

SAI SAMARTH R PHAYE

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WORK EXPERIENCE

- **Machine Learning Engineer, Panasonic Industrial Devices Singapore, Singapore**
(Supervisor: Dr. Vasileios Vonikakis, Since July'19)
 - Developing AI-powered systems for human-sensing technologies for B2B solutions.
 - Majorly working on face analytics using classical computer vision/deep learning – predicting human demographics using face images in the wild; deploying on the edge devices without compromising the performance. Focusing on **feature selection and learning, model optimization and deployment**.
- **Graduate Researcher, Sound and Music Computing Lab, National University of Singapore** [\[GitHub\]](#)
(Supervisors: Dr. Emmanouil Benetos and A/Prof. Ye Wang, Aug'18-June'19)
 - Researched on novel deep neural methods for Acoustic Scene Classification and assisted in related projects. Proposed a novel architecture for acoustic data, **published in IEEE ICASSP 2019**.
 - Teaching Assistant for the course **CS4347: Sound and Music Computing** at School of Computing, National University of Singapore (II Semester AY 2018-19).

EDUCATION

Qualification	University	Institute	Year	Grade/%
B. Tech.	IIT Ropar	IIT Ropar, India	2014-2018	7.28/10
Intermediate/+2	CBSE	HHEA Raipur, India	2013-2014	91.6/100
Matriculation	CBSE	HHEA Raipur, India	2011-2012	9.6/10

PUBLICATIONS

- **[Journal Article] José Ignacio Orlando, .., Sai Samarth R Phaye, .., Hrvoje Bogunović. REFUGE Challenge: A Unified Framework for Evaluating Automated Methods for Glaucoma Assessment from Fundus Photographs. Accepted in Medical Image Analysis, Volume 59, January 2020** [\[Report\]](#) [\[Paper\]](#)
 - Proposed a 2-level model in the challenge – first sub-network localizes the optic disc region in the sample fundus image, which is further used by second sub-network for finer segmentation of cup/disc.
 - Being **one of the top ten teams**, got invited to participate in the onsite round and orally present our work in Medical Image Computing and Computer Assisted Intervention (MICCAI) 2018, Spain.
- **[Conference] Sai Samarth R Phaye, Emmanouil Benetos and Wang Ye. SubSpectralNet – Using Sub-Spectrogram based Convolutional Neural Networks for Acoustic Scene Classification. Accepted in 14th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2019** [\[arXiv\]](#) [\[GitHub\]](#) [\[PPT\]](#)
 - Proposed SubSpectralNets – a deep learning architecture for acoustic scene classification, which leverages band-wise temporal information of the input time-frequency representations.
 - SubSpectralNet achieves a relative **improvement of +14% accuracy** over the baseline model by Detection and Classification of Acoustic Scenes and Events (DCASE) 2018.
- **[Conference and Workshop] Sai Samarth R Phaye*, Apoorva Sikka*, Abhinav Dhall and Deepti Bathula. Multi-level Dense Capsule Networks. Accepted in 14th Asian Conference on Computer Vision (ACCV2018), Perth, Australia, 2 - 6 December 2018.** [\[arXiv\]](#) [\[GitHub\]](#) **Also accepted in Women in Machine Learning (WiML) Workshop, NeurIPS 2019, Vancouver, Canada, 9 December 2019.**
 - Proposed Multi-level DCNets – introduces multiple level of capsules in Capsule Networks (CapsNets, NIPS 2017) and empowers the complete network using DenseNets, CVPR 2017.
 - Achieves **state-of-the-art performance on MNIST dataset with 20-fold reduction of training iterations; 7-fold decrease in the number of parameters** on the CIFAR-10 dataset over the CapsNets.
- **[Technical Demo] Sai Samarth R Phaye, Love Mehta and Mukesh Saini. The One Man Show. Accepted in 19th IEEE International Symposium on Multimedia (ISM2017), Taiwan, 11 - 13 December 2017** [\[Paper\]](#)
 - Developed an android application helpful for solo-musicians. Lets you record various single instrument videos in sync and using the proposed algorithm, merge them intelligently to create a final video.
 - Uses a **multi-modal system** (SVMs for audio and MLP for image) along with multimedia processing for **instrument recognition in the videos** (for instrument-based audio enhancements such as reverb).

