Ju Lin

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EDUCATION

PhD in Computer Engineering, Clemson University **Aug, 2018-Present**

- Advisor: Dr. Melissa Smith
- Main work: Robust Speech Recognition, Speech Enhancement and Machine Learning

M.S. in Computer Applied Technology, Beijing Language and Culture University **Sep, 2014-Jun, 2017**

- GPA: 88.4/100, Advisor: Prof. Jinsong Zhang
- Main works:

  Using acoustic and articulatory features to improve tone recognition under DNN framework.

  Using Multi-level confidence measures generated from DNN for Non-native Mandarin tone evaluation.

  Using tone nucleus acoustic features and DNN model for Mandarin prosody boundary detection.

B.S. in Computer Applied Technology, Liaocheng University **Sep, 2010-Jun, 2014**

RESEARCH INTERESTS

- Speech Recognition, Machine Learning, Computer Aided Language Learning, Prosody modeling

INTERNSHIP

Speech Group, China Academy of Telecommunications Technology **Beijing, China**

Intern, advised by Dr. Min Liang(Chief Technology Officer of signal processing) **Nov, 2015 – Apr, 2016**

- DNN based Mandarin speech recognition
- Noise speech processing
- Familiarized myself with some popular speech processing tools including: Kaldi, HTK etc.

ACADAMIC ACTIVITIES

- Reviewer:

  Asia-Pacific Signal and Information Processing Association (APSIPA) 2018

  National Conference on Man-Machine Speech Communication, NCMMSC 2017

  Asia-Pacific Signal and Information Processing Association (APSIPA) 2016

- Presentation:

  Made an oral presentation for the Paper [2] in Taipei, 2018.11

  Made an oral presentation for the Paper [8] in Jeju, Korea, 2016.12

  Made oral presentations for the Paper [5] and [6] in Tianjin, China, 2016.10

  Made a poster presentation for the Paper [4] in San Francisco, USA, 2016.09

  Made a poster presentation for the Paper [11] in Tianjin, China, 2015.10

RESEARCH EXPERIENCE

FCTL Lab, Clemson University **Clemson, USA**

Research Assistant, supervised by Prof. Melissa Smith Aug, 2018–present

- Currently, I mainly focus on speech enhancement and robust speech recognition project.

SAIT Lab, Beijing Language and Culture University **Beijing, China**

Research Assistant, supervised by Prof. Jinsong Zhang Sep, 2014–Jun 2018

- **Tone Recognition:** We consideredthe use of frame-level posteriors from a DNN trained topredict articulatory features, these features were concatenated with F0 and MFCC features and fed to another DNN-HMM system for decoding tones. This work can be found in [3, 5].
- **Tone Evaluation:** We proposed a method for evaluating the correctness of tones in continuous speech from non-native speakers of Mandarin by using multi-level confidence measures. This work has been accepted by INTERSPEECH 2016 [4].
- **Prosody Boundary Detection**: Prosodic phrasing refers to the perceived grouping of words in speech, and it was suggested to have influences on the laryngeal co-articulatory overlap during tone production. From the perspective of interaction between adjacent tones, we used tone nucleus model to accurately extract pitch reset and pitch level etc., which are useful for prosody boundary detection. This work can be found in [6, 7].
- **Detecting Pronunciation Erroneous Tendency**: Detecting pronunciation erroneous tendency (PET) can provide second languages learners with detailed instructive feedbacks in the computer aided pronunciation training (CAPT) systems. We investigated how to improve the performance of detecting PETs using deep neural network (DNN), at both feature level and model level. This work can be found in [2, 8].
- **Annotating Inter-Chinese Tone**: The consistency of annotating inter-Chinese tone needs to be improved due to various subjective and objective factors, we contrasted two kinds of annotating methods which were based on same annotating rules: direct perception-based annotation and annotating speech that were substituted pitch and duration. This substitution method used inter-Chinese's pitch and duration, while other speech information retained native speakers. This method could remove unnecessary information when annotating. This work can be found in [9].
- **The Relationship between Segments and Tone Perception**: Tone perception plays a very important role in tonal languages. Although previous studies have demonstrated that fundamental frequency is a significant cue in tone perception, there are other factors influencing it. We proposed a continua method based on syllables which included three types of consonants and two types of finals to explore the relationship between segments and tone perception. This work can be found in [10].
- **The Effect on Creaky Voice in Tone3:** The correlation between acoustic features and social identity has long been studied in the area of sociolinguistics. This research focuses on how factors like age and gender impact the distribution of creaky voice in Tone3 of Beijing dialect. This work has been published in [11].

