YUN CHENG (JOE) WANG

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EDUCATION

University of Southern California — Los Angeles, CA

Doctor of Philosophy, Electrical and Computer Engineering — Jan 2021 - Present

- Advisor: Professor C.-C. Jay Kuo, Anticipated graduation date: Dec 2023

University of Southern California — Los Angeles, CA

Master of Science, Electrical and Computer Engineering, GPA: 4.0/4.0 — Aug 2018 - Dec 2019

- Relevant coursework: Analysis of Algorithms, Convex Optimization, Multimedia Compression

National Taiwan University — Taipei, Taiwan

Bachelor of Science, Electrical Engineering, GPA: 3.8/4.3 — Sep 2014 - Jun 2018

- Relevant coursework: Digital Speech Processing, Machine Learning Foundations, Artificial Intelligence

TECHNICAL SKILLS

- **Programming Languages:** Python, C++, Java, Matlab, SPARQL, Bash, LaTeX
- **Software & APIs:** Apache Spark, Neo4j, Git, PyTorch, Huggingface, scikit-learn, XGBoost, nltk, OpenCV

RESEARCH INTERESTS

Knowledge Graphs, Data Discovery, Natural Language Processing, Representation Learning, Machine Learning on Graphs, Lightweight and Efficient Machine Learning Models, Perceptual Quality Assessment, Edge AI.

RESEARCH EXPERIENCE

Knowledge Graph Completion — Jan 2021 - Present

USC Media Communication Lab (MCL), Los Angeles, CA

- Propose communication system design to deploy generative AI (GenAI) services under an edge-cloud computing paradigm to improve user privacy and latency.
- Infer missing information, including entity types and relationships, in knowledge graphs based on observed triples.
- Develop models achieving SOTA results in low dimensions, i.e. 32 dimensions, on most knowledge graph datasets, where results are comparable with models in high dimensions, i.e. 500 dimensions.

Blind Image and Video Quality Assessment — Aug 2021 - Present

Collaboration between USC MCL and Meta Platforms, Inc., Los Angeles, CA

- Predict mean opinion scores (MOS) for in-the-wild images and user-created videos without pristine images and videos.
- Develop a lightweight pipeline deploying on user devices achieving SOTA results on synthetic datasets and competitive results on authentic datasets with 54 times smaller model size.
- Manage real-time inference on CPUs with a throughput of over 26 images/s.

Compositional Word Embeddings for Chinese — Sep 2020 - Dec 2020

Academia Sinica, Taipei, Taiwan

- Improved word embeddings for Chinese by incorporating semantic constituents of words.
- Leveraged structured word definitions in E-HowNet, a lexical knowledge base with 95K annotated Chinese words, to compose word embeddings using multi-relational graph convolutional networks.
- Incorporated masked language models for downstream Chinese applications.

Video Summarization for Drama Series — Dec 2017 - Jul 2018

Collaboration between NTU MPAC Lab and KKTV Co., Ltd., Taipei, Taiwan

- Identified storyline in each 45-minute episode of drama series using unsupervised clustering on frame features and textual analysis on transcripts to extract a 30-second video thumbnail.
- Conducted subjective tests with more than 20 subjects and A/B testing to evaluate generated video thumbnails.

INTERNSHIP EXPERIENCE

Yahoo, Inc. Remote

Research Intern May 2023 - Aug 2023

- Generate missing textual descriptions for entities in Yahoo Knowledge with a focus on person and company types.
- Text generation using LLMs is controlled by a fact ranking module to ensure interoperability and factuality.
- Deliver a research talk on "Recent Development in Knowledge Graph Embeddings and Applications."

Taboola, Inc. Los Angeles, CA

Data Scientist Intern Jun 2019 - Aug 2019

- Constructed a large-scale entity link graph to discover trending topics from daily news articles.
- Processed over 20K news articles from multiple publishers and updated knowledge base within an hour daily.
- Mentored and led 2 CS undergraduate interns.

TEACHING AND MENTORING EXPERIENCE

- TA for EE512: Stochastic Process for Financial Engineering, USC, Spring 2023.
- Guest lecturer for EE669: Multimedia Data Compression, USC, Fall 2022.
- Graduate student mentor, USC Viterbi School of Engineering, Fall 2021.
- Course mentor for EE503: Probability for Electrical and Computer Engineer, USC, Fall 2019.

