

Michael Chin-Chia Yeh

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PROFESSIONAL EXPERIENCE

Visa Research

Staff Research Scientist

Foster City, California

2018/09 –

- Time Series Data Mining

Time series data generated from transaction databases can provide critical insights for payment processing companies. To effectively utilize this information, I have developed machine learning models tailored for transactional time series data across various contexts. The following topics were studied in this area: matrix profile, deep learning, foundation models, time series forecasting, spatial-temporal forecasting, time series classification/regression, multi-future prediction, multi-model learning, online learning, motif/discord mining, and anomaly detection.

- Embeddings and Representation Learning

Embedding learning technologies are essential for unlocking deep insights into entities within databases. My research in this area has focused on three directions for analyzing Visa's data: 1) developing embedding learning frameworks, 2) mitigating the impact of undesirable information within embeddings, and 3) enhancing the scalability of embedding learning. The outcomes of these studies have enabled the development of embeddings for entities such as merchants, merchant categories, and countries, which have been successfully applied to various analytical tasks.

- Machine Learning for Tabular Data

Transaction data is typically stored as sequential tabular data, which presents unique challenges and opportunities for machine learning applications. My research and prototype efforts have been dedicated to advancing technologies in foundation models and sequential modeling, specifically tailored for tasks such as recommendation, stand-in processing, and fraud detection. By leveraging time series data mining, embedding learning, and sequential modeling techniques, I have developed innovative approaches that enhance the accuracy and efficiency of these tasks. This work has involved not only designing and implementing models but also rigorously evaluating their performance in real-world transactional environments, ensuring their robustness and scalability for large-scale applications.

I published *50 peer-reviewed papers* and *30 patents* at Visa as of 10/26/2024.

Supervisor: Wei Zhang, Mahashweta Das

University of California, Riverside (UCR)

Research Assistant

Riverside, California

3 Years

- All Pairs Similarity Search for Time Series Subsequences (Matrix Profile)

The all-pairs-similarity-search (or similarity join) problem has been extensively studied for text and a handful of other data types. However, there has been little progress on similarity joins for time series subsequences. The goal of the project is to develop an efficient/scalable algorithm solving the similarity join problem for time series data and show the utility of such algorithm when it's treated as a primitive operation for time series. The application of time series join includes visualization, motif/discord mining, clustering, etc.

I published *19 peer-reviewed papers* at UCR.

Supervisor: Prof. Eamonn Keogh

- Audio Word Representation of Audio Signals

Audio word (AW) representation symbolizes any local audio event as a codeword within a pre-constructed dictionary. Over the course of the project, I have conducted a systematic evaluation with various AW extracting configurations on audio classification/auto-tagging systems. Based on the result of the systematic evaluation, I have proposed a framework that aims to standardize the modularization of the AW representation extraction. I have also examined the possibility of incorporating various ideas (e.g., multi-scale feature learning, bagging) into the AW extraction process to learn better AW representation.

I published *8 peer-reviewed papers* at CITI.

Supervisor: Prof. Yi-Hsuan Yang

HONORS, AWARDS, AND SERVICE

- Honorable mention for 2019 SIGKDD doctoral dissertation award.
- First place in AALTD' 16 time-series classification challenge
- Travel Award: SDM 2018, KDD 2017, ICDM 2016.
- Program Committee: KDD 2019-2022, MiLeTS 2020-2022, AAAI 2021, ECML-PKDD (ADS) 2020.

EDUCATION

University of California, Riverside (UCR)

Ph.D. in Computer Science

University of California, Los Angeles (UCLA)

M.S. in Mechanical Engineering, Systems and Control

Virginia Polytechnic Institute and State University (Virginia Tech)

