# Kezhen Chen

+1 650-885-1487 • KezhenChen2021@u.northwestern.edu

## Professional Summary

- Strong research experience in Analogical Learning, Cognitive Science, Vision and language, Neural-Symbolic Reasoning, and Deep Learning.
- Working on ***Commonsense Vision and Language Understanding*** at ***Northwestern University*** advised by Prof. ***Kenneth Forbus***.
- Collaborated with ***Microsoft Research*** on ***Neural-Symbolic project as interns and part-time research engineer***.

## Skills & Expertise

- Programming Language— **Python, LISP, Java, C**
- Analytical/Scientific software — **MATLAB;**
- Web Development Tool – **PHP, JavaScript;**
- Research tools – **OpenCV**, **CogSketch, SAGE, Companions**
- Deep learning tools: **PyTorch, Tensorflow**
- Database Management – **SQL;**
- Operating system – **Windows, Linux, MAC OS**

## Education

**Northwestern University, Evanston, IL** **Sept.2016 – Expected Dec.2021**

***Ph. D. candidate in Computer Science. GRE: 170/170Q, 160/170V.***

- ***Working in Qualitative Reasoning Lab.***
- Advisor: Kenneth Forbus

**University of Rochester, Rochester, NY** **Sept.2012 – May.2016**

***Bachelor of Science in Computer Science, Minor of Arts in Economics and in Mathematics***

- ***Highest Honor degree***
- Dean's List for 3 semesters (2013-2015)

## Publications & Research Papers

- **Kezhen Chen***, Kenneth D. Forbus, "Visual Relation Detection using Hybrid Analogical Learning" accepted by AAAI 2021
- **Kezhen Chen***, Qiuyuan Huang, Daniel McDuff, Jianfeng Wang, Hamid Palangi, Xiang Gao, Kevin Li, Kenneth D. Forbus, Jianfeng Gao, "NICE: Neural Image Commenting Evaluation with an Emphasis on Emotion and Empathy" Human In the Loop Dialogue Systems workshop, NeurIPS 2020
- **Kezhen Chen***, Qiuyuan Huang, Paul Smolensky, Kenneth Forbus, Jianfeng Gao, "Learning Inference Rules with Neural Tensor Product Rules" Babymind workshop, NeurIPS 2020
- **Kezhen Chen***, Qiuyuan Huang, Hamid Palangi, Paul Smolensky, Kenneth Forbus and Jianfeng Gao, "Mapping Natural-language Problems to Formal-language Solutions using Structured Neural Representations" ICML 2020
- **Kezhen Chen***, Qiuyuan Huang, Hamid Palangi, Paul Smolensky, Kenneth Forbus and Jianfeng Gao, "TP-N2F: Tensor Product Representation for Natural to Formal Language Generation" KR2ML workshop, NeurIPS 2019 (***Best Paper Award***)
- **Kezhen Chen***, Kenneth D. Forbus, Dedre Gentner, Susan J. Hespos, and Erin M. Anderson, "Simulating Infant Visual Learning by Comparison: An Initial Model" CogSci 2020
- **Kezhen Chen***, Irina Rabkina, Matthew D. McLure and Kenneth D. Forbus, "Human-like Sketch Object Recognition via Analogical Learning" 33th *AAAI preceeding, Jan*, 2019
- Jason Wilson, Kezhen Chen, Maxwell Crouse, Constantine Nakos, Danilo Neves Ribeiro, Irina Rabkina, Kenneth Forbus. "Analogical Question Answering in a Multimodal Information Kiosk" ACS 2019

- **Kezhen Chen*** and Kenneth D. Forbus, "Action Recognition from Skeleton Data via Analogical Generalization over Qualitative Representations" 32th *AAAI preceeding, Feb*, 2018
- M. Iftekhar Tanveer*, Ru Zhao, **Kezhen Chen**, Zoe Tiet, Mohammed Ehsan Hoque, "AutoManner: An Automated Interface for Making Public Speakers Aware of Their Mannerisms" *ACM IUI, April,* 2016
- **Kezhen Chen*,** Kuan-Ting Chen*, Peizhong Cong, Winston Hsu, Jiebo Luo, "Who are the Devils Wearing Prada in New York City?" *ACM Multimedia Conference grand challenge*, October 2015

## Research Experience

**Ph.D. candidate, Qualitative Reasoning Group Lab, Northwestern University** **Sept.2016 – present**

Research area: Reasoning and Computer Vision, Advisor: **Prof. Kenneth D. Forbus**

- Building Hybrid Primal Sketch, an image cognition system with integration of deep learning models and knowledge base reasoning.
- Building an AI-based information kiosk via Microsoft Platform for Situated Intelligence. Combining computer vision and knowledge base question/answer.
- Performed human action recognition on continuous skeleton data via analogical learning models.
- Created a human-like and data-efficient approach on sketched object recognition and developed a structured representation for sketched object.

**Research Intern, Microsoft Research AI, Redmond** **May.2019 – Sept.2019, June.2020 – Sept.2020**

Research project: Neural-Symbolic, Advisor: Qiuyuan Huang, Hamid Palangi, Paul Smolensky, Jianfeng Gao

- Developed new deep learning models that combine the traditional symbolic representations as inductive bias to improve the structural learning ability of deep learning models.

**Research Assistant, Rochester Human-Computer Interaction (ROC HCI) Lab, UofR** **Jun.2015 – May.2016**

Project: **ROCSpeak - Public Speaking Analysis Research,** Advisor: **Prof. M. Ehsan Hoque**

- Analyzed public speaking videos from our database, extracted prosody, lexical, facial expression features
- Built a baseline with basic speech features, added body pattern for the improvements of accuracy of rating
- Compiled the rating feedback to users and gave helpful insight and tips according to the analysis

Project: **Body Movement Pattern Study,** Advisor: **Prof. M. Ehsan Hoque** **Jun.2015 – May.2016**

- Designed the body movement pattern study process and built the interface for this study
- Analyzed video data for body patterns, compared with feedback from Mechanical Turk workers ("Turkers")
- Used our system to generate five most frequent body patterns to participants and check for the performance

**Research Assistant, Visual Intelligence & Social Media Analytics Research Group, UofR** **Jan.2015 – May.2016**

Project: **New York Fashion Trend Research,** Advisor: **Prof. Jiebo Luo**

**Data-driven study on the relation fashion show and everyday trends is featured by *New York Post***

- Applied SVM to train the classifier of attribute to get the accurate description on fashion trends
- Constructed a large scale image database of street shooting picture using New York Fashion Week images
- Implemented the frequency pattern data mining to get information of fashion trends

**Research Assistant, Goergen Institute for Data Science, UofR** **Sep.2014 – May.2016**

Project: **Twitter Health Research (Multimedia Health Research)**, Advisor: **Prof. Henry Kautz**

- Collected and analyzed data from twitter, used machine learning and big data to predict health problems
- Studied flu, suicide, under-age drinking (my primary research) and restaurant health
- Used keywords and computer vision to train image and language classifiers to get age information