Yu-Peng Chen

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EDUCATION

University of Florida, Herbert Wertheim College of Engineering — *Gainesville, FL*
Ph.D. Computer and Information Science and Engineering (GPA: 3.96) — *Aug. 2019 – Present*
- Research Fields: Human-Centered Computing (HCC), Machine Learning, Mobile Health (mHealth)

University of Maryland, A. James Clark School of Engineering — *College Park, MD*
M.S. Electrical and Computer Engineering — *Aug. 2015 – May 2017*
- Major Areas: Deep Learning, Reinforcement Learning, Digital Image Processing

National Chiao Tung University (NCTU) — *Hsinchu, Taiwan*
B.S. Electronics Engineering — *Sept. 2010 – June 2014*

TECHNICAL SKILLS

- **Programming Languages**: Java, Python, TypeScript, JavaScript, Go, C#, C++, C, MATLAB, F#
- **Deep Learning Frameworks**: TensorFlow, PyTorch, Caffe, Keras, CNTK (Microsoft Cognitive Toolkit)
- **Other Tools and Systems**: Firebase, Angular, Android, Apache Cordova, Ionic, Flutter, Protocol Buffers, ONNX, OpenCV, CUDA, Unity, R, Qualtrics, Heroku, Django, Dialogflow, Akka, Git

WORK EXPERIENCE

The INIT Lab under Dr. Lisa Anthony, University of Florida — *Gainesville, FL*
Graduate Research Assistant — *Aug. 2019 – Present*

- **MyTrack+ (Collaborated with Dr. Kathryn Ross and Dr. Jaime Ruiz)**
  - Built mHealth apps to promote motivation, user engagement, and behavior change for long-term weight loss maintenance.
  - Conducted a systematic literature review of 66 papers on AI-powered mHealth apps that support health behavior change.
  - Implemented and published the GatorTrack Android mHealth app that sends context-based push notifications to engage users based on their physical activity transitions detected using machine learning techniques. The app utilizes Google's Transition API, Firestore database, Firebase Cloud Messaging, and Google Cloud Platform (GCP).
  - Implemented a data export tool for data analysis and an admin site for participant registration and management using Python, Django, and Firebase.
  - Surveyed and interacted with 50 mHealth apps for five days and qualitatively coded each notification that appeared using the coding scheme we developed. Our results are published in CHI 2021.
- **Face Touching (Collaborated with Dr. Mamoun Mardini)**
  - Implemented a human activity recognizer that is trained on the accelerometer data collected using a Samsung smartwatch to detect movement patterns of face touching for the purpose of mitigating the spread of COVID-19 using smartwatches.
- **$-Family (Collaborated with Dr. Jaime Ruiz)**
  - Investigated the relationship between children's cognitive development and their interactions with touchscreens to improve recognition rates for children's touchscreen gestures. Our results are published in ICMI 2020.
- **Biometrics / Secure and Trustworthy Cyberspace (SaTC)**
  - Investigated user preferences, attitudes, expectations, and needs with respect to natural multimodal interactions for authentication and security applications in the future of smart environments. This project is funded under the NSF SaTC program and partially supported by Discover Financial Services.

Altek Corporation — *Hsinchu, Taiwan*
Research and Development Engineer in Deep Learning — *June 2017 – July 2019*

- **Low-Power AI Chip**
  - Collaborated with a team of 40+ members to develop a small, low-cost, and low-power application-specific integrated circuit (ASIC) with a built-in Neural Processing Unit (NPU) for real-time human detection in security cameras based on Convolutional Neural Networks (CNNs).
  - Designed a network compression method involving low-rank approximation and dynamic fixed-point quantization for the deployment of pre-trained CNNs to resource-limited ASIC. Our detector achieved a 72× reduction in model size with a tolerable loss of 10% in accuracy.
  - Designed and trained models for object detection based on a survey of recent deep learning approaches, including Faster R-CNN, SSD, YOLO, FPN, RetinaNet and their various extensions such as Mask R-CNN and DSSD.
  - Conducted experiments on popular CNNs—including ResNet, Inception-v4, MobileNet and MTCNN—using our compression method for the deployment of these networks to our ASIC.
  - Implemented a human detection simulator in C language to demonstrate our product to potential customers.
  - Developed a toolchain for our ASIC including the model conversion tools to create compatible models from popular deep learning framework formats using Protocol Buffers.
  - Implemented a C library that will be ported to ARM-based CPUs for the post-processing in our human detection solution.
  - Surveyed studies on Generative Adversarial Networks (GANs), including super-resolution with GAN and WGAN.