B.S. in Mechanical Engineering

PUBLICATION

- **Chin-Chia Michael Yeh**, Yujie Fan, Xin Dai, Uday Singh Saini, Vivian Lai, Prince Osei Aboagye, Junpeng Wang, Huiyuan Chen, Yan Zheng, Zhongfang Zhuang, Liang Wang, and Wei Zhang, "RPMixer: Shaking Up Time Series Forecasting with Random Projections for Large Spatial-Temporal Data," *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, 2024.
- **Chin-Chia Michael Yeh**, Audrey Der, Uday Singh Saini, Vivian Lai, Yan Zheng, Junpeng Wang, Xin Dai, Zhongfang Zhuang, Yujie Fan, Huiyuan Chen, Prince Osei Aboagye, Liang Wang, Wei Zhang, and Eamonn Keogh, "Matrix Profile for Anomaly Detection on Multidimensional Time Series," *IEEE International Conference on Data Mining (ICDM)*, 2024.
- Maryam Shahcheraghi, **Chin-Chia Michael Yeh**, Yan Zheng, Junpeng Wang, Zhongfang Zhuang, Liang Wang, Mahashweta Das, and Eamonn Keogh, "Matrix Profile XXXI: Motif-Only Matrix Profile: Orders of Magnitude Faster," *IEEE International Conference on Knowledge Graph (ICKG)*, 2024.
- Audrey Der, **Chin-Chia Michael Yeh**, Xin Dai, Huiyuan Chen, Yan Zheng, Yujie Fan, Zhongfang Zhuang, Vivian Lai, Junpeng Wang, Liang Wang, Wei Zhang, and Eamonn Keogh, "A Systematic Evaluation of Generated Time Series and Their Effects in Self-Supervised Pretraining," *ACM International Conference on Information and Knowledge Management (CIKM)*, 2024.
- Jiarui Sun, Yujie Fan, **Chin-Chia Michael Yeh**, Wei Zhang, and Girish Chowdhary, "Revealing the Power of Masked Autoencoders in Traffic Forecasting," *ACM International Conference on Information and Knowledge Management (CIKM)*, 2024.

- Uday Singh Saini, Zhongfang Zhuang, **Chin-Chia Michael Yeh**, Wei Zhang, and Evangelos E Papalexakis, “Analysis of Causal and Non-Causal Convolution Networks for Time Series Classification,” *SIAM International Conference on Data Mining (SDM)*, 2024.
- Audrey Der, **Chin-Chia Michael Yeh**, Yan Zheng, Junpeng Wang, Zhongfang Zhuang, Liang Wang, Wei Zhang, and Eamonn Keogh, “PUPAE: Intuitive and Actionable Explanations for Time Series Anomalies,” *SIAM International Conference on Data Mining (SDM)*, 2024.
- Junpeng Wang, **Chin-Chia Michael Yeh**, Yujie Fan, Xin Dai, Yan Zheng, Liang Wang, and Wei Zhang, “PromptLandscape: Guiding Prompts Exploration and Analysis with Visualization,” *IEEE Pacific Visualization Conference (PacificVis)*, 2024.
- Yiran Li, Junpeng Wang, Prince Aboagye, **Chin-Chia Michael Yeh**, Yan Zheng, Liang Wang, Wei Zhang, and Kwan-Liu Ma, “Visual Analytics for Efficient Image Exploration and User-Guided Image Captioning,” *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2024.
- Huiyuan Chen, Zhe Xu, **Chin-Chia Michael Yeh**, Vivian Lai, Yan Zheng, Minghua Xu, and Hanghang Tong, “Masked Graph Transformer for Large-Scale Recommendation,” *International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2024.
- **Chin-Chia Michael Yeh**, Xin Dai, Huiyuan Chen, Yan Zheng, Yujie Fan, Audrey Der, Vivian Lai, Zhongfang Zhuang, Junpeng Wang, Liang Wang, and Wei Zhang, “Toward a Foundation Model for Time Series Data,” *ACM International Conference on Information and Knowledge Management (CIKM)*, 2023.
- **Chin-Chia Michael Yeh**, Huiyuan Chen, Xin Dai, Yan Zheng, Junpeng Wang, Vivian Lai, Yujie Fan, Audrey Der, Zhongfang Zhuang, Liang Wang, Wei Zhang, and Jeff M. Phillips, “An Efficient Content-based Time Series Retrieval System,” *ACM International Conference on Information and Knowledge Management (CIKM)*, 2023.
- Yujie Fan, **Chin-Chia Michael Yeh**, Huiyuan Chen, Yan Zheng, Liang Wang, Junpeng Wang, Xin Dai, Zhongfang Zhuang, and Wei Zhang, “Spatial-Temporal Graph Boosting Networks: Enhancing Spatial-Temporal Graph Neural Networks via Gradient Boosting,” *ACM International Conference on Information and Knowledge Management (CIKM)*, 2023.
- Dongyu Zhang, Liang Wang, Xin Dai, Shubham Jain, Junpeng Wang, Yujie Fan, **Chin-Chia Michael Yeh**, Yan Zheng, Zhongfang Zhuang, and Wei Zhang, “FATA-Trans: Field And Time-Aware Transformer for Sequential Tabular Data,” *ACM International Conference on Information and Knowledge Management (CIKM)*, 2023.
- **Chin-Chia Michael Yeh**, Yan Zheng, Menghai Pan, Huiyuan Chen, Zhongfang Zhuang, Junpeng Wang, Liang Wang, Wei Zhang, Jeff M. Phillips, and Eamonn Keogh, “Sketching Multidimensional Time Series for Fast Discord Mining,” *IEEE International Conference on Big Data (BigData)*, 2023.
- **Chin-Chia Michael Yeh**, Huiyuan Chen, Yujie Fan, Xin Dai, Yan Zheng, Vivian Lai, Junpeng Wang, Zhongfang Zhuang, Liang Wang, Wei Zhang, and Eamonn Keogh, “Ego-Network Transformer for Subsequence Classification in Time Series Data,” *IEEE International Conference on Big Data (BigData)*, 2023.
- **Chin-Chia Michael Yeh**, Huiyuan Chen, Xin Dai, Yan Zheng, Yujie Fan, Vivian Lai, Junpeng Wang, Audrey Der, Zhongfang Zhuang, Liang Wang, and Wei Zhang, “Temporal Treasure Hunt: Content-based Time Series Retrieval System for Discovering Insights,” *IEEE International Conference on Big Data (BigData)*, 2023.
- Audrey Der, **Chin-Chia Michael Yeh**, Yan Zheng, Junpeng Wang, Huiyuan Chen, Zhongfang Zhuang, Liang Wang, Wei Zhang, and Eamonn Keogh, “Time Series Synthesis Using the Matrix Profile for Anonymization,” *IEEE International Conference on Big Data (BigData)*, 2023.
- **Chin-Chia Michael Yeh**, Xin Dai, Yan Zheng, Junpeng Wang, Huiyuan Chen, Yujie Fan, Audrey Der, Zhongfang Zhuang, Liang Wang, and Wei Zhang, “Multitask Learning for Time Series Data with 2D Convolution,” *IEEE International Conference on Machine Learning and Applications (ICMLA)*, 2023.

