FEDERICO ANG

Speech / Multimedia Signal Processing & Voice AI

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TECH STACK

Python | Shell | Open Source | Matlab | C++ | Cloud | PyTorch | Docker | k8s | git | LaTeX | APIs

TECH SKILLS

Signals and systems | Speech processing | Voice AI | IVR systems | Audio manipulation | NLP/NLU | GPT/LLMs | Machine Learning | Data Structures | Algorithms | Probability | Circuit Theory | Communications | Networking | Cloud | Scalability | MLOps | Security and privacy | Productionization

LANGUAGES

Filipino: Native
English: Fluent
Japanese: Mid-level

REFERENCES

Available upon request.

ABOUT ME

Dedicated R&D scientist in speech signal processing, specializing in AI-driven voice and conversational systems. Contributed to research in speech recognition and synthesis, and in developing practical voice AI systems for consumer applications.

EXPERIENCE

Voice AI R&D Consultant | myLanguage, Inc.

Nov 2024 – Present | USA (Remote)

- Developed and optimized 100+ ASR and Language ID models across multiple frameworks, achieving 2-17% WER improvements across different languages while supporting diverse translation products and client requirements, including low-resource languages and challenging acoustic conditions.
- Built and managed large-scale data pipelines for text, audio, and language data curation, processing, and quality assurance to support R&D initiatives across multiple projects.
- Enhanced ML infrastructure and operations by implementing improved DevOps/MLOps processes, developing custom tracing solutions for ONNX runtime targets, and streamlining model deployment workflows.
- Provided technical leadership on voice AI architecture for diverse deployment scenarios including offline, online, edge, batch, and real-time processing, establishing best practices for model serving and optimization.

Assistant Manager | Rakuten Group, Inc.

Jan 2020 – Jun 2024 | Tokyo, Japan

- Led cross-functional speech and conversational AI initiatives spanning R&D, engineering, and team management, including publishing conference papers, conducting hiring, and mentoring team members.
- Spearheaded family-safe content moderation system for online marketplace, developing custom speech recognition model to flag inappropriate language in spoken content, projecting significant cost savings through reduced manual review requirements.
- Architected and deployed 'Speech Factory' MLOps platform for ASR model development, integrating automated annotation, use-case customization, and benchmarking systems; achieved 7x efficiency improvement in production IVR optimization with substantial cost reduction.
- Drove strategic transformation of speech recognition development processes, establishing scalable infrastructure that enhanced model adaptability and accelerated deployment cycles across multiple production use cases.

Research Scientist | Rakuten Group, Inc.

Jan 2018 – Jun 2024 | Tokyo, Japan

- Worked on baseline training and finetuning of several modern speech AI frameworks (NeMo, ESPnet, icefall, speechbrain) and querying APIs (cloud-based and AI products) for maintaining an internal running Japanese ASR performance scoreboard and develop PoCs related to speech tech: translation with ASR and TTS conversion.
- Improved the speech recognition accuracy of an internal HMM-DNN ASR model for voice-based product search by ~20% absolute, and a proprietary model (Nuance) for an IVR use case by ~7% absolute.
- Developed the voice interface of a concierge robot for a conference demonstration interacted by ~50 people.

Assistant Professor | University of the Philippines Diliman

Jan 2010 – Mar 2013, Aug 2016 – Jul 2017 | Quezon City, Philippines

- Served various roles from teaching, research advising, lab directing, and organizing university-wide events.
- Taught university-level engineering courses from circuit theory to advanced signal processing, paneled for and advised successful undergraduate student projects:
  - Sebastian, A.R., "Improving Filipino Speech Synthesis Using Voice Conversion," 2017.
  - Burgos, M.C. and M. De Lara, "Automatic Speech Recognizer for Closed Captioning of Filipino News Broadcasts," 2010.
  - Eala, M.C.F., "A Prototype for Hands-Free Filipino Text Messaging," 2011.
  - Ancheta, J.C.M., K. Chua, and K.M. Francia, "An Evaluation of Smoothing Techniques for Language Modeling in Filipino Automatic Speech Recognition Systems," 2012.

- Crisostomo, R.L. and L. Godoy, "Improvements on the Development of a Closed Captioning System for Filipino News Broadcasts," 2012.

Other Posts

- **Temporary post as Assistant Professor (Apr 2016 – Aug 2016)** at the College of Computer Studies, **De La Salle University, Manila, Philippines**. Taught courses in computer architecture, feedback control systems and web security.
- **Guest researcher (Jul 2009 – Dec 2009)** at the International Center for Advanced Communication Technologies (interACT) in **Karlsruhe Institute of Technology, Karlsruhe, Germany**. Underwent training related to large-scale automatic speech recognition development.

EDUCATION

PhD in Media and Network Technologies | Hokkaido University

Apr 2013 – Mar 2016 | Sapporo, Japan

- Coursework on data mining and retrieval, AI, pattern recognition, statistical learning, and multiagent systems.
- Research assistant at the Information and Communication Networks (ICN) Laboratory
- Dissertation entitled "A Study of Time-Varying Speech Features in the Context of Noise-Robust Speech Recognition" under the supervision of Dr.Eng. Yoshikazu Miyanaga.

MS in Electrical and Electronics Engineering | University of the Philippines Diliman

Nov 2007 – Apr 2009 | Quezon City, Philippines

- Coursework on linear systems, advanced digital and wireless communication systems, advanced digital and adaptive signal processing, advanced networking, coding and information theory, machine learning, and natural language processing.
- Contributed to several funded research projects as an affiliate university research assistant for the Digital Signal Processing (DSP) Laboratory
- Master's thesis entitled "Joint Source-Channel Coding for Packet Network Transmission of Low Bit-Rate Encoded Wideband Speech" under the supervision of Dr. Rowena Cristina L. Guevara.

