain-lesion model to the lung, and the transfer of a lung-lesion model to the brain by comparing against a model constructed: (a) without model-transfer (i.e. random weights); and (b) using model-transfer from a lesion-agnostic dataset (ImageNet). In all cases, our lesion models were found to perform substantially better. Publication accepted.

Peer to Peer AI Tracing App for COVID-19

Dr. Yoshua Bengio, In Collaboration with MILA, Montreal

One of the contributors for the software of a Peer to Peer tracing app for use in Canada. Was mentioned in MILA's white paper for the same as a contributor: https://mila.quebec/wp-content/uploads/2020/05/COVI-whitepaper-V1.pdf

Social Networks: Telegram Chatbot To Enhance Question-Answer Chats

Dr. Neena Goveas, BITS Pilani Goa (August 2019 to December 2019)

Built an NLP & Social Networks-based Python interface that scrapes data off the Telegram chats, classifies users according to activity, and suggests experts as well as timings for various topics, using tools such as Gephi. Tested on Ubuntu IRC chat logs, and has been implemented for a university chat group. Poster won 1st place at ACM-W Poster Competition.

Portable Holter Monitor with Real Time Threat Detection

Dr. Neena Goveas, BITS Pilani Goa (January 2019 to April 2019)

Developed a low cost, portable Holter monitor that could be potentially used by soldiers working in remote conditions to detect conditions like breathlessness and fatigue. Created models for the detection of sleep apnea from real time ECG data and achieved an accuracy of 90%. Wrote scripts on a Raspberry Pi for processing the data from the hardware to run the model and give real time threat detection. Publication accepted.

SCHOLARSHIPS AND ACHIEVEMENTS

- Ranked **7th** among women in India in **Code-Hers 1.0**, organised by **NIT Warangal**
- Awarded **1st place** in **ACM-W India** Celebrations of Women in Computing Poster Competition
- One of **50 students** selected throughout India for the prestigious **Google Research India AI Summer School** for the Human Computer Interaction + AI for Social Good track

- Recipient of the prestigious **Grace Hopper Celebration India Scholarship 2020** for deserving women students from computing, engineering and IT backgrounds.
- Ranked **245 worldwide** for Google's Code I/O for women coding contest
- **1st Runner-up in India** for NETAPP's SheCode hackathon (2019)
- One of **40 students** selected throughout India for 2020 Summer Internship at **UBER, India**
- Recipient of the highly competitive **MITACS Globalink Scholarship** to pursue research in Canada (Summer of 2019)
- Recipient of the **Institute Merit Scholarship (fee waiver)** for consistent excellent performance in academics (2018 onwards)
- Recipient of India's **INSPIRE scholarship (2017)** (Innovation in Science Pursuit for Inspired Research Scholarship)
- Recipient of the **NTSE Scholarship** (National Talent Search Examination scholarship) (2014)
- Recipient of **Gold medal (ranked 12th in SE Asia)** in APMOPS, Singapore
- Ranked **22 in India** in NSO (National Science Olympiad) (2008) and **24 internationally** in IMO (International Mathematics Olympiad) (2009)

TEACHING ASSISTANT

- **Object Oriented Programming:** Designed questions, junit tests, and conducted weekly evaluative labs to test students on principles of Object-Oriented Programming in Java.
- **Computer Programming:** Designed weekly labs from scratch for first year undergraduate students as a part of their continuous evaluation. Assisted students in completing design projects as a part of the course

VOLUNTEER EXPERIENCE

Founder of BITS Goa Women in Tech: BGWiT is an initiative to reduce the gender gap in technology, and foster interactions, networking, and sharing of ideas among women interested in technology.
Instagram: https://www.instagram.com/bitsgoawomenintech/
Website: https://bitsgoawomenintech.wixsite.com/bgwit

- Current Participation of 187 women across batches
- Conducted AMAs with successful female alumni (5 so far)
- Started the very first BITS Women Coding League (with 70 participants) to reward consistent programmers, and started a novel 'Coding Buddy' system to increase participation

- **Ambassador at WomenTech Network:** A global mission to unite 100,000 women in technology to discuss things that matter.
- **Active member of Ladies Storm Hackathons, India:** An initiative to close the gender gap in technology.
- **Teach Zari:** Volunteered at Zari village to teach students school-level math

EXTRACURRICULARS

- **'Marketing Manager'** in Department of Sponsorship and Marketing: Raised sponsorship for India's largest cultural festival with a budget of 75L.
- Founder and member of the **BITS Pilani Acapella** Crew: Took music theory lessons for over 100 students. Part of the team that ranked 2nd in South India for Acapella
- Core member of the campus literary and debating society: Organised **'Contention'**, one of India's largest debates and several national level poetry slams for our flagship poetry slam event **'InVerse'**.
- Passed Grade 3 in Piano, ABRSM (Singapore)
- Completed Gold level Certificate in swimming (Singapore)
- Black Belt holder in Taekwondo, recognized by the Singapore Taekwondo Federation (STF)