- Yujie Fan, **Chin-Chia Michael Yeh**, Huiyuan Chen, Liang Wang, Zhongfang Zhuang, Junpeng Wang, Xin Dai, Yan Zheng, and Wei Zhang, “Spatial-Temporal Graph Sandwich Transformer for Traffic Flow Forecasting,” *Joint European Conference on Machine Learning and Knowledge Discovery in Databases (ECML-PKDD)*, 2023.
- Huiyuan Chen, **Chin-Chia Michael Yeh**, Yujie Fan, Yan Zheng, Junpeng Wang, Vivian Lai, Mahashweta Das, and Hao Yang, “Sharpness-Aware Graph Collaborative Filtering,” *International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2023.
- Yan Zheng, Junpeng Wang, **Chin-Chia Michael Yeh**, Yujie Fan, Huiyuan Chen, Liang Wang, and Wei Zhang, “EmbeddingTree: Hierarchical Exploration of Entity Features in Embedding,” *IEEE Pacific Visualization Symposium (PacificVis)*, 2023.
- Yiran Li, Junpeng Wang, Xin Dai, Liang Wang, **Chin-Chia Michael Yeh**, Yan Zheng, Wei Zhang, and Kwan-Liu Ma, “How Does Attention Work in Vision Transformers? A Visual Analytics Attempt,” *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2023.
- Vivian Lai, Huiyuan Chen, **Chin-Chia Michael Yeh**, Minghua Xu, Yiwei Cai, and Hao Yang, “Enhancing Transformers without Self-supervised Learning: A Loss Landscape Perspective in Sequential Recommendation,” *ACM Conference on Recommender Systems (RecSys)*, 2023.
- Huiyuan Chen, Xiaoting Li, Vivian Lai, **Chin-Chia Michael Yeh**, Yujie Fan, Yan Zheng, Mahashweta Das, and Hao Yang, “Adversarial Collaborative Filtering for Free,” *ACM Conference on Recommender Systems (RecSys)*, 2023.
- Huiyuan Chen, Kaixiong Zhou, Kwei Heng Lai, **Chin-Chia Michael Yeh**, Yan Zheng, Xia Hu, and Hao Yang, “Hessian-aware Quantized Node Embeddings for Recommendation,” *ACM Conference on Recommender Systems (RecSys)*, 2023.
- **Chin-Chia Michael Yeh**, Mengting Gu, Yan Zheng, Huiyuan Chen, Javid Ebrahimi, Zhongfang Zhuang, Junpeng Wang, Liang Wang, and Wei Zhang, “Embedding Compression with Hashing for Efficient Representation Learning in Large-Scale Graph,” *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, 2022.
- **Chin-Chia Michael Yeh**, Yan Zheng, Junpeng Wang, Huiyuan Chen, Zhongfang Zhuang, Wei Zhang, and Eamonn Keogh, “Error-bounded Approximate Time Series Joins Using Compact Dictionary Representations of Time Series,” *SIAM International Conference on Data Mining (SDM)*, 2022.
- Huiyuan Chen, **Chin-Chia Michael Yeh**, Fei Wang, and Hao Yang, “Graph Neural Transport Networks with Non-local Attentions for Recommender Systems,” *ACM Web Conference (WWW)*, 2022.
- Prince Osei Aboagye, Yan Zheng, Jack Shunn, **Chin-Chia Michael Yeh**, Junpeng Wang, Zhongfang Zhuang, Huiyuan Chen, Liang Wang, Wei Zhang, and Jeff Phillips, “Interpretable Debiasing of Vectorized Language Representations with Iterative Orthogonalization,” *International Conference on Learning Representations (ICLR)*, 2022.
- Archit Rathore, Sunipa Dev, Jeff M. Phillips, Vivek Srikumar, Yan Zheng, **Chin-Chia Michael Yeh**, Junpeng Wang, Wei Zhang, and Bei Wang, “VERB: Visualizing and Interpreting Bias Mitigation Techniques Geometrically for Word Representations,” *ACM Transactions on Interactive Intelligent Systems (TiIS)*, 2022.
- Audrey Der, **Chin-Chia Michael Yeh**, Renjie Wu, Junpeng Wang, Yan Zheng, Zhongfang Zhuang, Liang Wang, Wei Zhang, and Eamonn Keogh, “Matrix Profile XXVII: A Novel Distance Measure for Comparing Long Time Series,” *IEEE International Conference on Knowledge Graph (ICKG)*, 2022.
- Jiarui Sun, Mengting Gu, **Chin-Chia Michael Yeh**, Yujie Fan, Girish Chowdhary, and Wei Zhang, “Dynamic Graph Node Classification via Time Augmentation,” *IEEE International Conference on Big Data (BigData)*, 2022.
- Prince O Aboagye, Yan Zheng, **Chin-Chia Michael Yeh**, Junpeng Wang, Zhongfang Zhuang, Huiyuan Chen, Liang Wang, Wei Zhang, and Jeff Phillips, “Quantized Wasserstein Procrustes Alignment of Word Em-

