

# Shang-Yu Su

[shangyusu.tw@gmail.com](mailto:shangyusu.tw@gmail.com) | <https://www.shangyusu.com>

## RESEARCH INTERESTS

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Natural Language Processing with Deep Learning, Dialogue Systems, Search/Recommendation Systems

## EDUCATION

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**National Taiwan University (NTU)** 2017/02 – 2021/10

*Doctor of Philosophy in Computer Science;*

Advisor: Yun-Nung (Vivian) Chen

**Thesis:** “Exploiting the Duality between Language Understanding and Generation and Beyond”

**National Taiwan University (NTU)** 2012/09 – 2017/01

*Bachelor of Science in Electrical Engineering;*

## RESEARCH EXPERIENCES

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**Rakuten** 2023/2 –

*Senior Research Scientist*

- Designed and shipped end-to-end data pipelines for visual search across retrieval and ranking, performing data ingestion for training and offline evaluation.
- Built a complete experimentation workflow for visual search ranking, including model training, offline evaluation, monitoring, and production model shipment.
- Achieved a 150% lift in core offline ranking metrics, contributing to higher-quality retrieval and better business outcomes.
- Led a cross-regional R&D team (1 data scientist + 1 PhD intern) across semantic and visual search, introducing LLM-based approaches for attribute mining and catalog enrichment to strengthen metadata quality and search relevance.

From 0→1, designed and built deep-learning-based search systems for Rakuten’s e-commerce marketplaces (Ichiba, Fashion, ...):

- Multilingual semantic search
  - Expanded language support from Japanese-only to five languages: Japanese, Korean, Traditional Chinese, English, and Vietnamese.
  - Delivered 29.4B JPY/year in attributed GMS uplift across Ichiba and Fashion search.
- Image-to-image visual search
  - Replaced a third-party solution with an in-house model, improving quality and reducing costs by 42.7% (>45M JPY annual savings).
  - Drove +250% attributed GMS and +260% attributed CVR in item-similarity search.
- Multi-modal semantic search
  - Built a vision-language embedding model to improve vector search relevance and retrieval quality.
- Deep personalized re-ranking
  - Developed and deployed deep learning models for the re-ranking stage to personalize results and boost engagement.

**Google** 2020/10 – 2021/01

*Research Intern, Google AI Research*

Advisor: Abhinav Rastogi

- **Unsupervised Multilingual Response Generation**

**Amazon**

2020/07 – 2020/10

*Applied Scientist Intern, Alexa AI*

Advisor: Sungjin Lee

- **Natural Language Understanding**

**Amazon**

2019/04 – 2019/08

*Applied Scientist Intern, Alexa AI*

Advisors: Dilek Hakkani-Tur and Mihail Eric

- **Knowledge-Grounded Response Generation**

**Microsoft**

2018/03 – 2018/06

*Research Intern*

Advisors: Jianfeng Gao and XiuJun Li

- **Dialogue Policy Optimization**

**NTU CSIE Machine Intelligence and Understanding Lab (MiuLab)**

2016/09 – 2021/10

*Undergraduate / Graduate Research Assistant*

Advisor: Yun-Nung (Vivian) Chen

- **Duality between Language Understanding and Generation**

- **Language Understanding**

- **Dialogue Policy Optimization**

- **Language Generation**

- **Other Dialogues Problems**

## **WORKING EXPERIENCES**

**Yahoo!**

2016/07 – 2017/03

*Software Engineering Intern*

- Rebuilt Yahoo! News Taiwan website with new technologies, which consumes over 2.2 million daily users (No.1 in Taiwan)
- Built an iOS app to enable video live streaming and real-time text chatting in less than 1.5 months
- Engaged in Scrum software development

**Microsoft**

2015/07 – 2016/06

*Software Engineering Intern*

- Completed several data visualization features and integrated them into a company internal system, the works cover front-end development and backend-database integration
- Implemented Power Point online web front-end features

## **PUBLICATIONS**

(Listed preprint, conference, and journal publications. **co-first author\***)

1. **Shang-Yu Su\***, Po-Wei Lin\*, and Yun-Nung Chen, “TREND: Trigger-Enhanced Relation-Extraction Network for Dialogues,” in *Proceedings of The 23rd Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL 2022)*, Edinburgh, UK, September 7-9, 2022. *ACL/ISCA*.