INTERNSHIPS

- **Undergraduate Research Intern, CorTexT Manager / IFRIS, Paris** [\[Website\]](#)
(Supervisors: Dr. Marc Barbier and Philippe Breucker, May-July'17)
 - Created a PHP application for CorTexT Manager – helps users to **analyse and manipulate big databases** used in the CorTexT Platform.
 - Modified and developed the application over the depreciated API using Silex, PHP, JS/jQuery and AJAX. Also coded a lock mechanism for databases for multi-user accessibility.
- **Undergraduate Research Intern, Université Marne la Vallée, Paris** [\[YouTube\]](#) [\[GitHub\]](#)
(Supervisors: Dr. Philippe Gambette and Dr. Jean-Marc Leblanc, May-July'16)
 - Created a **very generic and open source** web-interface/ application which would help to extract big databases (Corpus) into various extract formats (Lexico, TreeCloud, TextObserver, HTML, CSV etc.) and perform visualizations on the same.
 - Incorporated **emoticon detection and text visualization tools**, which can be used for further research.

TECHNICAL SKILLS

- **ML/DL Libraries** - PyTorch, Keras, TensorFlow, scikit-learn, OpenCV, ONNX
- **Programming/Scripting Languages** - Python, JavaScript, JAVA, C, C++, SQL
- **Tools** - Jupyter Notebook, MATLAB, \LaTeX

ACHIEVEMENTS

- Secured a rank under **top 0.001 percentile** (out of **1.3 million candidates**) in Joint Entrance Exam (Mains and Advanced combined) – national level university entrance examination in India, 2014.
- Won "**Hack In Punjab**" - **All India Level Hackathon Event**, organised by **Top Careers And You**, Sept'15.
 - Created an Android Application using **Ionic Framework** which would solve problems faced by travellers. The app alarms the user when (s)he is within 2km radius of the destination.

KEY ACADEMIC PROJECTS

- **Memify - Automatic Meme Generation Application** – *Computer Vision, Machine Learning, Image Processing*
(Guide: Dr. Abhinav Dhall, September - November'17)
 - Created an Android Application which captures a picture and **designs a meme according to the expressions of the person** using facial expression recognition.
 - Used **Local Phase Quantization descriptors** as the features to encode the manually created image-captions-dataset which is present on the server and found the best match using chi-squared matching.
- **Collage Maker using Hybrid Images** [\[Report\]](#) – *Image Processing*
(Guide: Dr. Abhinav Dhall, September'17)
 - Created an application in MATLAB R2015b which takes numerous images as input and designs a collage with overlapping border of images.
 - Uses **divide and conquer algorithm** to create the final collage. Overlapping is done using the concept of hybrid images and alpha blending.
- **Surveillance Video Human Detection** – *Machine Learning*
(Guide: Dr. Mukesh Saini, Feb'17)
 - Developed an application to identify motion regions of a surveillance video and then detect humans in those motion regions.
 - Incorporated the Gaussian Mixture based adaptive background model and trained a Support Vector Machines on Histogram of Oriented Gradients extracted from human image dataset.
- **Game Terminal** – *Web-application Development*
(Guide: Dr. Narayanan C Krishnan, January - March'16)
 - Developed an interactive PHP web application/interface which **mimics a Linux terminal** with numerous supported commands.
 - Incorporated three Phaser.io and JavaScript based games: Snakes, Flappy Blocks, Bricks Break. Added functionality to like/dislike the games and write the reviews (saved in a MySQL database).

RELEVANT COURSEWORK

- Computer Vision, Multimedia Systems, Database Systems, Digital Image Processing, Data Structures and Algorithms, Discrete Mathematics, Linear Algebra, Probability Theory, Computer Graphics, Computer Architecture, Programming Paradigms and Pragmatics, Operating Systems

OTHERS

- **When not working**, I am **composing music** professionally [\[YouTube Channel\]](#). Ex-member of Guitar Ensemble at National University of Singapore (**GENUS**).
- **Spoken Languages**: Fluent in English, Hindi; Beginner in French.