# Yiqing Liang

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## EDUCATION

**Brown University**                                                                                                     Providence, RI
Ph.D. in Computer Science                                                                                         Sep 2021–
- Advisor: Professor James Tompkin

**Columbia University**                                                                                                 New York, NY
M.S. (Thesis) in Computer Science                                                                           Aug 2019 – May 2021
- GPA: 3.83/4.00
- Selected awards: First Place in 2019 Columbia Data Science Hackathon
- Core courses: Computer Vision (A), Robot Learning (A), Thesis (A)

**Massachusetts Institute of Technology (MIT)**                                                   Cambridge, MA
Exchange Student, Electrical Engineering and Computer Science                      Feb 2018 – Jun 2018
- Special Student Program
- GPA: 5.00/5.00
- Core Courses: Intro to Machine Learning (A), Applied Probability (A)

**Fudan University**                                                                                                    Shanghai, China
B.S. in Computer Science, Best Thesis Honor (A)                                                  Sep 2015 – Jun 2019
- Major GPA: 3.62/4.00
- Selected awards: Excellent Student Scholarship (5%, 2016), Excellent Student Leader (5%, 2016)
- Core courses: Linear Algebra (A-), Artificial Intelligence (A), Programming (A)

## PUBLICATION

[1] *SSCNav: Confidence-Aware Semantic Scene Completion for Visual Semantic Navigation*
**Yiqing Liang**, Boyuan Chen, Shuran Song
International Conference on Robotics and Automation (ICRA), 2021
Project  Arxiv

## RESEARCH EXPERIENCE

**Columbia University**                                                                                                 New York, NY
Research Assistant to Professor Shih-Fu Chang
**Semantically Relevant Scene Graphs for Visual Commonsense Reasoning**
                                                                                                                                  Oct 2020 – Nov 2020
- Applied visual scene graphs in a Transformer-based framework for visual commonsense reasoning (VCR) task and to design a weakly supervised training strategy to generate semantically relevant scene graphs.
- Generated offline object detection features of Visual Genome dataset with bottom-up-attention model for scene graph generation.
- Organized large-scale code to re-implement a scene graph generator (Neural Motif) for ablation study.

Research Assistant to Professor Shuran Song
**SCTR: Scene Completion Transformer** (Ongoing)                                             Aug 2020 - April 2021
- Innovated a novel indoor scene completion method by making use of Transformer-based models' capacity to capture high-level commonsense context to build hierarchical indoor graphs.
- Utilized Matterport3D houses to generate a large-scale dataset (50 thousand) of indoor scene's egocentric top-down maps with annotated object and room information sequences and helper functions.
- Performed extensive experiments to explore different representations and configurations.

**SSCNav: Confidence-Aware Semantic Scene Completion for Visual Semantic Navigation**  Project
                                                                                                                                  Sep 2019 - Oct 2020
- Justified explicitly utilizing scene priors as semantic scene completion with self-calibrated confidence estimation and spatial action map could help object-goal navigation.

- Proposed a pipeline consisting of scene completion, confidence and navigation modules.
- Trained with DDQN; SR: 27% and SPL: 16% ~SOTA on Habitat Challenge 2020 ObjectNav (subset).

**MIT (Department of Electrical Engineering and Computer Science)**    Cambridge, MA
Research Assistant to Professor Antonio Torralba
**Indoor Scene Context Analysis**    Jul 2018 - Aug 2018
- Aimed to employ reinforcement learning methods to help agents understand indoor scene context, a step towards visual context understanding rather than traditional vision tasks.

**VirtualHome Environment Development**    Jun 2018
- Created APIs for VirtualHome, an interactive 3D indoor environment built in Unity3D, to lay a solid foundation for future exploration.

**Efficient Indoor Navigation by Visual Signal**    Mar 2018 - May 2018
- Taught agents to do short-distance in-door self-navigation in the House3D environment through Reinforcement Learning (RL) with higher efficiency by removing redundant network components.

**Fudan University, Department of Computer Science**    Shanghai, China
Research Assistant to Professor Wei Zhang
**Video Object Segmentation Algorithm Study (Best BS Thesis)**    Dec 2018 - May 2019
- Proposed to employ Superpixel SSN and majority vote to improve the SOTA OSVOS algorithm.
- Outperformed OSVOS on DAVIS dataset's validation set on 4/6 metrics $J_m, J_o, F_m, F_d$.

Research Assistant to Professor Yaqian Zhou
**Automatic Writing Identification**    Oct 2016 - Jan 2017
- Identified Chinese characters (accuracy: 0.81): created an algorithm to cut words out of pages with lines from pupils' hand-written exercises.

# WORK EXPERIENCE

**SenseTime**    Shanghai, China
Education Research Intern    Aug 2018 – Mar 2019
- Applied Unity3D to create 3D mazes where robots could be manipulated to play around as a base programming education environment for high school students.
- Introduced a C sharp-Python parser to allow Python control in Unity3D by typing in interactive text boxes, thus enabling high school students to acquire Python programming in aforementioned maze.
- Led AI education's RL section: gave lectures to high school students, wrote textbooks, designed exercises and implemented projects.

**NS Solutions (Shanghai) Co., Ltd**    Shanghai, China
SDE Intern    Jul 2017 – Aug 2017
- Designed a data visualization plan for clients with a whole set of Tableau projects.
- Created a financial report generation algorithm with excel VBA attached.
- Developed calculation part of an automatic retail management software.

# ADDITIONAL INFORMATION

**Coding Skills**
- Programming Languages: Python, Bash, C, C++, HTML, C sharp, JAVA, MATLAB.
- Operating Systems: macOS, Linux, Windows.
- Research skills: Github, PyTorch, OpenCV, Numpy, CUDA, Matplotlib, Tensorboard, Tmux.

**Languages**
- Mandarin (native), English (fluent), Japanese (proficient).

**Interests**
- Workout, singing, brewing tea.