Sarthak Yadav

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Education

2013–2017 **Bachelor of Technology in Computer Science and Engineering**, *Krishna Institute of Engineering and Technology*, Ghaziabad.

Work Experience

2018–Present **Research Engineer**, Staqu Technologies, Gurugram.

2017–2018 **Jr. Research Engineer**, Staqu Technologies, Gurugram.

Articles

[1] Sarthak Yadav and Atul Rai. Learning discriminative features for speaker identification and verification. In *Proc. Interspeech 2018*, pages 2237–2241, 2018. doi: 10.21437/Interspeech.2018-1015. URL `http://dx.doi.org/10.21437/Interspeech.2018-1015`.

[2] Sarthak Yadav, Manoj Gupta, and Ankur Singh Bist. Prediction of ubiquitination sites using ubinets. *Advances in Fuzzy Systems*, 2018, 2018.

[3] Sarthak Yadav and Ankur Singh Bist. Learning overcomplete representations using leaky linear decoders. *International Journal of Digital Information and Wireless Communications (IJDIWC)*, 2018, 2018.

Research Interests

- Interpretable deep learning for speech and audio processing
- Cross-modal perception in deep neural networks
- Video processing using 3D-convolutional neural networks
- Designing efficient, intuitive and effective neural network architectures
- Deep learning for speech and audio processing using raw signals

Honours

March 2019 **SATL INT System Field Test, South Western Command, Indian Army**
Represented Staqu Technologies at the Field test of SATL INT systems developed in collaboration with DGIS, Indian Army

June 2019 **AI Round Table Conference, DGIS HQ**
Represented Staqu Technologies at the *A.I in Indian Army RTC*. Presented the SATL INT system to the hon'ble Director General of Information Systems; Director General - CDAC; and the Director General of Human Resources, Indian Army.

Dec 2018 **Teaching my Teachers at K.I.E.T.**
The Department of Computer Science and Engineering at my alma mater, K.I.E.T., invited me to give a lecture to the faculty members on *Deep Learning for Spoken Language Understanding* as a part of the Faculty Development Program.

Projects

Sept 2017 - Ongoing **Speaker Recognition: Identification and Verification**
Developed an end-to-end Speaker Identification and Verification system using 2D CNNs and Spectrograms as inputs by training a discriminative Speaker Embedding using the Joint Supervision of Softmax Loss and Center Loss. This work was later published and presented at Interspeech 2018.
I have also developed the following technologies in the speaker recognition domain:

1. **Speaker Diarization in a Conversational Setting**: Accurate speaker diarization system for up to 3 speakers.
2. **Speech classifier**: Distinguishing Speech into *Speech*, *Speech with Noise*, *Speech with Music* and *No Speech* classes.
3. **Call Dump Analysis for Predictive Policing**: Capable of searching a database of over 10,00,000 registered offenders in a second for **Telangana State Police**

June 2018 - Sept 2018 **SATL INT: Army-ROI Detection from Satellite and Aerial Imagery under the Directorate General of Information Systems, Indian Army**
Proudly part of the first 3-person team that facilitated research and development of SATL INT systems in the Indian Army, at the DGIS HQ premises. Manually annotated highest-security clearance satellite imagery. Responsible for all major demonstrations and evaluations of the system.

March 2018 - May 2018 **Violence Detection in the Wild:** Implementing and developing a 3D-CNN based Binary Classifier for detecting Violence from CCTV Feeds and Smartphone Videos in near real-time on single GPU systems.

Sept 2018 - Ongoing **Face Recognition: Identification and Verification**
Developed a Facial Recognition system capable of recognizing upto 24x19 sized face patches, in real-time. I've co-developed and worked on the following applications:

1. **Face Search**: Utilized by multiple State police agencies across North India, such as Uttrakhand (UKAIS), Uttar Pradesh (TRINETRA), Punjab (PAIS) and Rajasthan (ABHED). Helped catch over **1500+ criminals** (as of March 2019).
2. **Real-time Face Recognition on Large Scale CCTV Streams (JARVIS)**: Running on 600+ CCTV feeds from 250+ Jails across Uttar Pradesh.
3. **Real-time Face Recognition on NVIDIA Jetson**: Half-precision face tracking, detection and recognition. Powers Staqu's proprietary Smart-Glass Solution.

Oct 2018 - Ongoing **Real-time Intrusion Detection on Large Scale CCTV Streams (JARVIS)**
Fast and accurate object detection models running on CCTV footage from over 1500 CCTV streams from prisons across Uttar Pradesh

May - June 2018 **Fashion Meta-Tag Detection**
Detecting fashion meta-tags, specifically Neck type and Sleeve type from Fashion Images using multi-label classification CNNs for each task.
Training in a multi-task setting in conjunction with apparel classification improved classification performance by approx. 3%.

Aug - Sept 2017 **Apparel Detection and Localization in the Wild**
Trained an Object Detection and Localization system for localization and classification of clothing items into the following 4 classes: *Full Body*, *Upper Body*, *Half Bottoms* and *Full Bottoms*

Aug - Sept 2017 **Clothes Parsing in the Wild using Semantic Segmentation**
Implemented a Semantic Segmentation system for Clothes Parsing in the Wild using a Fully Convolutional CNN
with separate networks for Indian Ethnic Wear and Western Clothing due to conflicting semantic characteristics (Lehengas resemble Long Skirts, etc).

Achievements

Kaggle, Jan 2018 **TensorFlow Speech Recognition Challenge**. Bronze Medal, Ranked **89** (out of 1315 Teams)

Kaggle, June 2017 **Intel & MobileODT Cervical Cancer Screening**. Silver Medal, Ranked **41** (out of 261 Teams)

Kaggle, April 2017 **The Nature Conservancy Fisheries Monitoring**. Silver Medal, Ranked **52** (out of 389 Teams)

Kaggle, Sept 2016 **Predicting Red Hat Business Value**. Bronze Medal, Ranked **217** (out of 2271 Teams)

InnoPrakalp, Nov 2016 **Inter-College Project Competition** Team Project Voix was ranked **3** (out of 60 teams) at InnoPrakalp 2016.

NSO, 2010 **School Topper** Class 10, National Science Olympiad (NSO) 2010