bedding Spaces,” *Biennial Conference of the Association for Machine Translation in the Americas (AMTA)*, 2022.

- Huiyuan Chen, Yusan Lin, Menghai Pan, Lan Wang, **Chin-Chia Michael Yeh**, Xiaoting Li, Yan Zheng, Fei Wang, and Hao Yang, “Denoising Self-attentive Sequential Recommendation,” *ACM Conference on Recommender Systems (RecSys)*, 2022.
- Huiyuan Chen, Xiaoting Li, Kaixiong Zhou, Xia Hu, **Chin-Chia Michael Yeh**, Yan Zheng, and Hao Yang, “TinyKG: Memory-Efficient Training Framework for Knowledge Graph Neural Recommender Systems,” *ACM Conference on Recommender Systems (RecSys)*, 2022.
- Archit Rathore, Sunipa Dev, Vivek Srikumar, Jeff M Phillips, Yan Zheng, **Chin-Chia Michael Yeh**, Junpeng Wang, Wei Zhang, and Bei Wang, “An Interactive Visual Demo of Bias Mitigation Techniques for Word Representations From a Geometric Perspective,” *NeurIPS 2021 Competitions and Demonstrations Track*, Proceedings of Machine Learning Research (PMLR), 2022.
- Junpeng Wang, Liang Wang, Yan Zheng, **Chin-Chia Michael Yeh**, Shubham Jain, and Wei Zhang, “Learning-From-Disagreement: A Model Comparison and Visual Analytics Framework,” *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2022.
- Bo Dong, Yuhang Wu, **Chin-Chia Michael Yeh**, Yusan Lin, Yuzhong Chen, Hao Yang, Fei Wang, Wanxin Bai, Krupa Brahmksri, Yimin Zhang, Chinna Kummitha, and Verma Abhisar, “Semi-supervised Context Discovery for Peer-Based Anomaly Detection in Multi-Layer Networks,” *International Conference on Information and Communications Security (ICICS)*, 2022.
- Jingzhu He, Yuhang Lin, Xiaohui Gu, **Chin-Chia Michael Yeh**, and Zhongfang Zhuang, “PerfSig: Extracting Performance Bug Signatures via Multi-modality Causal Analysis,” *International Conference on Software Engineering (ICSE)*, 2022.
- **Chin-Chia Michael Yeh**, Zhongfang Zhuang, Junpeng Wang, Yan Zheng, Javid Ebrahimi, Ryan Mercer, Liang Wang, and Wei Zhang, “Online Multi-horizon Transaction Metric Estimation with Multi-modal Learning in Payment Networks,” *ACM International Conference on Information and Knowledge Management (CIKM)*, 2021.
- Huiyuan Chen, Lan Wang, Yusan Lin, **Chin-Chia Michael Yeh**, Fei Wang, and Hao Yang, “Structured Graph Convolutional Networks with Stochastic Masks for Recommender Systems,” *International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2021.
- Prince Osei Aboagye, Yan Zheng, **Chin-Chia Michael Yeh**, Junpeng Wang, Wei Zhang, Liang Wang, Hao Yang, and Jeff Phillips, “Normalization of Language Embeddings for Cross-Lingual Alignment,” *International Conference on Learning Representations (ICLR)*, 2021.
- Junpeng Wang, Wei Zhang, Hao Yang, **Chin-Chia Michael Yeh**, and Liang Wang, “Visual Analytics for RNN-Based Deep Reinforcement Learning,” *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2021.
- Jingzhu He, **Chin-Chia Michael Yeh**, Yanhong Wu, Liang Wang, and Wei Zhang, “Mining Anomalies in Subspaces of High-dimensional Time Series for Financial Transactional Data,” *Joint European Conference on Machine Learning and Knowledge Discovery in Databases (ECML-PKDD)*, 2021.
- **Chin-Chia Michael Yeh**, Zhongfang Zhuang, Yan Zheng, Liang Wang, Junpeng Wang, and Wei Zhang, “Merchant Category Identification Using Credit Card Transactions,” *IEEE International Conference on Big Data (BigData)*, 2020.
- **Chin-Chia Michael Yeh**, Zhongfang Zhuang, Wei Zhang, and Liang Wang, “Multi-future Merchant Transaction Prediction,” *Joint European Conference on Machine Learning and Knowledge Discovery in Databases (ECML-PKDD)*, 2020.
- **Chin-Chia Michael Yeh**, Dhruv Gelda, Zhongfang Zhuang, Yan Zheng, Liang Gou, and Wei Zhang, “Towards a Flexible Embedding Learning Framework,” *IEEE International Conference on Data Mining Workshop on Multi-Source Data Mining (MSDM)*, 2020.