Gorilla Technology Group *Taipei, Taiwan*
Assistant Software Engineer of Surveillance & Security Business (Full-Time Internship) *June 2016 – Aug. 2016*

- **TensorFlow and CNTK**
  - Built and trained CNNs using TensorFlow and CNTK for deep learning applications, including license plate recognition, age detection, and face detection and recognition, and shared the results with the development team.

PUBLICATIONS

Journal Articles

[J.1] Chen Bai, **Yu-Peng Chen**, Adam Wolach, Lisa Anthony, and Mamoun T. Mardini 2021. "Using Smartwatches to Detect Face Touching" Sensors 21, no. 19: 6528. https://doi.org/10.3390/s21196528

[J.2] Pedro Feijoo-Garcia, **Yu-Peng Chen**, Shaghayegh Esmaeili, Yingbo Ma, and Christina Gardner-McCune. 2021. Write2Code: Pen-Based Educational Tool for Java. International Journal of Emerging Technologies in Learning (iJET) 16, 3: 307–315. Retrieved from https://www.learntechlib.org/p/219020

Refereed Conference Papers

[C.1] **Yu-Peng Chen,** Chen Bai, Adam Wolach, Mamoun T. Mardini, and Lisa Anthony. 2021. Detecting Face Touching with Dynamic Time Warping on Smartwatches: A Preliminary Study. In Companion Publication of the 2021 International Conference on Multimodal Interaction (ICMI '21 Companion), October 18–22, 2021, Montréal, QC, Canada. ACM, New York, NY, USA, 6 pages. https://doi.org/10.1145/3461615.3485433

[C.2] Julia Woodward, **Yu-Peng Chen**, Katarina Jurczyk, Kathryn M. Ross, Lisa Anthony, and Jaime Ruiz. 2021. A Survey of Notification Designs in Commercial mHealth Apps. In CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21 Extended Abstracts), May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3411763.3451639

[C.3] Ziyang Chen, **Yu-Peng Chen**, Alex Shaw, Aishat Aloba, Pavlo Antonenko, Jaime Ruiz, and Lisa Anthony. 2020. Examining the Link between Children's Cognitive Development and Touchscreen Interaction Patterns. In Proceedings of the 2020 International Conference on Multimodal Interaction (ICMI '20), 635–639. https://doi.org/10.1145/3382507.3418841

SELECTED AWARDS

2021 Florida Hacks with IBM Hackathon *Gainesville, FL*
REcyeipts *Sept. 2021 – Dec. 2021*

- Won **3rd place** with a $15000 prize.
- Designed *REcyeipts*, a personalized mobile app that uses receipts to encourage recycling habits. This app is designed to help users snap a picture of their receipt and connect them to recycling resources using AI solutions on IBM Cloud.

2021 University of Florida AI for Science Bootcamp (GPU Hackathon) *Gainesville, FL*
Winning Team *Oct. 23rd 2021*

- Built DL models for tropical cycle detection and steady flow estimation and won the award for the best team. This one-day online AI bootcamp is hosted jointly by NVIDIA, OpenACC, and UF.

GRADUATE COURSE PROJECTS

- **Human-Centered Input Recognition Algorithms (using Java)** *Jan. 2022 – May. 2022*
  - Implemented the $1 and $P algorithms for recognizing unistroke and multistroke touchscreen gestures.
  - Developed an application that contains a GUI for remote gesture data collection and real-time recognition demonstration.
- **Digital Health (using Java)** *Aug. 2021 – Dec. 2021*
  - Developed the GatorAct mHealth app that can count four types of exercises and detect sedentary behavior using the eSense "earable" (i.e., a wearable for the ear) platform and Firestore database.
  - Conducted a systematic literature review on Atrial Fibrillation (AFib) detection using commercially available wearables.
- **Distributed Operating System (using F#)** *Aug. 2020 – Dec. 2020*
  - Implemented a Twitter clone that simulates client-server communication based on the WebSocket protocol and JSON APIs. Public-key cryptography is used for client connection, establishing shared secrets, and digitally signing tweets.
- **Natural User Interaction (using JavaScript and Unity)** *Jan. 2020 – May. 2020*
  - Designed and implemented Write2Code, a web app that recognizes handwritten Java code and provides visual feedback.
  - Developed a speech agent that can take audio queries regarding COVID-19 statistics and speak back to the user with the answer to the query. The application consists of a GUI built using Unity and a Dialogflow agent.
- **Reinforcement Learning (using Python and OpenAI Gym)** *Aug. 2016 – Dec. 2016*
  - Implemented Conservative Policy Iteration (CPI) to resolve exponential time required for exploration in Policy Gradient within large state space environments.
  - Developed an agent that utilizes Q-learning to play the PAC-MAN game and won at least 90% of the time.