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

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.

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 EXPERIENCE

Efficient Machine Learning and Edge AI

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

- *Generative AI at Scale* — Jan 2023 - Present
- Define the memory, computation, and network requirements to deploy generative AI services, e.g. ChatGPT, at scale.
- Analyze the latency for generative AI services under different network communication frameworks.
- Identify design considerations for generative AI models for better efficiency, computation offloading, and privacy.

- *Blind Image and Video Quality Assessment* — Aug 2021 - Dec 2022
- Collaborate with Meta Platforms on predicting user perceptual experience on images and videos without references.
- 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.

Knowledge Graph Completion — Jan 2021 - Present

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

- Infer missing information, including entity types and relationships, in knowledge graphs based on observed triples.
- Train embeddings for entities, relations, and types in knowledge graphs.
- Design grouping and clustering algorithms on relation and entity types for efficient training and inference.
- Achieve SOTA results in low dimensions on link prediction, where results are competitive to models in high dimensions.

Compositional Word Embeddings for Chinese — Sep 2020 - May 2021

Academia Sinica, Taipei, Taiwan

- Improve word embeddings for Chinese by incorporating semantic constituents of words.
- Leverage 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.
- Incorporate masked language models for downstream Chinese applications.

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 interpretability and factuality.
- Deliver research findings 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/Fall 2024.
- 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

- Poster "GreenKGC: A Lightweight Knowledge Graph Completion Method" at ACL2023, Jul 2023.
- Poster "Compounding Geometric Operations for Knowledge Graph Completion" at ACL2023, Jul 2023.
- Poster "A Multi-stage Classification Framework for KGC" 12th USC ECE research festival, Oct 2022.
- Poster "Rule-Guided Knowledge Graph Completion" at 11th USC ECE research festival, Oct 2021.
- Invited talk on "Introduction to Knowledge Graphs" 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/Research Assistantship/Teaching Assistantship, Spring 2021 - Present.
- USC EE MS honors program, Dec 2019.
- Member, IEEE, Signal Processing and Communication Society, since 2018.

REFERENCE

- Prof. C.-C. Jay Kuo, *Thesis Advisor*
  University of Southern California
  Email: `jckuo AT usc.edu`