- Yan Zhu, **Chin-Chia Michael Yeh**, Zachary Zimmerman, and Eamonn Keogh, “Matrix Profile XVII: Indexing the Matrix Profile to Allow Arbitrary Range Queries,” *IEEE International Conference on Data Engineering (ICDE)*, 2020.
- Yan Zhu, Shaghayegh Gharghabi, Diego Furtado Silva, Hoang Anh Dau, **Chin-Chia Michael Yeh**, Nader Shakibay Senobari, Abdulaziz Almaslukh, Kaveh Kamgar, Zachary Zimmerman, Gareth Funning, Abdullah Mueen, and Eamonn Keogh, “The Swiss Army Knife of Time Series Data Mining: Ten Useful Things You Can Do with the Matrix Profile and ten Lines of Code,” *Data Mining and Knowledge Discovery (DMKD)*, 2020.
- Zhongfang Zhuang, **Chin-Chia Michael Yeh**, Liang Wang, Wei Zhang, and Junpeng Wang, “Multi-stream RNN for Merchant Transaction Prediction,” *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining Workshop on Machine Learning in Finance (MLF)*, 2020.
- **Chin-Chia Michael Yeh**, Yan Zhu, Hoang Anh Dau, Amirali Darvishzadeh, Mikhail Noskov, and Eamonn Keogh, “Online Amnestic DTW to allow Real-Time Golden Batch Monitoring,” *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, 2019.
- Shaghayegh Gharghabi, **Chin-Chia Michael Yeh**, Yifei Ding, Wei Ding, Paul Hibbing, Samuel LaMunion, Andrew Kaplan, Scott E. Crouter, and Eamonn Keogh, “Domain Agnostic Online Semantic Segmentation for Multi-dimensional Time Series,” *Data Mining and Knowledge Discovery (DMKD)*, 2019.
- Hoang Anh Dau, Anthony Bagnall, Kaveh Kamgar, **Chin-Chia Michael Yeh**, Yan Zhu, Shaghayegh Gharghabi, Chotirat Ann Ratanamahatana, and Eamonn Keogh, “The UCR Time Series Archive,” *IEEE/CAA Journal of Automatica Sinica*, 2019.
- **Chin-Chia Michael Yeh**, “Towards a Near Universal Time Series Data Mining Tool: Introducing the Matrix Profile,” University of California, Riverside, 2018.
- Alireza Abdoli, Amy C. Murillo, **Chin-Chia Michael Yeh**, Alec C. Gerry, and Eamonn J. Keogh, “Time Series Classification to Improve Poultry Welfare,” *IEEE International Conference on Machine Learning and Applications (ICMLA)*, 2018.
- Nader S. Senobari, Gareth J. Funning, Eamonn Keogh, Yan Zhu, **Chin-Chia Michael Yeh**, Zachary Zimmerman, and Abdullah Mueen, “Super-Efficient Cross-Correlation (SEC-C): A Fast Matched Filtering Code Suitable for Desktop Computers,” *Seismological Research Letters*, 2018.
- Yan Zhu, **Chin-Chia Michael Yeh**, Zachary Zimmerman, Kaveh Kamgar, and Eamonn Keogh, “Matrix Profile XI: SCRIMP++: Time Series Motif Discovery at Interactive Speeds,” *IEEE International Conference on Data Mining (ICDM)*, 2018.
- Yan Zhu, Zachary Zimmerman, Nader S. Senobari, **Chin-Chia Michael Yeh**, Gareth Funning, Abdullah Mueen, Philip Brisk, and Eamonn Keogh, “Exploiting a Novel Algorithm and GPUs to Break the Ten Quadrillion Pairwise Comparisons Barrier for Time Series Motifs and Joins,” *Knowledge and Information Systems (KIS)*, 2018.
- **Chin-Chia Michael Yeh**, Yan Zhu, Liudmila Ulanova, Nurjahan Begum, Yifei Ding, Hoang Anh Dau, Zachary Zimmerman, Diego F. Silva, Abdullah Mueen, and Eamonn Keogh, “Time Series Joins, Motifs, Discords and Shapelets: a Unifying View that Exploits the Matrix Profile,” *Data Mining and Knowledge Discovery (DMKD)*, 2018.
- Shaghayegh Gharghabi, Yifei Ding, **Chin-Chia Michael Yeh**, Kaveh Kamgar, Liudmila Ulanova, and Eamonn Keogh, “Matrix Profile VIII: Domain Agnostic Online Semantic Segmentation at Superhuman Performance Levels,” *IEEE International Conference on Data Mining (ICDM)*, 2017.
- **Chin-Chia Michael Yeh**, Nickolas Kavantzias, and Eamonn Keogh, “Matrix Profile VI: Meaningful Multi-dimensional Motif Discovery,” *IEEE International Conference on Data Mining (ICDM)*, 2017.
- **Chin-Chia Michael Yeh**, Nickolas Kavantzias, and Eamonn Keogh, “Matrix Profile IV: Using Weakly Labeled Time Series to Predict Outcomes,” *Proceedings of the VLDB Endowment (VLDB)*, 2017.

