Cheng-Fu Yang

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Education

National Taiwan University (NTU) *Sep. 2016 - Jun. 2020*

B.S. in Electrical Engineering

- **GPA:** overall: **4.02/4.3** (3.86/4.0), CS-Related: **4.27/4.3** (4.0/4.0)
- **Honors:** Dean's List * 2 (F '16, S '19)
- **Selected Courses:** Machine Learning 2018 Fall (**A+**), Machine Learning and having it deep structured 2019 Spring (**A+**), Special Topics on Machine Learning (**A+**), Digital Speech Processing (**A+**), Deep Learning and Natural Language Processing 2019 Fall (**A+**), Computer Vision 2018 Fall (**A+**), Data Structure and Programming 2017 Fall (**A**), Algorithms 2018 Spring (**A+**)

Research Experience

NTU Vision & Learning Lab *Sep. 2019 - Present*

Advisor: Prof. Yu-Chiang Frank Wang

Undergraduate Researcher and Research Assistant

- Researched on **text to layout generation**, with focus on synthesizing **conceptually diverse** yet realistic layout. [1].
- Advanced **cross-modal mutual learning** strategies to achieve **audio-visual speech recognition** and **manipulation** at the same time. [3]
- Researched on **semantic-guided image completion** by learning to **expand** the **scene graph** of images. [5]
- Help undergraduate students with research topics on **composed image retrieval**, **image change captioning**, and **audio-visual localization**.

Collaborative Research Project in Partnership with Google Research *Jul. 2021 - Present*

Advisor: Prof. Yu-Chiang Frank Wang (NTU EE), Dr. Yun-Hsuang Sung (Google Research), Dr. Da-Cheng Juan (Google Research)

Research Participant

- Researched on **cross-modal data understanding and generation**.
- Achieved **weakly-supervised image manipulation** by observing the **instruction consistency** and **description discrimination**. [4]

Collaborative Research Project in Partnership with Carnegie Mellon University *Aug. 2020 - Oct. 2021*

Advisor: Prof. Yu-Chiang Frank Wang (NTU EE), Prof. Louis-Philippe Morency (CMU LTI), Prof. Ruslan Salakhutdinov (CMU MLD)

Research Participant

- Researched on **semi-supervised cross-modal contrastive learning**.
- **Distilling** the knowledge from **BERT** and **CLIP** to ensure *fluency, fidelity*, and *adequacy* for **novel object captioning**. [2]

NTU IOX Center *Mar. 2019 - Dec. 2019*

Advisor: Prof. Hung-Yi Lee & Prof. Tzong-Han Tsai

Undergraduate Researcher

- Built an interactive **multimodal chatbot** to help workers to correctly assemble robots by giving them instructions. [demo]
- Proposed a **multimodal dialogue system** and improved the accuracy of **user intent classification** by **24%**. [6]

Publication (Sort by date, † indicates equal contribution)

[1] **Cheng-Fu Yang**†, Wan-Cyuan Fan†, Fu-En Yang and Yu-Chiang Frank Wang. "LayoutTransformer: Scene Layout Generation with Conceptual and Spatial Diversity." *Accepted to CVPR 2021*. [paper]

[2] **Cheng-Fu Yang**, Yao-Hung Hubert Tsai, Wan-Cyuan Fan, Yu-Chiang Frank Wang, Louis-Philippe Morency, Ruslan Salakhutdinov. "Learning Visual-Linguistic Adequacy, Fidelity, and Fluency for Novel Object Captioning." *Submitted to ICLR 2022 (Under Review)*. [paper]

[3] Chih-Chun Yang, **Cheng-Fu Yang**, Wan-Cyuan Fan and Yu-Chiang Frank Wang. "Cross-Modal Mutual Learning for Audio-Visual Speech Recognition and Manipulation." *Accepted to AAAI 2022*.

[4] Wan-Cyuan Fan, **Cheng-Fu Yang**, Yu-Chiang Frank Wang. "No Look Ahead: Target-free Text-guided Image Manipulation." *Submitted to CVPR 2022 (Under Review)*.

[5] Qiao-An Yang, **Cheng-Fu Yang**, Wan-Cyuan Fan, Cheng-Yo Tan, Meng-Lin Wu, Yu-Chiang Frank Wang. "Scene Graph Expansion for Semantics-Guided Image Completion." *Submitted to CVPR 2022 (Under Review)*.