2. Ting-Chun Wang, **Shang-Yu Su**, and Yun-Nung Chen, “BARCOR: Towards A Unified Framework for Conversational Recommendation Systems,” *arXiv preprint*, 2022.
3. **Shang-Yu Su\***, Po-Wei Lin\*, and Yun-Nung Chen, “HUMBO: Bridging Response Generation and Facial Expression Synthesis,” *arXiv preprint*, 2021.
4. Yung-Sung Chuang, **Shang-Yu Su**, and Yun-Nung Chen, “Lifelong Language Knowledge Distillation,” in *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP 2020)*, Virtual, November 16-20, 2020. ACL.
5. **Shang-Yu Su\***, Yung-Sung Chuang\*, and Yun-Nung Chen, “Dual Inference for Improving Language Understanding and Generation,” in *Findings of the 2020 Conference on Empirical Methods in Natural Language Processing (Finding of EMNLP 2020)*, Virtual, November 16-20, 2020. ACL.
6. **Shang-Yu Su**, Chao-Wei Huang, and Yun-Nung Chen, “Towards Unsupervised Language Understanding and Generation by Joint Dual Learning,” in *Proceedings of The 58th Annual Meeting of the Association for Computational Linguistics (ACL 2020)*, Virtual, July 5-July 10, 2020. ACL.
7. **Shang-Yu Su**, Chao-Wei Huang, and Yun-Nung Chen, “Dual Supervised Learning for Natural Language Understanding and Generation,” in *Proceedings of The 57th Annual Meeting of the Association for Computational Linguistics (ACL 2019)*, Florence, Italy, July 28-Aug 2, 2019. ACL.
8. Yu-An Wang\*, Yu-Kai Huang\*, Tzu-Chuan Lin\*, **Shang-Yu Su**, and Yun-Nung Chen, “Modeling Melodic Feature Dependency with Modularized Variational Auto-Encoder,” in *Proceedings of The 44th IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2019)*, Brighton, U.K., May 12-17, 2019. IEEE.
9. **Shang-Yu Su**, Shan-Wei Lin, and Yun-Nung Chen, “Compound Variational Auto-Encoder,” in *Proceedings of The 44th IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2019)*, Brighton, U.K., May 12-17, 2019. IEEE.
10. **Shang-Yu Su**, Pei-Chieh Yuan, and Yun-Nung Chen, “Dynamically Context-Sensitive Time-Decay Attention for Dialogue Modeling,” in *Proceedings of The 44th IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2019)*, Brighton, U.K., May 12-17, 2019. IEEE.
11. Yi-Ting Yeh, Tzu-Chuan Lin, Hsiao-Hua Cheng, Yi-Hsuan Deng, **Shang-Yu Su**, and Yun-Nung Chen, “Reactive Multi-Stage Feature Fusion for Multimodal Dialogue Modeling,” in *The 7th Dialog System Technology Challenge (DSTC7) in Proceedings of Thirty-Third AAAI Conference on Artificial Intelligence (AAAI 2019)*, Honolulu, Hawaii, USA, 2019.
12. Hao-Tong Ye, Kai-Ling Lo, **Shang-Yu Su**, and Yun-Nung Chen, “Knowledge-Grounded Response Generation with Deep Attentional Latent-Variable Model,” in *The 7th Dialog System Technology Challenge (DSTC7) in Proceedings of Thirty-Third AAAI Conference on Artificial Intelligence (AAAI 2019)*, Honolulu, Hawaii, USA, 2019. NOTE: Also published in *Computer Speech and Language* (Journal, 2020)
13. Ting-Rui Chiang, Chao-Wei Huang, **Shang-Yu Su**, and Yun-Nung Chen, “Learning Multi-Level Information for Dialogue Response Selection by Highway Recurrent Transformer,” in *The 7th Dialog System Technology Challenge (DSTC7) in Proceedings of Thirty-Third AAAI Conference on Artificial Intelligence (AAAI 2019)*, Honolulu, Hawaii, USA, 2019. NOTE: Also published in *Computer Speech and Language* (Journal, 2020)