- **Chin-Chia Michael Yeh**, Helga Van Herle, and Eamonn Keogh, “Matrix Profile III: The Matrix Profile Allows Visualization of Salient Subsequences in Massive Time Series,” *IEEE International Conference on Data Mining (ICDM)*, 2016.
- Yan Zhu, Zachary Zimmerman, Nader S. Senobari, **Chin-Chia Michael Yeh**, Gareth Funning, Abdullah Mueen, Philip Brisk, and Eamonn Keogh, “Matrix Profile II: Exploiting a Novel Algorithm and GPUs to Break the One Hundred Million Barrier for Time Series Motifs and Joins,” *IEEE International Conference on Data Mining (ICDM)*, 2016.
- **Chin-Chia Michael Yeh**, Yan Zhu, Liudmila Ulanova, Nurjahan Begum, Yifei Ding, Hoang Anh Dau, Diego F. Silva, Abdullah Mueen, and Eamonn Keogh, “Matrix Profile I: All Pairs Similarity Joins for Time Series: A Unifying View that Includes Motifs, Discords and Shapelets,” *IEEE International Conference on Data Mining (ICDM)*, 2016.
- Diego F. Silva, **Chin-Chia Michael Yeh**, Gustavo E. A. P. A. Batista, Eamonn Keogh, “SiMPle: Assessing Music Similarity Using Subsequences Joins,” *International Society for Music Information Retrieval Conference (ISMIR)*, 2016.
- Diego F. Silva, **Chin-Chia Michael Yeh**, Yan Zhu, Gustavo E. A. P. A. Batista, Eamonn Keogh, “Fast Similarity Matrix Profile for Music Analysis and Exploration,” *IEEE Transactions Multimedia (TMM)*, 2015.
- **Chin-Chia Michael Yeh**, Ping-Keng Jao, and Yi-Hsuan Yang. *The AWtoolbox for characterizing audio information*, Academia Sinica, Technical Report, 2015.
- Li Su, **Chin-Chia Michael Yeh**, Jen-Yu Liu, Ju-Chiang Wang, and Yi-Hsuan Yang, “A Systematic Evaluation of the Bag-of-frames Representation for Music Information Retrieval,” *IEEE Transactions Multimedia (TMM)*, 2014.
- **Chin-Chia Michael Yeh**, Ping-Keng Jao, and Yi-Hsuan Yang. “AWtoolbox: Characterizing Audio Information Using Audio Words,” *ACM International Conference Multimedia (MM)*, 2014.
- **Chin-Chia Michael Yeh**, Ju-Chiang Wang, Yi-Hsuan Yang, and Hsin-Min Wang, “Improving Music Auto-tagging by Intra-song Instance Bagging,” *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2014.
- Ping-Keng Jao, **Chin-Chia Michael Yeh**, and Yi-Hsuan Yang, “Modified LASSO Screening for Audio Word-based Music Classification Using Large-scale Dictionary,” *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2014.
- **Chin-Chia Michael Yeh** and Yi-Hsuan Yang, “Towards a More Efficient Sparse Coding Based Audio-word Feature Extraction System,” *Asia Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC)*, 2013.
- **Chin-Chia Michael Yeh**, Li Su, and Yi-Hsuan Yang, “Dual-layer Bag-of-frames Model for Music Genre Classification,” *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2013.
- Jen-Yu Liu, **Chin-Chia Michael Yeh**, Yuan-Ching Teng, and Yi-Hsuan Yang, “Bilingual Analysis of Song Lyrics and Audio Words,” *ACM International Conference Multimedia (MM)*, 2012.
- **Chin-Chia Michael Yeh** and Yi-Hsuan Yang, “Supervised Dictionary Learning for Music Genre Classification,” *ACM International Conference on Multimedia Retrieval (ICMR)*, 2012.

