Yi-Chun(Rimi) Chen

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My research topics are about Visual Narrative Comprehension and Generation—the intersection of Computer Vision, Language Processing, Machine Learning, Multi-media, and Generative AI.

Summary

Research Interests, Multi-media Comprehension and Generation, Computer Vision, Machine Learning, Generative AI
Skilled in, Programming **(**Python, Java, C, C++, javascript), Numeric computing (Matlab), Deep learning tools (Tensorflow, Keras, Sklearn), Graphical tool (WebGL), Web tool (Html5, Python flask)
Language, English—professional, Mandarin—native, Japanese-- limited working proficiency

Education

Doctor of Philosophy in Computer Science August 2015 – August 2023
North Carolina State University (NCSU), Raleigh, NC GPA: 3.56/4.0

Master of Science in Computer Science September 2011 – July 2013
National Tsing Hua University (NTHU), Hsinchu, Taiwan GPA: 4.17/4.3

Bachelor of Science in Computer Science September 2007 – June 2011
National Tsing Hua University (NTHU), Hsinchu, Taiwan GPA: 80.9/100

Research Projects & Work Experiences

Ph.D. Student & Research Assistant September 2015 – Present
ARNAV Lab—North Carolina State University, US; Advisor: Dr. Arnav Jhala
Knowledge management: "A knowledge management framework for accessing and encoding visual narrative data."

- Proposed a framework to combine a hierarchical LSTM with knowledge representations of comics to understand and encode visual storytelling data.
- Provided program interfaces--portals, for accessing knowledge representations of comic data.
- Demonstrated the framework's usability with two applications—narrative analysis model, comic content generation.
- Implemented knowledge graphs and pre-processing scripts for visual narrative information retrieval and analysis.
  Dissertation title: "A Framework with Hierarchical Models for Visual Narrative Sequence Encoding and Its Applications."

Computational Model: "A computational model that understands and encodes visual narrative sequences."

- Simulated the cognitive process of how humans comprehend visual narratives using hierarchical machine learning models, image and text feature encoders, and filters to achieve comic sequence understanding.
- Released the analytical results, annotations of comic data, and the trained model to support future application developments.

Document Analysis: "An automatically comic panel transition labeling model for genre analysis."

- Applied a two-layer CNN learning model with a feedback-in-loop process for labeling panels based on visual grammar.
- Analyzed the reliability of the labeled results and the labels' distribution on genres to achieve the classification of data.

Neural Style Transfer: "A neural style transfer framework for comic image processing."

- Built a neural style transfer model with a multi-channel pipeline to decompose comics' multi-modality features.
- Transferred Japanese manga into other art styles, including western comic style, by the computational model.

Image Sequence Generation: "A comic generation model that creates image sequences through iterative editing processes."

- Proposed a model with multiple refinement layers to create comic sequences through the customizable editing process.
- Equipped the model with functions for customizing and adapting the editing layers to bring a variety of generated comics.
- Produced a sample dataset as the basic materials for comic generations.

Reading comprehension model: "A planning-based pipeline to infer the missing part in story text."

- Conducted experiments on natural language processing tools to decompose story text.
- Transformed the verb predicates in Verbnet--the subject-object triples of actions into logical literals for the planning.
- Implemented a model with planning concepts to make the system capable of inferring the missing content of stories through preconditions and postconditions.

Large Scale Text Visualization: "A web interface to display the large-scale novel text and provides indexes of story content."

- Designed a web interface to visualize story text and let readers jump between story focuses interactively.
- Implemented functions to support the switching between story focuses.
- Analyzed the sentiment that showed in novels' text through natural language processing tools

Interactive Story Content Authoring Tool: "V-SET: an authoring tool for generating Narrative Adventure Game."
- Designed a graphic interface that allows authors to modify characters, scenes, event choices, and story content to generate visual content.
- Provided functions to render story dialogue from scripts to narrative adventure games

Research Assistant May 2014 – June 2015
Institute of Information Science—Academia Sinica, Taiwan; Advisor: Dr. Jane Win-Shih Liu
Data System: "OpenISDM Project: an open framework for disaster information systems."
- Developed a distributed, event-triggered, active notification service IASS (Intelligent Active Storage Service) using RDF knowledge representation.
- Provided program interfaces--portals--for related applications to access disaster scenarios data and captured device records

Master Student & Research Assistant September 2011 – July 2013
Artificial Intelligence Lab—NTHU, Taiwan; Advisor: Dr. Von-Wun Soo
- Integrated reinforcement learning with task allocations protocol to distribute complex tasks in large-scale networks.
- Conducted experiments on hyperparameters to speed up the convergence of the learning model.
  Thesis: "Oracle Learning for Agent Negotiation Based on Rationality in Task Allocation Problem."

Multi-agents System Project: "National Energy Project: studies of automated coordination and self-healing based on multi-intelligent agent systems in smart-grids."
- Designed a task allocation protocol for power restoration problems in multi-agents system through intelligent agents' self-adaptability.

Undergraduate Researcher January 2010 – November 2010
High Performance Computing, New Orleans, LA; Advisor: Dr. Yeh-Ching Chung
- Analyzed bottlenecks and predicted execution time of the science software--Weather Research & Forecasting Model (WRF).
- Reduced the execution time for science software by tuning hyperparameters and the high-performance computing clusters.
- Awarded as the Overall Winner in Supercomputing 2010 (SC10) Conference: Student Cluster Competition (SCC).

Publications

- F Freitas, T Berreth, **YC Chen**, A Jhala." Characterizing the perception of urban spaces from visual analytics of street-level imagery." In AI & society 38 (4), 1361-1371, 2023.
- **Chen YC**, Jhala A. "*A Computational Model of Comprehension in Manga Style Visual Narratives*." In Proceedings of the Annual Meeting of the Cognitive Science Society 2021 (Vol. 43, No. 43).
- **Chen YC**, Robertson J, Jhala A. "*Abstractions for Narrative Comprehension Tasks*." In INT/WICED@ AIIDE 2018.
- Yi-Wei Huang, **Yi-Chun Chen**, Wan-Yu Yu and Von-Wun Soo. "*Stochastic Negotiation with Market Utility for Automated Power Restoration on a Smart Grid*," The third international workshop on Agent Technologes for Energy Systems (ATES2012), in AAMAS 2012.

Other Experiences

Volunteer, Recording Books Service Center for the Blind, NTHU, Taiwan September 2007 – January 2008
Teaching Assistant, Foundations of Interactive Game Design, NCSU, Raleigh, NC. September 2015 – Present
- Hold workshops and office hours to assist students with game design tools (GameMaker, Twine, Stencyl, PuzzleScript).
- Assisted lectures and office hours for game design theories (MDA framework, choice poetics, game challenges design, etc.).

Selected Course Projects, NCSU, Raleigh, NC 2015 – 2016
- Computer Graphic:
  - Implemented shadowing and rendering algorithms through C++ and OpenGL.
  - Accomplished the implementation of the Q*bert game through WebGL 3D rendering functions.
- Game Engine:
  - Designed a game object model and the infrastructure of the game engine.
  - Provided interfaces to call game engine functions and modify scripts to create new games.
  - Delivered four sample games through the implemented functions.
- Game AI:
  - Designed a robbers & cops game with limited sighted Non-player characters (NPCs) and implemented the environment.
  - Applied reinforcement learning to multiple intelligent agents to adjust their behaviors to achieve behavior tree learning.