14. Chao-Wei Huang, Ting-Rui Chiang, **Shang-Yu Su**, and Yun-Nung Chen, "RAP-Net: Recurrent Attention Pooling Networks for Dialogue Response Selection," in *The 7th Dialog System Technology Challenge (DSTC7) in Proceedings of Thirty-Third AAAI Conference on Artificial Intelligence (AAAI 2019)*, Honolulu, Hawaii, USA, 2019. NOTE: Also published in *Computer Speech and Language (Journal, 2020)*
15. **Shang-Yu Su** and Yun-Nung Chen, "Investigating Linguistic Pattern Ordering in Hierarchical Natural Language Generation," in *Proceedings of 7th IEEE Workshop on Spoken Language Technology (SLT 2018)*, Athens, Greece, December 18-21, 2018. IEEE.
16. **Shang-Yu Su**, XiuJun Li, Jianfeng Gao, Jingjing Liu, and Yun-Nung Chen, "Discriminative Deep Dyna-Q: Robust Planning for Dialogue Policy Learning," in *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing (EMNLP 2018)*, Brussels, Belgium, October 31-November 4, 2018. ACL
17. Baolin Peng, XiuJun Li, Jianfeng Gao, Jingjing Liu, Kam-Fai Wong, and **Shang-Yu Su**, "Deep Dyna-Q: Integrating Planning for Task-Completion Dialogue Policy Learning," in *Proceedings of The 56th Annual Meeting of the Association for Computational Linguistics (ACL 2018)*, Melbourne, Australia, July 15-20, 2018
18. **Shang-Yu Su**, Kai-Ling Lo, Yi-Ting Yeh, and Yun-Nung Chen, "Natural Language Generation by Hierarchical Decoding with Linguistic Patterns," in *Proceedings of The 16th Annual Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT 2018)*, New Orleans, USA, June 1-6, 2018
19. **Shang-Yu Su**, Pei-Chieh Yuan, and Yun-Nung Chen, "How Time Matters: Learning Time-Decay Attention for Contextual Spoken Language Understanding in Dialogues," in *Proceedings of The 16th Annual Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT 2018)*, New Orleans, USA, June 1-6, 2018
20. **Shang-Yu Su\***, Po-Chun Chen\*, Ta-Chung Chi\*, and Yun-Nung Chen, "Dynamic Time-Aware Attention to Speaker Roles and Contexts for Spoken Language Understanding," in *Proceedings of 2017 IEEE Workshop on Automatic Speech Recognition and Understanding (ASRU 2017)*, Okinawa, Japan, December 16-20, 2017.
21. **Shang-Yu Su\***, Ta-Chung Chi\*, Po-Chun Chen\*, and Yun-Nung Chen, "Speaker Role Contextual Modeling for Language Understanding and Dialogue Policy Learning," in *Proceedings of The 8th International Joint Conference on Natural Language Processing (IJCNLP 2017)*, Taipei, Taiwan, November 27-December 1, 2017.

## SELECTED HONOR & AWARDS

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### [PhD Thesis Award \(2022\)](#)

TAAI

- Honorable Mention

### [Best Thesis Award \(2022\)](#)

ACLCLP

- The best NLP thesis nationwide.

### [Google PhD Fellowship \(2020\)](#)

Google

- 1 of the 4 recipients of Natural Language Processing area worldwide.

### **Foxconn Technology Award (2021)**

*Foxconn*

### **Appier Scholarship**

*Appier Inc.*

- Travel grant for EMNLP 2018.
- Travel grant for ACL 2019.

### **Verizon Media Scholarship Program**

*Verizon Media Inc.*

- Travel grant for ACL 2019.

### **PROFESSIONAL ACTIVITIES**

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All served as *Program Committee (Dialogue and Interactive Systems)* or *Reviewer*:

#### **Conferences and Workshops:**

*ACL, EMNLP, IJCNLP, AACL, NAACL, EACL, COLING, AAIL, ACL Student Research Workshop, ACL Demo Track, NeurIPS, ICLR, Dialog System Technology Challenges (DSTC), NLP4ConvAI Workshop, Human in the Loop Dialogue Systems Workshop, ACM ICMI-CATSLU, IEEE DataCom, ICASSP*

#### **Journals:**

*Computer Speech & Language, IEEE Signal Processing Letter, IEEE Access, Transactions on Audio, Speech and Language Processing (TASLP), Neurocomputing*

### **LANGUAGES**

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- Chinese (native)
- English (fluent): **TOEIC-Gold (>900)** with experiences of working in the USA
- Japanese (fluent): **JLPT-N2**
- Korean (mid-level): **TOPIK-Level 3**

### **REFERENCES**

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- Dr. Dongzhe Wang  
Principal Research Scientist of Rakuten
- Dr. Yun-Nung (Vivian) Chen  
Professor of National Taiwan University, [yvchen@csie.ntu.edu.tw](mailto:yvchen@csie.ntu.edu.tw)
- Dr. Jianfeng Gao  
Distinguished Scientist & Vice President at Microsoft Research, [jfgao@microsoft.com](mailto:jfgao@microsoft.com)
- Dr. Sungjin Lee  
Executive Vice President of Samsung Electronics, ex-Principal Applied Scientist of Amazon
- Dr. Dilek Hakkani-Tur  
Professor of UIUC, ex-Senior Principal Applied Scientist of Amazon