BS in Computer Engineering | University of the Philippines Diliman

Jun 2003 – Nov 2007 | Quezon City, Philippines

- Digital signal processing laboratory trainee and affiliate
- Undergraduate student project entitled "On-Device (Symbian S60) Implementation of an Automatic Filipino Speech Recognition System"

Massive Online Open Courseware Certificates

- Structuring Machine Learning Projects, Coursera, Oct 2017.
- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization, and Optimization, Coursera, Sep 2017.
- Neural Networks and Deep Learning, Coursera, Sep 2017.
- Discrete-Time Signal Processing, Graduate-Level DSP Group, MIT 6341x, EdX, May 2015.
- Artificial Intelligence, UC Berkeley, EdX, May 2015.
- Discrete-Time Signals and Systems, Part 1: Time-Domain, Rice Uni, EdX, Mar 2015.
- Introduction to Artificial Intelligence, Stanford Uni, Udacity, Dec 2011.

CONFERENCES

Conference Speaker

- 22nd Conference of the **Oriental COCOSDA (International Committee for the Coordination and Standardisation of Speech Databases and Assessment), Cebu, Philippines, Oct 2019**
- **High Impact Technology Solutions (HITS) Forum**, 2011 National Science and Technology Week Celebration, **Pasay City, Philippines, Jul 2011**.

Conference Session Chair

- 22nd Conference of the **Oriental COCOSDA (International Committee for the Coordination and Standardisation of Speech Databases and Assessment), Cebu, Philippines, Oct 2019**
- **IEEE Region 10 Conference (IEEE TENCON), Cebu City, Philippines, Nov 2012**
- 7th **International Conference on Natural Language Processing and Knowledge Engineering (NLP-KE), Tokushima, Japan, Nov 2011**.

Research Presenter

- **IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Online, Jun 2023**.
- 20th **International Conference on Digital Signal Processing (DSP), Singapore, Jul 2015**.
- **International Symposium on Circuits and Systems (ISCAS), Melbourne, Australia, Jun 2014**.
- **IEEE Region 10 Conference (IEEE TENCON), Cebu City, Philippines, Nov 2012**.
- 7th **International Conference on Natural Language Processing and Knowledge Engineering (NLP-KE), Tokushima, Japan, Nov 2011**.
- 4th **AUN/SEED-Net Regional Conference on Information and Communication Technology (RCICT), Ho Chi Minh City, Vietnam, Oct 2011**.
- 9th **International Symposium on Communications and Information Technologies (ISCIT), Incheon, South Korea, Sep 2009**.
- 4th **International Colloquium on Signal Processing and its Applications (CSPA), Kuala Lumpur, Malaysia, Mar 2008**.

PUBLICATIONS

- Xin, Detai, S. Adavanne, F. Ang, A. Kulkarni, S. Takamichi, and H. Saruwatari, **Improving Speech Prosody of Audiobook Text-to-Speech Synthesis with Acoustic and Textual Contexts**. In: IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Rhode Island, Greece, 2023.
- Ang, F.M., H. Tsutsui, and Y. Miyanaga, **Incorporation of Time-Varying LP Cepstral Features in HMM-Based Isolated Word Speech Recognition**. In: International Symposium on Signals, Circuits and Systems (ISSCS), Iaşi, Romania, 2015.
- Ang, F.M., Y. Miyanaga, R.C.L. Guevara, R. Cajote, M.G.A. Bayona. **Open Domain Continuous Filipino Speech Recognition with Code-Switching**. In: 2014 International Symposium on Circuits and Systems (ISCAS), Melbourne, Australia, 2014.
- Ang, F.M., J.C.M. Ancheta, K.M. Francia, and K. Chua. **Evaluation of Smoothing Techniques for Language Modeling in Automatic Filipino Speech Recognition**. In: The 2012 IEEE Region 10 Conference, Cebu City, Philippines, 2012.
- Ang, F.M., M.C. Burgos, and M. De Lara. **Automatic Speech Recognition for Closed-Captioning of Filipino News Broadcasts**. In: 7th International Conference on Natural Language Processing and Knowledge Engineering (NLP-KE), Tokushima, Japan, 2011.
- Ang, F.M., R. Almonte, M.G.A. Bayona, and L.R. Lazaro. **A Summary of Past and Current Developments in Filipino Speech Recognition and Speech-to-Text**. In: Proceedings of the 4th AUN/SEED-Net Regional Conference on Information and Communication Technology (RCICT), Ho Chi Minh City, Vietnam, 2011.
- Ang, F.M., and R.C.L. Guevara. **A Robust Packet Loss Recovery Scheme for Wideband Speech Codecs**. In: Proceedings of the 9th International Symposium on Communications and Information Technologies (ISCIT), Incheon, South Korea, 2009.
- Ang, F.M., and R.C.L. Guevara. **On-Device Implementation of an Automatic Filipino Speech Recognition System**. In: Proceedings of the 4th International Colloquium on Signal Processing and its Applications (CSPA), Kuala Lumpur, Malaysia, 2008.

PROJECTS (PUBLIC ACCESS)

FlipVox: Filipino ASR Suite (on-going) |

2024

- FlipScribe: Filipino Video Subtitling Tool
- FlipGraph: Streaming Filipino Dictation Tool
- FlipShrew: Finetuned Whisper Models for Filipino

Japanese Audiobook TTS Project Demo |

2022

- Combined bilateral lexical and audio context embeddings for better modeling of prosody in longform, multi-speaker TTS

Filipino (Tagalog) ASR model recipe for kaldi (featured in Alpha Cephei's vosk) | |

2020

- Data augmentation via noise, volume and tempo perturbation using MUSAN dataset.
- Language modeling via SRILM