# Rutuja Ubale

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## EDUCATION

**University of California, Los Angeles** — Sep 2015 – Dec 2016
Master of Science in Electrical Engineering — **GPA: 3.6 / 4.00**
Advised by Prof. Dr. Abeer Alwan (Speech Processing and Auditory Perception Laboratory)
Courses: Speech Processing, Natural Language Processing, Data Science, Machine Learning, Statistical Programming, Big Data: Modeling and Mining the Web, Graphs and Network Flows, Linear Programming

**Vishwakarma Institute of Technology, University of Pune, India** — Jul 2011 – May 2015
Bachelor of Technology in Electronics Engineering — **GPA: 9.23 / 10.00**
Courses: Computer Programming, Data Structures and Algorithms, Digital Signal processing, Embedded Systems, Coding and Data Compression, Pattern Recognition, Optimization, Digital Image Processing

## RESEARCH INTERESTS

Machine Learning, Speech Processing, Natural Language Processing, Multimodal Processing, Data Science, Dialog Systems.

## WORK EXPERIENCE

**Educational Testing Service (ETS)** | Associate Research Engineer (Speech and NLP) — Feb 2017 – present
Dialog, Multimodal and Speech Research Center (DIAMONDS) — San Francisco, CA

- *Voice Biometrics*
- *Spoken Dialogue Systems*
- *Deep Learning for Automated Spoken Response Scoring*
- *Multimodal Scoring*
- *Native Language Identification*

**Educational Testing Service (ETS)** | Natural Language Processing Consultant — Jun 2016 – Sep 2016
Dialog, Multimodal and Speech Research Center (DIAMONDS) — San Francisco, CA

- *Spoken Language Understanding for Conversational Dialogue Systems*

**Speech Processing and Auditory Perception Lab (SPAPL)** | Student Researcher — Jan 2016 – Dec 2016
University of California Los Angeles (UCLA) — Los Angeles, CA

- *Noise Robust Speaker Identification in limited training data environments*
- *Understanding and modeling kids' speech (M.S. Project - Fall 2016)*

## HONORS & AWARDS

**YFRSW Scholarship at Interspeech 2016** — Sep 2016
Workshop for Young Female Researchers in Speech Science & Technology — San Francisco, CA
Funded by NSF, Microsoft & Google.

- Scholarship recipient, selected to participate at the workshop for women undergraduate and masters students working in speech science and technology at the Interspeech 2016 conference in San Francisco (September 2016).

**Pune Municipal Corporation Scholarship** — 2009, 2011
Academic excellence in Higher Secondary Certificate and Secondary School Certificate examinations.

## TECHNICAL SKILLS

- *Programming*: Python, R, MATLAB, C, C++, JavaScript, SQL, HTML, CSS
- *Tools*: Tensorflow, Keras, Apache Spark, WEKA, SKLL, NLTK, gensim, OpenFace, Kaldi, Voicebox, VoiceSauce, CVX, VMware, MS Office
- *Hardware*: Atmel AVR, 80C51 Micro-controller, 89S51 Micro-controller
- *Operating Systems*: MS Windows, Linux, Mac OS

## PUBLICATIONS

**R. Ubale**, Y. Qian, K. Evanini. "Exploring end-to-end attention-based neural networks for native language identification." in Proceedings of the IEEE Workshop on Spoken Language Technology (SLT 2018).

Y.Qian, **R. Ubale**, M. Mulholland, K. Evanini, X. Wang. "A prompt-aware neural network approach to content-based scoring of non-native spontaneous speech." in Proceedings of the IEEE Workshop on Spoken Language Technology (SLT 2018).

Y.Qian, **R. Ubale**, P. Lange, K. Evanini. "From Speech Signals to Semantics - Tagging Performance at Acoustic, Phonetic and Word Levels." in Proceedings of the 11th International Symposium on Chinese Spoken Language Processing (ISCSLP 2018).

Z. Ni, **R. Ubale**, Y.Qian, M. Mandel, S. Yoon, A. Misra, D. Suendermann-Oeft. "Unusable Spoken Response Detection with BLSTM Neural Networks." in Proceedings of the 11th International Symposium on Chinese Spoken Language Processing (ISCSLP 2018).

V. Ramanarayanan, D. Pautler, P. Lange, E. Tsuprun, **R. Ubale**, K. Evanini, and D. Suendermann-Oeft. "Toward Scalable Dialog Technology for Conversational Language Learning: A Case Study of the TOEFL® MOOC." in Proceedings of Interspeech 2018.

K. Evanini, M. Mulholland, **R. Ubale**, Yao Qian, R. Pugh, V. Ramanarayanan, and A. Cahill. "Improvements to an Automated Content Scoring System for Spoken CALL Responses: The ETS Submission to the Second Spoken CALL Shared Task." in Proceedings of Interspeech 2018.