PATENT

- Dongyu Zhang, Liang Wang, Junpeng Wang, Xin Dai, **Michael Yeh**, Yan Zheng, and Wei Zhang, “Method, System, and Computer Program Product for Providing a Type Aware Transformer for Sequential Datasets.” WO2024197299A1.
- Jiarui Sun, Mengting Gu, **Michael Yeh**, Liang Wang, and Wei Zhang, “System, Method, and Computer Program Product for Dynamic Node Classification in Temporal-Based Machine Learning Classification Models.” US Patent App. 18/271,301.

- Huiyuan Chen, Mahashweta Das, **Michael Yeh**, Yujie Fan, Yan Zheng, Wang Junpeng, Vivian Lai, and Hao Yang, “Method, System, and Computer Program Product for Improving Training Loss of Graph Neural Networks Using Bi-Level Optimization,” US Patent App. 18/426,717.
- Bo Dong, Yuhang Wu, Yu-San Lin, **Michael Yeh**, and Hao Yang, “System, Method, and Computer Program Product for User Network Activity Anomaly Detection,” US Patent App. 18/202,405.
- Yan Zheng, Wei Zhang, **Michael Yeh**, Liang Wang, Junpeng Wang, Shubham Jain, and Zhongfang Zhuang, “System, Method, and Computer Program Product for Feature Analysis Using an Embedding Tree,” US Patent App. 18/280,828.
- Zhongfang Zhuang, **Michael Yeh**, Wei Zhang, Mengting Gu, Yan Zheng, and Liang Wang, “System, Method, and Computer Program Product for Analyzing Multivariate Time Series Using a Convolutional Fourier Network,” US Patent 11,922,290.
- Yan Zheng, **Michael Yeh**, Junpeng Wang, Wei Zhang, Liang Wang, Hao Yang, and Prince Osei Aboagye, “Method, System, and Computer Program Product for Normalizing Embeddings for Cross-embedding Alignment,” US Patent App. 18/530,710.
- Junpeng Wang, Liang Wang, Yan Zheng, **Michael Yeh**, Shubham Jain, Wei Zhang, Zhongfang Zhuang, and Hao Yang, “System, Method, and Computer Program Product to Compare Machine Learning Models,” US Patent App. 18/281,663.
- Sunipa Dev, Yan Zheng, **Michael Yeh**, Junpeng Wang, Wei Zhang, and Archit Rathore, “System, Method, and Computer Program Product for Debiasing Embedding Vectors of Machine Learning Models,” US Patent App. 18/280,792.
- Huiyuan Chen, Yu-San Lin, Lan Wang, **Michael Yeh**, Fei Wang, and Hao Yang, “Structured Graph Convolutional Networks with Stochastic Masks for Network Embeddings,” US Patent 11,966,832.
- **Michael Yeh**, Zhongfang Zhuang, Junpeng Wang, Yan Zheng, Javid Ebrahimi, Liang Wang, and Wei Zhang, “Time Series Predictive Model for Estimating Metric for a Given Entity,” US Patent App. 18/275,598.
- Zhongfang Zhuang, **Michael Yeh**, Wei Zhang, and Ebrahimi Javid, “Residual Neural Networks for Anomaly Detection,” US Patent App. 18/013,350.
- Junpeng Wang, Wei Zhang, Hao Yang, **Michael Yeh**, Liang Wang, “System, Method, and Computer Program Product for Dynamic User Interfaces for RNN-Based Deep Reinforcement Machine-Learning Models,” US Patent App. 17/912,070.
- Zhongfang Zhuang, **Michael Yeh**, Liang Wang, Wei Zhang, and Junpeng Wang, “System, Method, and Computer Program Product for Multivariate Event Prediction Using Multi-Stream Recurrent Neural Networks,” US Patent App. 17/148,984.
- **Michael Yeh**, Liang Gou, Wei Zhang, Dhruv Gelda, Zhongfang Zhuang, Yan Zheng, “System, Method, and Computer Program Product for Analyzing a Relational Database Using Embedding Learning,” US Patent App. 18/509,465.
- Yan Zheng, Yuwei Wang, Wei Zhang, **Michael Yeh**, and Liang Wang, “Unsupervised Embeddings Disentanglement Using a GAN for Merchant Recommendations,” US Patent App. 18/085,034.
- Huiyuan Chen, **Michael Yeh**, Fei Wang, and Hao Yang, “System, Method, and Computer Program Product for Determining Long-Range Dependencies Using a Non-Local Graph Neural Network,” WO-2023069589-A1.
- Huiyuan Chen, Yu-San Lin, Menghai Pan, Lan Wang, **Michael Yeh**, Fei Wang, and Hao Yang, “System, Method, and Computer Program Product for Denoising Sequential Machine Learning Models,” WO-2023069244-A1.
- **Michael Yeh**, Yan Zheng, Huiyuan Chen, Zhongfang Zhuang, Junpeng Wang, Liang Wang, Wei Zhang, Mengting Gu, and Javid Ebrahimi, “Embedding Compression for Efficient Representation Learning in Graph,” WO-2023055614-A1.

