Yun-Wei Chu

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EDUCATION

Purdue University *2021 - Present*
Ph.D. in Electrical & Computer Engineering

National Chiao Tung University *2015 - 2017*
M.S. in Electrical & Control Engineering

National Chi Nan University *2011 - 2015*
B.S. in Electrical Engineering

RESEARCH EXPERIENCE

Research Assistant. Purdue University 01/2021 - Present
Advisor: Christopher Brinton *West Lafayette, IN*

- **Model Calibration for Federated Learning**
  - Developed a train-time calibration method for federated learning to ensure reliable predictions.
- **Fairness-Aware Pre-training for Federated Learning**
  - Proposed a robust distributed pre-training scheme that significantly improves average performance and fairness, providing any unseen federated learning tasks with a better initialization.
- **Efficient Large Language Modeling**
  - Designed a meta-learning-based communication method for large language models (LLMs) in federated multilingual machine translation, improving translation performance and efficiency.
- **Personalized Machine Learning for eLearning**
  - Employed personalized federated learning to customize models for online students with different demographic variables and mitigate the biases for underrepresented minorities.

Research Intern. NEC Labs 05/2024 - 08/2024
Advisor: Christopher Malon *Princeton, NJ*

- **Multi-modal Large Language Model for Healthcare**
  - Designed a Visual-RAG system to retrieve useful medical images for multi-modal large language models (MLLMs). Fine-tuned MLLMs' to improve their image-text association capabilities and enhance diagnostic performance.

Research Intern. Microsoft 05/2022 - 08/2022
Advisor: Silviu Cucerzan, Michael Gamon, Nirupama Chandrasekaran *Redmond, WA*

- **Entity-Centric News Headline Generation**
  - Collected a news dataset from Bing based on user intensively searched entities. Implemented large language models to generate entity-centric news headlines aligned with human preferences.

NLP Research Scientist. Academia Sinica 04/2019 - 01/2021
Advisor: Lun-Wei Ku *Taipei, Taiwan*

- **Multi-modal Language Generation and Evaluation**
  - Proposed the first reference-free auto-evaluation metric for Visual Storytelling. The metric aligns to human judgement and better rank the quality of stories than other metrics.
  - Enriched visual storytelling with knowledge graphs and relation extraction model. Designed a Transformer model with a human-like discriminator to align visual stories with human preferences.
  - Designed a cross-modality attention network for Video Question Answering, significantly enhancing the model's capability in dynamic scene reasoning.

Research Assistant. National Chiao Tung University 09/2015 - 11/2017
Advisor: Bing-Fei Wu *Hsinchu, Taiwan*

○ **Image-based Heart Rate Detection**
  - Constructed an adaptive module to dynamically select personalized model and improve the performance of heart rate detection in outdoor driving scenarios.

PUBLICATIONS

[1] **Unlocking the Potential of Model Calibration in Federated Learning.** Y.-W. Chu, D.-J. Han, S. Hosseinalipour, C. Brinton. *ICLR*, 2025.

[2] **Reducing Hallucinations of Medical Multimodal Large Language Models with Visual Retrieval-Augmented Generation.** Y.-W. Chu, K. Zhang, C. Malon, M. Min. *AAAI GenAI4Health*, 2025.

[3] **Rethinking the Starting Point: Collaborative Pre-Training for Federated Downstream Tasks.** Y.-W. Chu, D.-J. Han, S. Hosseinalipour, C. Brinton. *AAAI*, 2025.

[4] **Only Send What You Need: Learning to Communicate Efficiently in Federated Multilingual Machine Translation.** Y.-W. Chu, D.-J. Han, C. Brinton. *The Web Conference Workshop on Federated Foundation Models*, 2024.

[5] **Multi-Layer Personalized Federated Learning for Mitigating Biases in Student Predictive Analytics.** Y.-W. Chu, S. Hosseinalipour, E. Tenorio, L. Cruz, K. Douglas, A. Lan, C. Brinton. IEEE Transactions on Emerging Topics in Computing, 2024.

[6] **Mitigating Biases in Student Performance Prediction via Attention-Based Personalized Federated Learning.** Y.-W. Chu, S. Hosseinalipour, E. Tenorio, L. Cruz, K. Douglas, A. Lan, C. Brinton. *ACM CIKM*, 2022.

[7] **Learning to Rank Visual Stories From Human Ranking Data.** Y.-W. Chu*, C.-Y. Hsu*, V. Chen, K.-C. Lo, C. Chen, T.-H. Huang and L.-W. Ku. *ACL-IJCNLP*, 2022.

[8] **Clustering Guided Meta-Learning for Click-Based Student Performance Prediction.** Y.-W. Chu, E. Tenorio, L. Cruz, K. Douglas, A. Lan, C. Brinton. *IEEE BigData*, 2021.

[9] **Plot and Rework: Modeling Storylines for Visual Storytelling.** Y.-W. Chu*, C.-Y. Hsu*, T.-H. Huang and L.-W. Ku. *Findings of ACL-IJCNLP*, 2021.

[10] **Stretch-VST: Getting Flexible With Visual Stories.** Y.-W. Chu*, C.-Y. Hsu*, T.-L. Yang, T.-H. Huang and L.-W. Ku. *ACL-IJCNLP*, 2021.

[11] **End-to-end Recurrent Cross-Modality Attention for Video Dialogue.** Y.-W. Chu, K.-Y. Lin, C.-C. Hsu, L.-W. Ku. *IEEE Transactions on Audio, Speech and Language Processing*, 2021.

[12] **Let's Talk! Striking Up Conversations via Conversational Visual Question Generation.** S.-H. Chan, T.-L. Yang, Y.-W. Chu, C.-Y. Hsu, T.-H. Huang, Y.-S. Chiu and L.-W. Ku. *AAAI workshop on Reasoning and Learning for Human-Machine Dialogues*, 2021.

[13] **Multi-step Joint-Modality Attention Network for Audio Visual Scene-Aware Dialog System.** Y.-W. Chu, K.-Y. Lin, C.-C. Hsu, L.-W. Ku. *AAAI workshop on Dialog System Technology Challenge*, 2020.

[14] **MVIN: Learning multi-view items for recommendation.** C.-Y. Tai, M.-R. Wu, Y.-W. Chu, S.-Y. Chu, L.-W. Ku. *ACM SIGIR*, 2020.

[15] **GraphSW: a training protocol based on stage-wise training for GNN-based Recommender Model.** C.-Y. Tai, M.-R. Wu, **Y.-W. Chu**, S.-Y. Chu, L.-W. Ku. *arXiv preprint*, 2019.

[16] **Neural Network Based Luminance Variation Resistant Remote-Photoplethysmography for Driver's Heart Rate Monitoring.** B.-F. Wu, **Y.-W. Chu**, P.-W. Haung, M.-L. Chung. *IEEE Access*, 2019.

[17] **A Motion Robust Remote-PPG Approach to Driver's Health State Monitoring.** B.-F. Wu, **Y.-W. Chu**, P.-W. Haung, M.-L. Chung. *ACCV workshop on Computer Vision Technologies for Smart Vehicle*, 2016.

ACADEMIC SERVICE

Peer Reviewer: ACL Rolling Review 2023-2024, COLING 2024, NeurIPS 2024, ACL 2020-2023, EMNLP 2020-2023, INFOCOM 2021-2024, IEEE/ACM TASLP, IEEE TKDE.

Area Chair: ACL Rolling Review.