C. W. Leong, L. Liu, **R. Ubale**, and L. Chen. "Toward large-scale automated scoring of scientific visual models." In Proceedings of the Fifth Annual ACM Conference on Learning at Scale, 2018.

Y. Qian, **R. Ubale**, V. Ramanarayanan, P. Lange, D. Suendermann-Oeft, K. Evanini, and E. Tsuprun, "Exploring ASR-free end-to-end modeling to improve spoken language understanding in a cloud-based dialog system," in Proceedings of 2017 IEEE Workshop on Automatic Speech Recognition and Understanding (ASRU), Dec. 2017.

Y. Qian, K. Evanini, P. L. Lange, R. A. Pugh, **R. Ubale**, F.K. Soong, "Improving native language (L1) identification with better VAD and TDNN trained separately on native and non-native English corpora," in Proceedings of 2017 IEEE Workshop on Automatic Speech Recognition and Understanding (ASRU), Dec. 2017.

Y. Qian, **R. Ubale**, V. Ramanarayanan, P.L. Lange, D. Suendermann-Oeft, K. Evanini and E. Tsuprun, "Towards End-to-End Modeling of Spoken Language Understanding in a Cloud-based Spoken Dialog System," in Proceedings of SEMDIAL 2017 (SaarDial) Workshop on the Semantics and Pragmatics of Dialogue (pp. 160-161).

## PROFESSIONAL ACTIVITIES

Reviewer for **IEEE Spoken Language Technology Workshop** (SLT), 2018.

Reviewer for **Interspeech**, 2018.

## PRESENTATIONS

**Ubale, R.**, Qian, Y., Suendermann-Oeft, D., Lange, P., Ramanarayanan, V, & Ivanov, A. Statistical framework for real time implementation of the Spoken Language Understanding component in the HALEF spoken dialog system. Technical Report, ETS San Francisco, September 2016.

**Ubale, R.** Drunk-Text Detection. Poster Presentation. Workshop for Young Female Researchers in Speech Science & Technology, Interspeech 2016, San Francisco, CA.

**Ubale, R.** High Efficiency Video Coding (HEVC) – An overview of Recommendation ITU-T H.265. Technical Report, Vishwakarma Institute of Technology Pune, 2013.

## THESIS

**Accent Correction System Based On Feedback Stimuli Generation** Jan 2014 – Apr 2015
Developed an accent correction system in which non-native English speaker's speech is corrected by identifying deviations in the person's current speech from the desired accent using PSOLA and Regression Analysis.
[Tools: MATLAB]

## OPEN SOURCE CONTRIBUTIONS

**halef-SETU - Python Package** https://pypi.python.org/pypi/halef-SETU/
**Statistical Engine for Text Understanding (SETU)** https://sourceforge.net/p/halef/halef-SETU
halef-SETU provides an easy wrapper around SKLL models for statistical language understanding as well as an easy to use API based on Flask

## SELECTED COURSE PROJECTS

**Area function construction of children's /a/ vowel from 3D ultrasounds** Sep 2016 – Nov 2016
The goal of this project is to facilitate the understanding of children's production of the vowel /a/ through computation of area function - a measure that is representative of a speaker's vowel or consonant production through volumetric imaging.
[Tools: MATLAB]

**Noise Robust Speaker Identification System** May 2016 – Jun 2016
Built a system using cepstral features, normalization and filtering techniques to achieve robustness to noise conditions.
[Tools: MATLAB, VoiceBox, VoiceSauce]

**Drunk-Text Detection** Jan 2016 – Mar 2016
Given a Tweet, the goal is to identify if it was written under the influence of alcohol or not. Performed text-based analysis to determine level of inebriation. Multiclass Support Vector Machine (SVM) classifier is trained using stylistic, LDA and n-gram features to detect drunk tweets.

[Tools: Python, Scikit-learn, PyEnchant, NLTK, Tweepy, Re, Pandas, Numpy]

**Acoustic correlates to speaker identity** Feb 2016 – Mar 2016

Analyzed the performance of different acoustic features - formants, spectral slope parameters, voice source features, MFCC, LPC, LPCC and DTW using SVM and KNN classifiers for predicting perceptual dissimilarity for a pair of sounds and determining whether a pair of speech sounds are from the same speaker or not.
[Tools: MATLAB, VoiceSauce]

## MISCELLANEOUS

Languages: English – Fluent, Marathi – Native proficiency, Hindi – Native proficiency, French – Basic proficiency (speak, read, write with basic competence), Spanish - Basic proficiency (speak, read, write with basic competence)