

# Jaesung Bae

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## EDUCATION

### Korea Advanced Institute of Science and Technology (KAIST)

Feb 2017 - Feb 2019

*MS in School of Electrical Engineering*

*Daejeon, South Korea*

- GPA: 3.95/4.30 (3.84/4.00)
- Advisor: Dr. Dae-Shik-Kim (Brain Reverse Engineering and Imaging Lab)
- Thesis: Speech Command Recognition using Capsule Network

### University of Applied Sciences Upper Austria

Sep 2015 - Jan 2016

*Exchange student*

*Upper Austria, Austria*

### Yonsei University

Mar 2013 - Feb 2017

*BS in Electrical and Electronics Engineering*

*Seoul, South Korea*

- GPA: 3.69/4.30 (3.61/4.00)
- Honors - 2nd Semester, 2016

## WORK EXPERIENCE

### Samsung Research, Samsung Electronics

May 2022 - Present

*Speech AI Researcher*

*Seoul, South Korea*

- Language & Voice Team, Global AI Center
- Research topics: Zero-shot Text-to-Speech (TTS), personalized TTS, on-device TTS, and expressive TTS

### NCSoft

Mar 2019 - Apr 2022

*Speech AI Researcher*

*Seongnam, South Korea*

- Speech AI Lab, AI Center
- Research topics: Expressive TTS, fine-grained prosody control of TTS, and multi-speaker TTS
- I also served as Technical Research Personnel, which is a form of alternative military service in South Korea.

## PUBLICATIONS

\*: Equal contribution

**2023** **Jaesung Bae**, Joun Yeop Lee, Ji-Hyun Lee, Seongkyu Mun, Taehwa Kang, Hoon-Young Cho, Chanwoo Kim, "Latent Filling: Latent space data augmentation for zero-shot speech synthesis," *arXiv preprint, arXiv:2310.03538*, 2023. (accepted to ICASSP 2024)

Heejin Choi, **Jaesung Bae**, Joun Yeop Lee, Seongkyu Mun, Jihwan Lee, Hoon-Young Cho, Chanwoo Kim, "MELS-TTS : Multi-emotion multi-lingual multi-speaker text-to-speech system via disentangled style tokens," 2023. (accepted to ICASSP 2024)

Joun Yeop Lee, **Jaesung Bae**, Seongkyu Mun, Jihwan Lee, Ji-Hyun Lee, Hoon-Young Cho, Chanwoo Kim, "Hierarchical timbre-cadence speaker encoder for zero-shot speech synthesis," in *Proc. Interspeech*, 2023.

Taejun Bak, Junmo Lee, Hanbin Bae, Jinhyeok Yang, **Jaesung Bae**, Young-Sun Joo, "Avocodo: Generative adversarial network for artifact-free vocoder," in *Proc. AAAI*, 2023.

**2022** **Jaesung Bae**, Jinhyeok Yang, Tae-Jun Bak, Young-Sun Joo, "Hierarchical and multi-scale variational autoencoder for diverse and natural non-autoregressive text-to-speech," in *Proc. Interspeech*, 2022.

Jihwan Lee, Joun Yeop Lee, Heejin Choi, Seongkyu Mun, Sangjun Park, **Jaesung Bae**, Chanwoo Kim, "Into-TTS: Intonation template based prosody control system," *arXiv preprint arXiv:2204.01271*, 2022.

**2021** **Jaesung Bae**, Tae-Jun Bak, Young-Sun Joo, and Hoon-Young Cho, "Hierarchical context-aware transformers for non-autoregressive text to speech," in *Proc. Interspeech*, 2021.

Jinhyeok Yang\*, **Jaesung Bae\***, Taejun Bak, Youngik Kim, and Hoon-Young Cho, "GANSpeech: Adversarial training for high-fidelity multi-speaker speech synthesis," in *Proc. Interspeech*, 2021.

Taejun Bak, **Jaesung Bae**, Hanbin Bae, Young-Ik Kim, and Hoon-Young Cho, "FastPitchFormant: Source-filter based decomposed modeling for speech synthesis," in *Proc. Interspeech*, 2021.

Hanbin Bae, **Jae-Sung Bae**, Young-Sun Joo, Young-Ik Kim, and Hoon-Young Cho, “A neural text-to-speech model utilizing broadcast data mixed with background music,” in *Proc. IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, 2021.

**Jae-Sung Bae**, Hanbin Bae, Young-Sun Joo, Junmo Lee, Gyeong-Hoon Lee, Hoon-Young Cho, “Speaking speed control of end-to-end speech synthesis using sentence-level conditioning,” in *Proc. Interspeech*, 2020.

**2019** Juntae Kim, **Jae-Sung Bae**, “Phase-aware speech enhancement with a recurrent two stage network,” *arXiv preprint arXiv:2001.09772*, 2019.