- Huiyuan Chen, Xiaoting Li, **Michael Yeh**, Yan Zheng, and Hao Yang, “System, Method, and Computer Program Product for Saving Memory During Training of Knowledge Graph Neural Networks,” WO-2023215214-A1.
- Yujie Fan, **Michael Yeh**, Huiyuan Chen, Liang Wang, Zhongfang Zhuang, Junpeng Wang, Xin Dai, Yan Zheng, and Wei Zhang, “Method, System, and Computer Program Product for Spatial-Temporal Graph Sandwich Transformer for Traffic Flow Forecasting,” WO-2024108079-A1.
- **Michael Yeh**, Yan Zheng, Junpeng Wang, Wei Zhang, and Zhongfang Zhuang “Error-Bounded Approximate Time Series Join Using Compact Dictionary Representation of Time Series,” WO-2022260906-A1.
- Huiyuan Chen, Mahashweta Das, **Michael Yeh**, Yan Zheng, Vivian Lai, and Hao Yang, “Method, System, and Computer Program Product for Providing a Framework to Improve Discrimination of Graph Features by a Graph Neural Network,” WO-2024081177-A1.
- Audrey Der, **Michael Yeh**, Yan Zheng, Junpeng Wang, Huiyuan Chen, Zhongfang Zhuang, Liang Wang, and Wei Zhang, “Anonymizing Time-Series Data Using Matrix Profile,” WO-2024059538-A1.
- Prince Osei Aboagye, Yan Zheng, **Michael Yeh**, Junpeng Wang, Huiyuan Chen, Zhongfang Zhuang, Liang Wang, and Wei Zhang, “Interpretable Debiasing of Vectorized Language Representations with Iterative Orthogonalization,” WO-2023250413-A1.
- Liang Wang, Junpeng Wang, Yan Zheng, Shubham Jain, **Michael Yeh**, Zhongfang Zhuang, Wei Zhang, and Hao Yang, “System, Method, And Computer Program Product for Identifying Weak Points in a Predictive Model,” WO-2023048708-A1.
- **Michael Yeh**, Xin Dai, Yan Zheng, Junpeng Wang, Yujie Fan, Huiyuan Chen, Zhongfang Zhuang, Liang Wang, and Wei Zhang, “Method, System, and Computer Program Product for Multitask Learning on Time Series Data,” WO-2024076656-A1.
- Huiyuan Chen, Xiaoting Li, Menghai Pan, Hao Yang, and **Michael Yeh**, “Method, System, and Computer Program Product for Simplifying Transformer for Sequential Recommendation,” WO-2023235308-A1.
- Yan Zheng, Prince Osei Aboagye, Zhongfang Zhuang, **Michael Yeh**, Junpeng Wang, Liang Wang, Javid Ebrahimi, and Wei Zhang, “Method, system, and computer program product for unsupervised alignment of embedding spaces,” WO-2023059503-A1.
- Yiran Li, Junpeng Wang, Xin Dai, Liang Wang, **Michael Yeh**, Yan Zheng, and Wei Zhang, “System, Method, And Computer Program Product for Analyzing and/or Improving Transformer Models,” WO-2024081405-A1.

RELEVANT SKILL

Programming Language

- Proficient: Python, MATLAB, and \LaTeX
- Familiar: Java, C#, and C++

Natural Language

- Bilingual Proficiency: English, Mandarin Chinese