

Yun-Wei Chu

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EDUCATION

Purdue University Ph.D. student in Electrical & Computer Engineering	<i>2021 - Present</i>
National Chiao Tung University M.S. in Electrical & Control Engineering	<i>2015 - 2017</i>
National Chi Nan University B.S. in Electrical Engineering	<i>2011 - 2015</i>

RESEARCH EXPERIENCE

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

◦ **Machine learning for eLearning**

- Analyzed students' clicking behavior to their in-video quiz performance; Employed a meta-learning-based training procedure that guides the prediction model to reflect similarities within student behavioral clusters and improve 3.8% ACC versus baseline model.
- Designed a personalized federated learning method to predict the learning performance of MOOC students with different demographic information.

Research Assistant. Academia Sinica 2019 - 2021
Advisor: Dr. Lun-Wei Ku *Taipei, Taiwan*

◦ **Visual Storytelling**

- Implemented knowledge graphs to enrich the story content and planned a storyline using relation extraction model; Employed Transformer Language Model with a human-like discriminator to refine visual stories. Produced visual stories that are superior in terms of diversity, coherence, and humanness, per both automatic and human evaluations. (Publication [C1])
- Proposed a Length-Controlled Transformer to generate prolong visual stories with better focus and detail; designed a website to demonstrate the ability to prolong stories. (Publication [C2])
- Integrated visual storytelling framework into vision-to-question task to generate response-provoking questions; Developed websites in MTurk for human evaluations on story quality. (Publication [C3])

◦ **Video Dialogue Question Answering**

- Developed multi-step joint-modality attention network based on recurrent neural network for dynamic scenes reasoning and improved 20.8% CIDEr score versus baseline model. (Publication [J1], [C4]; Grant [a])

◦ **Multiview Items Recommendation**

- Introduced an user-oriented module on graph neural network to aggregate features and enhance personalized recommendations. (Publication [C5])

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

◦ **Image-based Heart Rate Detection**

- Constructed an Adaptive Neural Network Model to dynamically select personalized model and eliminate facial luminance variation noise from rPPG signal; Reduced 70% MAE compared with baselines on heart rate detection in outdoor driving scenarios. (Publication [J2], [C6]; Grant [b])
- Re-designed C++-based algorithm into JAVA-based heart rate detection APP; Implemented APP on SiME smart glasses to determine targets' tension. (Patent [P1], [P2], [P3]; Grant [c], [d])

PUBLICATIONS

Journal Papers

- [J1] **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. [\[Paper\]](#)
- [J2] **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. [\[Paper\]](#)

Conference Papers

- [C1] **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. [\[Paper\]](#) (* equal contribution)
- [C2] **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 Demo*, 2021. [\[Paper\]](#) [\[Video\]](#) (* equal contribution)
- [C3] **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. [\[Paper\]](#)
- [C4] **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. [\[Paper\]](#)
- [C5] **MVIN: Learning multi-view items for recommendation.** C.-Y. Tai, M.-R. Wu, Y.-W. Chu, S.-Y. Chu, L.-W. Ku. *International ACM SIGIR Conference*, 2020. [\[Paper\]](#)
- [C6] **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. [\[Paper\]](#)

Patents

- [P1] **Non-contact Heartbeat Rate Measurement System, Method and Apparatus Thereof.** B.-F. Wu, M.-L. Chung, T.-Y. Tsou, Y.-W. Chu, K.-H. Chen, P.-W. Huang, Y.-Y. Lin. *US Patent #10835135*, Issued Nov 2020.
- [P2] **Non-contact Heartbeat Rate Measurement Apparatus.** B.-F. Wu, M.-L. Chung, T.-Y. Tsou, Y.-W. Chu. *Taiwan Patent #I667635*, Issued Aug 2019.
- [P3] **Monitoring System and Monitoring Method for Infant.** B.-F. Wu, M.-L. Chung, T.-Y. Tsou, Y.-W. Chu. *Taiwan Patent #I658815*, Issued May 2019.

GRANTS & AWARDS

- [a] **2020 Travel Grant (\$3000)**, For attending AAAI Conference, Academia Sinica
- [b] **2016 Research Scholarship for Graduate Student (\$7000)**, MOST Taiwan
- [c] **2016 Venture Capital (\$650k)**, MOST Taiwan
- [d] **2016 Outstanding Team of Talentpreneur Innovation Competition**, NCTU Taiwan

ACADEMIC SERVICE

Peer Reviewer: EAACL 2021, COLING 2021, IEEE INFOCOM 2021, ACL 2020, SocialNLP 2020, IAAI 2020-2021, IEEE ACCESS 2019.

TECHNICAL SKILLS

Language: Python, C/C++, Matlab, L^AT_EX

Machine Learning Toolkits: PyTorch, Tensorflow, Scikit-learn, NLTK

Machine Learning Techniques: Natural Language Processing, Multi-modal Processing, Knowledge Graph and Relation Extraction, Graphical Theory, Deep Reinforcement Learning