PUBLICATIONS AND PATENTS

[1] **Ju Lin**, Lexuan Sun, Xiang Lan, Sufeng Niu, Melissa Smith, Kuang-Ching Wang, "A WAVENET BASED MULTI-TASK LEARNING FOR VOICE ACTIVITY DETECTION", *INTERSPEECH2019 (submitted).*

[2] **Ju Lin,** Wei Zhang, Yanlu Xie, Jinsong Zhang, "A Multi-modal Soft Targets Approach for Pronunciation ErroneousTendency detection, *ISCSLP, 2018* .

[3] **Ju Lin**, Wei Li, Yingming Gao, Yanlu Xie, Nancy F. Chen, Sabato Marco Siniscalchi, Jinsong Zhang, Chin-Hui Lee, "Improving Mandarin Tone Recognition Based on DNN by Combining Acoustic and Articulatory Features Using Extended Recognition Networks", *Journal of signal processing systems 2018.*

[4] **Ju Lin**, Yanlu Xie, Jinsong Zhang, "Automatic Evaluation of Non-native Mandarin Tone by Using Multi-level confidence measures", *INTERSPEECH*, *2016.*

[5] **Ju Lin**, Yingming Gao, Yanlu Xie, Jinsong Zhang, "Improving Mandarin Tone Recognition Based on DNN by combining acoustic and articulatory features", *ISCSLP, 2016.*

[6] **Ju Lin**, Wei Zhang, Yanlu Xie, Jinsong Zhang, "Automatic Mandarin Prosody Boundary Detecting Based on Tone nucleus and DNN model", *ISCSLP, 2016.*

[7] **Ju Lin**, Wei Zhang, Yanlu Xie, Jinsong Zhang, "Using Tone nucleus and DNN model for Mandarin Prosody

Boundary Detection", *Journal of Chinese Information Processing*, *2016, 30(6):35-39.*

[8] Yingming Gao, Yanlu Xie, **Ju Lin**, Jinsong Zhang, "DNN Based Detection of Pronunciation Erroneous Tendency in Data Sparse Condition",*Asia-Pacific Signal and Information Processing Association, APSIPA 2016.*

[9] Qi Zhang, Yanlu Xie, Shuang Zheng, **Ju Lin**, Jinsong Zhang, "A Preliminary Study on Tone Annotation Method of Inter-Chinese", *proceedings of the 12th Phonetics Conference of China, PCC 2016*.

[10] Chong Cao, **Ju Lin**, Yanlu Xie, Jinsong Zhang, "The preliminary study of influence on tone perception from segments", *ISCSLP*, *2016*.

[11] Zhijing Liu, **Ju Lin,** Jinsong Zhang, Weijia Zhang, "The Effect of Age and Gender on Creaky Voice in Tone3 of Beijing Dialec",*Chinese Journal of Phonetics, 2016.*

[12] Patent Application Number: 2016107577678

[13] Patent Application Number:2016108954500

TEACHING EXPERIENCES

- 2014 Fall **Tutor for Calculus,** *College of Information Science, Beijing Language and Culture University*
- 2015 Spring **Tutor for Calculus,** *College of Information Science, Beijing Language and Culture University*

GRANT AND AWARDS

- 2017.07 **The Outstanding Graduate Students of Beijing**
- 2016-2017 **Youth Independent Research Program Projects for Graduate Students**(Fundamental Research Funds for Central Universities in China) "Prosody modeling in Mandarin and its application in Second-language learning"
- 2016.12 **National Scholarship for Graduates**
- 2016-2017 **The First Prize of Excellent graduate Scholarship**
- 2012-2013 **The Third Prize of Excellent Undergraduate Scholarship**
- 2011-2012 **The Third Prize of Excellent Undergraduate Scholarship**
- 2010-2011 **The Third Prize of Excellent Undergraduate Scholarship**

KNOWLEDGE AND SKILLS

Theoretical Background

- Prosody Modeling, ASR, CALL, Deep learning

Technical Skills

- Programming Language: C, C++, SHELL, PERL, Python
- Software: MATLAB, HTK, STRAIGHT, PRAAT, SRILM, Kaldi，KERAS