Juntae Kim\*, **Jae-Sung Bae\***, Minsoo Hahn, “End-point detection with state transition model based on chunk-wise classification,” *arXiv preprint arXiv:1912.10442*, 2019.

**2018** **Jae-Sung Bae**, Dae-Shik Kim, “End-to-end speech command recognition with capsule network,” in *Proc. Interspeech*, 2018.

## PROJECTS

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### On-device Personalized TTS System

May 2022 - Present

- I contributed to the research and development of an on-device personalized TTS system integrated into *Samsung Galaxy* devices and utilized within *Bixby text-call* functionality.
- It can create a personalized TTS system by fine-tuning the TTS system directly on the user’s device with just 18 utterances.

### TTS System of K-pop Fandom Platform, “UNIVERSE”

Mar 2019 - Apr 2022

- I conducted research and crafted a multi-speaker TTS system capable of generating the voices of approximately *100 K-pop artists* within a single TTS system. This TTS system is utilized in the following two services integrated into UNIVERSE.
- **1. Fan Networking Service (FNS):** In this service, K-pop artists create posts with photos and short comments, similar to Instagram. The TTS system reads these comments aloud in the respective artists’ voices, enhancing the fan experience.
- **2. Private Call:** UNIVERSE offers a feature that allows fans to receive simulated phone calls with the voices of their favorite artists. The TTS system was used to generate the voices for these artist phone calls, providing fans with a unique and exciting interaction with their beloved artists.

### Fine-grained Prosody Control of TTS System

Mar 2021 - Apr 2022

- I led the research and was the principal developer of an advanced TTS system capable of fine-grained prosody control. This allows users to generate speech with the specific prosodic characteristics they desire.
- It was launched as an *internal API*, and a website was also developed to enable users to generate speech with the required prosodic characteristics.
- As an example of its practical application, the TTS system was utilized to create speech for a video introducing the updated patch notes for the game “Trickster-M”. ([Youtube Link](#))

### TTS System in Baseball Broadcast Scenario

Mar 2019 - Mar 2021

- I played a pivotal role in the research and development of an expressive TTS system, specifically designed for diverse scenarios in baseball.
- The TTS system is capable of generating speech in four distinct emotional tones: highly expressive, expressive, neutral, and depressed.
- It can generate expressive speech responses based on input text symbols such as commas (,), tilde (~), exclamation marks (!), and question marks (?).
- I published several demos on NCSoft’s official blog and news articles. ([Demo Videos](#) and [Blog Post Links](#))

### Stock Price Prediction

Jan 2018 - Dec 2018

- I conducted research and developed a deep learning model capable of predicting the rise/fall of the KOSPI 200 index, employing a mixture-of-expert (MoE) method.
- I developed a model based on the RNN-VAE approach to predict future prices of 58 major factors using historical price data of various factors, sector indices, etc.

### Human Facial Expression, Behavior Recognition, and Tracking

Mar 2017 - Dec 2017

- I conducted research and developed a deep learning model capable of detecting faces in input images and predicting the gender and age of the detected individuals.
- I led the project and mainly developed the face detection and gender/age prediction model.

## TEACHING

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[EE635] Functional Brain Imaging (TA)   <i>KAIST</i>	Sep 2018 - Dec 2018
[EE209] Programming Structure for Electrical Engineering (TA)   <i>KAIST</i>	Sep 2017 - Dec 2017

## INVITED TALK

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<b>End-to-End Speech Command Recognition with Capsule Network</b> <i>Naver Corp.</i> <ul style="list-style-type: none"><li>• <a href="#">Youtube Link</a></li></ul>	Sep 2018 <i>Seongnam, South Korea</i>
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## MEDIA

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<b>Hierarchical Timbre-Cadence Speaker Encoder for Zero-shot Speech Synthesis</b> <i>Samsung Research's official blog (<a href="#">Link</a>)</i>	Sep 2023
<b>Introducing Four Papers Accepted at Interspeech 2021</b> <i>NCSoft's official blog (<a href="#">Link</a>)</i>	Sep 2021
<b>NCSoft's Speech AI Lab: Creating Achievements Together and Growing Together - Four Papers Accepted at Interspeech 2021</b> <i>NCSoft's official blog (<a href="#">Link</a>)</i>	Sep 2021
<b>Preserving the Realism of Baseball Game with "Broad-Casting Style" TTS System that Mimics Sports Commentators</b> <i>Yonhap News (<a href="#">Link</a>), NCSoft's official blog (<a href="#">Link</a>)</i>	Dec 2020
<b>Speed Control of AI TTS Systems Enhancing Naturalness of Synthesized Speech</b> <i>NCSoft's official blog (<a href="#">Link</a>)</i>	Nov 2020

## SKILLS

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- Python, pytorch, C++, git, docker, and tensorflow