PUBLICATIONS

[1] **Yun-Cheng Wang**, Jintang Xue, Chengwei Wei, C.-C. Jay Kuo, "An Overview on Generative AI at Scale with Edge-Cloud Computing", *arXiv, 2023.*

[2] Chengwei Wei, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, "An Overview on Language Models: Recent Developments and Outlook", *arXiv, 2023.*

[3] **Yun-Cheng Wang**, Xiou Ge, Bin Wang, C.-C. Jay Kuo, "AsyncET: Asynchronous Learning for Knowledge Graph Entity Typing with Auxiliary Relation", *Under Review, 2023.*

[4] **Yun-Cheng Wang**, Xiou Ge, Bin Wang, C.-C. Jay Kuo, "GreenKGC: A Lightweight Knowledge Graph Completion Method", *Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers), 2023.*

[5] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, "Knowledge Graph Embedding with 3D Compound Geometric Transformations", *arXiv, 2023.*

[6] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, "Compounding Geometric Operations for Knowledge Graph Completion", *Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers), 2023.*

[7] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, "TypeEA: Type-Associated Embedding for Knowledge Graph Entity Alignment", *APSIPA Transactions on Signal and Information Processing, 2023.*

[8] Zhanxuan Mei, **Yun-Cheng Wang**, C-C Jay Kuo, "Blind Video Quality Assessment at the Edge", *arXiv, 2023.*

[9] Zhanxuan Mei*, **Yun-Cheng Wang***, Xingze He, Yong Yan, C-C Jay Kuo, "Lightweight High-Performance Blind Image Quality Assessment", *arXiv, 2023.*

[10] Zhanxuan Mei, **Yun-Cheng Wang**, Xingze He, C-C Jay Kuo, "GreenBIQA: A Lightweight Blind Image Quality Assessment Method", *IEEE MMSP, 2022.*

[11] **Yun-Cheng Wang**, Xiou Ge, Bin Wang, C.-C. Jay Kuo, "KGBoost: A Classification-Based Knowledge Base Completion Method with Negative Sampling", *Pattern Recognition Letter, 2022.*

[12] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, "CORE: A knowledge graph entity type prediction method via complex space regression and embedding", *Pattern Recognition Letter, 2022.*

[13] Bin Wang, Fenxiao Chen, **Yun-Cheng Wang**, C.-C. Jay Kuo, "Efficient Sentence Embedding via Semantic Subspace Analysis", *International Conference on Pattern Recognition (ICPR), 2020.*

[14] Fenxiao Chen, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, "Graph representation learning: A survey", *APSIPA Transactions on Signal and Information Processing, 2020.*

[15] Bin Wang, Angela Wang, Fenxiao Chen, **Yun-Cheng Wang**, C.-C. Jay Kuo, "Evaluating word embedding models: Methods and experimental results", *APSIPA Transactions on Signal and Information Processing, 2019.*

TEAM PROJECTS

Knowledge Graph for Music Recommendation Fall 2021

Final Project for DSCI558: Building Knowledge Graphs | 2 Ph.D. students in EE

- Construct a knowledge graph with over 23K soundtracks, 11.5K artists, and 471K edges from multiple sources.
- Devised a recommendation system by training embeddings for soundtracks, artists, genres, and lyrics.

Object and Key Phrase Retrieval for YouTube Videos Mar 2019

2019 LA Hacks | 4 graduate students in EE ans CS

- Enhanced YouTube search engine by allowing searches for specific objects or key phrases in videos.
- Adopted Google Cloud Platform as backend and JavaScript to implement frontend.

PRESENTATIONS

- Research "A multi-stage classification framework for knowledge graph completion" is presented at 12-th USC ECE research festival, Oct 2022.
- Research "Rule-Guided Knowledge Graph Completion" is presented at 11-th USC ECE research festival, Oct 2021.
- Invited talk "Introduction to Knowledge Graph" for Department of EE at NTNU, Taipei, Taiwan, Sep 2020.

HONORS, MEMBERSHIP, AND PROFESSIONAL SERVICE

- 2022 APSIPA Sadaoki Furui Prize Paper Award.
- Journal reviewer: IEEE/ACM TASLP (2022), IEEE IoT Magazine (2023).
- Conference reviewer: ECML-PKDD (2022), ACL (2023), EMNLP (2023).
- Viterbi Graduate Fellowship, Spring 2021.
- USC EE MS honors program, Dec 2019.
- Student Member, IEEE, Signal Processing and Communication Society, since 2018.