# Paarth Neekhara

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## Education

2019-Present **PhD in Computer Science**, University Of California San Diego.
Advised by Prof. Julian McAuley and Prof. Shlomo Dubnov

2017–2019 **Masters in Computer Science**, *University Of California San Diego, CGPA 3.9.*

2013–2017 **BTech in Computer Science**, *Indian Institute of Technology, Roorkee, CGPA 8.6 (scale of 10).*

## Experience

Jan 2019 - Present **Lab Member**, *Prof. Julian McAuley*, UCSD.
Working on machine learning for speech processing and machine learning security.

Jun 2020 - Sep 2020 **Research Intern**, *Facebook Inc*, Seattle (Remote).
Interned with the AI Red team to evaluate the vulnerabilities of DeepFake detectors from the DFDC challenge and models in production.

Oct 2017 - Mar 2019 **Teaching Assistant**, UCSD.
Teaching Assistant for graduate and undergraduate machine learning courses including CSE-253: Neural Networks for Pattern Recognition (Graduate), MUS-206 Deep and Shallow Learning for Music generation, CSE-190 Neural Networks.

Jun 2018 - Aug 2018 **Research Assistant**, *Professor Shlomo Dubnov*, UCSD.
Summer Research Assistant for Professor Shlomo Dubnov. Worked on Adversarial Reprogramming of Sequence Classification Neural Networks.

May 2016 - Jul 2016 **Software Engineering Intern**, *Microsoft*, Hyderabad, India.
Worked with the Bing STCI Team and wrote a pipeline to extract Event related data from the distributed cloud database of Microsoft - COSMOS.

May 2015 - Present **Software Architect**, *Blue Water Trade Winds*, Dehradun, India.
Software architect for BOSS: A web based platform for voyage optimization, fleet management and vessel performance analysis for shipping companies and oil majors. https://bwesglobal.com/

## Publications

[8] **Expressive Neural Voice Cloning** , *Preprint - https://arxiv.org/abs/2102.00151*,
**Paarth Neekhara***, Shehzeen Hussain*, Shlomo Dubnov, Farinaz Koushanfar, Julian McAuley.
Framework to synthesize expressive speech for a new speaker using just a few seconds of audio.

[7] **WaveGuard: Understanding and mitigating audio adversarial examples**, *USENIX Security 2021*,
Shehzeen Hussain*, **Paarth Neekhara***, Shlomo Dubnov, Julian McAuley, Farinaz Koushanfar.
Robust defense against adversarial examples for speech recognition systems.

[6] **Adversarial DeepFakes: Evaluating Vulnerability of Deepfake Detectors to Adversarial Examples**, *WACV 2021*,
Shehzeen Hussain*, **Paarth Neekhara***, Malhar Jere, Farinaz Koushanfar, Julian McAuley.
Craft adversarial DeepFake videos that can bypass state of the art DeepFake detectors.

[5] **Adversarial Reprogramming of Text Classification Neural Networks**, *EMNLP 2019*,
**Paarth Neekhara**, Shehzeen Hussain, Shlomo Dubnov, Farinaz Koushanfar.
Adversarially repurpose text classification neural networks for alternate tasks.

[4] **Universal Adversarial Perturbations for Speech Recognition Systems**, *Interspeech 2019*,
**Paarth Neekhara***, Shehzeen Hussain*, Prakhar Pandey, Shlomo Dubnov, Julian McAuley, Farinaz Koushanfar.
Find a single audio agnostic perturbation which when added to an input audio will most likely cause mis-transcription by a victim Speech Recognition Model.

[3] **Expediting TTS Synthesis with Adversarial Vocoding**, Interspeech 2019
**Paarth Neekhara***, Chris Donahue*, Miller Puckette, Shlomo Dubnov, Julian McAuley.
Vocoding mel-spectrograms to audio using GANs for magnitude estimation.

[2] **FastWave: Accelerating Autoregressive Convolutional Neural Networks on FPGA**, ICCAD 2019
Shehzeen Hussain, Mojan Javaheripi, **Paarth Neekhara**, Ryan Kastner, Farinaz Koushanfar.
Accelerarating inference of WaveNet based neural networks on FPGA.

[1] **Unsupervised Image to Image Translation**, *Preprint - https://arxiv.org/abs/1701.02676*,
Hao Dong, **Paarth Neekhara**, Chao Wu, Yike Guo.
Worked remotely with PhD students from Imperial College London, on the task of domain translation using an Auxiliary GAN. A trained generator network was inverted to project back to latent space and cross-conditioned to synthesize corresponding image in a different domain.

## Open Source Machine Learning Projects

Nov 2017 **Convolutional–VQA**, *https://github.com/paarthneekhara/convolutional-vqa*.
Used a dilated convolutional model for sequence modelling for the task of Visual Question Answering using attention over Visual Features

Dec 2016 **ByteNet**, *https://www.github.com/paarthneekhara/byteNet-tensorflow*.
Implemented the bytenet model of dilated convolutions for sequence to sequence translation from the DeepMind's paper "Neural Machine Translation in Linear Time" .

Aug 2016 **Text To Image Synthesis**, *https://www.github.com/paarthneekhara/text-to-image*.
Developed a tensorflow implementation of synthesizing images from text by conditioning a generative adversarial network with skip thought vectors. Used the GAN-CLS algorithm from the paper "Generative Adversarial Text-to-Image Synthesis" and conditioned it with uni-skip vectors.

## Software Engineering Projects

May-2015 - Present **BOSS**, *https://bwesglobal.com/services/boss/*.
A web based platform for voyage optimization, fleet management and vessel performance analysis for shipping companies and oil majors. Worked on full stack development and high level designing of the application.

Dec-2015 - Present **Cargo Heating Management**, *https://bwesglobal.com/services/chm/*.
Led the development of the software based solution for planning and monitoring cargo heating operations on ships to optimize fuel consumption.

## Relevant Courses

Graduate CSE-250A Probabilistic Graphical Models, CSE-293 Convex Optimization, CSE-250B Machine Learning Statistical Approach

Online Stanford CS-231n, Stanford CS-224d

## Achievements

- Honorable Mention for the Masters Research Award, UC San Diego, 2019
- National Runners Up, Microsoft Hackathon: Code Fun Do, India - 2016
- University Runners Up, Microsoft Hackathon: Code Fun Do, IIT Roorkee - 2015
- Gold Medalist, DPS RK Puram, For excellence in Academic Performance