[6] Yu-Ching Chiu, Bo-Hao Chang, Tzu-Yu Chen, **Cheng-Fu Yang**, Nanyi Bi, Richard Tzong-Han Tsai, Hung-yi Lee, Jane Yung-jen Hsu. "Multi-modal User Intent Classification Under the Scenario of Smart Factory." *Accepted to AAAI 2021 Student Abstract*. [paper]

Working & Teaching Experience

Deep Learning for Computer Vision 2020 Fall *Sep. 2020 - Jan. 2021*

Teaching Assistant

- Provided hands-on teaching to students and help them with programming assignments, including **GAN**, **Domain Adaptation**, **Semantic Segmentation** and **Meta Learning**.

Machine Learning 2020 Spring *Feb. 2020 - Jun. 2020*

Teaching Assistant

- Designed programming assignments on **Network Compression** [video] and **Unsupervised Learning** [video].
- Introduced recent progress on **Domain Adaptation** [slide].

Machine Learning 2019 Fall *Sep. 2019 - Jan. 2020*

Teaching Assistant

- Designed programming assignments on **Linear Regression** [slide] and **Image Clustering** [slide].
- Designed machine learning related handwriting problems, including math theory and induction of algorithms. [pdf].

ASUS Intelligent Cloud Services *Jul. 2019 - Aug. 2019*

Software Engineer Intern

- Derived a novel **BFS** algorithm with **C++** and OpenCV for scanned document denoising and deskewing; increased the AP of OCR by **2%**.
- Utilized **Graph Embedding** and Clustering Algorithms to analyze the relationship between employees' productivity and browsing behavior.
- Designed a Peer-Review Feedback System with **React** and **Python**; established an anonymous feedback mechanism in ASUSTek.

Selected Projects

Smart Music Playing [project page] *Jan. 2020*

Course Final Project of "**Embedded System**" [Flask, Node, Rpi]

- Developed a system that detects whether users are in the room, and hence automatically turns on/off the home appliances.
- Leveraged **STM32** and **Rpi** to communicate between server and sensors.

Attentional UNet-GAN for Form Removal [project page] *Aug. 2019*

Project done during internship at ASUS Intelligent Cloud Services [Pytorch]

- Developed a algorithm to remove background information and preserve important foreground information such as signatures and stamps.
- Implemented a **UNET-GAN** with attention mechanism for **unsupervised object recognition** and achieved over **90%** in precision.

NTU Course Context-aware Search Engine [project page] *Jun. 2019*

Outstanding Final Project of "**Digital Speech Processing**" [BeautifulSoup, Pytorch]

- Developed a context-aware search engine with **BERT** to find semantic related results instead of matching word by word.
- Implemented a **PRF** algorithm to optimize searching results.

Depth Map Generation on More Realistic Scenes [project page] *Jan. 2019*

Outstanding Final Project of "**Computer Vision**" [Pytorch]

- Designed a two-stage framework for generating depth map based on disparity of two images.
- Leveraged a discriminator to classify synthetic and real data, and adopt different processing pipelines for each kind of data.

Mandarin Typing System for the Physically Impaired [project page] *Dec. 2018*

Course final project of "**Biomedical Engineering**" [Pytorch]

- Implemented a blink-detection method allowing physically impaired to select desire Mandarin Phonetic Symbol by blinking.
- Investigated rules for Mandarin Phonetic Symbol and created a friendly graphic user interface.

Automatic Fruit Quality Inspection [project page] *Nov. 2018*

Finalist at "**Agriculture Hackathon**" 2018 [React, Pytorch]

- Investigated and implemented a deep convolution network to classify the quality of passion fruits.
- Developed a Chatbot using Python Line bot SDK, allowing users to inquire the price of fruits according to their quality.

Honors & Awards

2016, 2019 **Dean's List,** Awarded to students with academic performance in the top 5% of their class *Taipei, Taiwan*

2018 **First Prize,** Institute for Information Industry Enterprise Award at Meichu hackathon 2018 *Hsinchu, Taiwan*

2019 **Finalist,** Agriculture Hackathon (AgThon) 2018 *Taichung, Taiwan*