# ZEKUN LI

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## EDUCATION

**University of Minnesota (UMN)**, Minneapolis, MN — 09/2021 - present
Ph.D. of Computer Science, College of Science and Engineering

**University of Southern California (USC)**, Los Angeles, CA — 08/2016 - 08/2021
Ph.D. of Computer Science, Viterbi School of Engineering

**University of Southern California (USC)**, Los Angeles, CA — 08/2014 - 05/2016
Master of Computer Science, Viterbi School of Engineering

**Chongqing University (CQU)**, China — 09/2010 - 06/2014
Bachelor of Engineering, College of Computer Science

## SKILLS

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|---|---|
| **Programming Languages** | Python, C++, C, Java, MATLAB, JavaScript, PHP |
| **Deep Learning Frameworks** | Pytorch (Preferred), Keras, Tensorflow, Theano, Caffe, CNTK |

## PUBLICATION

**Zekun Li**, Jina Kim, Yao-Yi Chiang and Muhao Chen **SpaBERT: Pretrained Language Models on Geographic Data for Geo-Entity Representation**. Accepted by *EMNLP 2022*

Yikun Xu, Pengwen Dai, **Zekun Li**, Hongjun Wang and Xiaochun Cao **The Best Protection Is Attack: Fooling Scene Text Recognition with Minimal Pixels**. Submitted to *TIFS 2022*

Pengwen Dai, Siyuan Yao, Sanyi Zhang, **Zekun Li**, Xiaoguang Han and Xiaochun Cao **ACE: Active Contour Evolution for Oriented Object Detection**. Accepted by *TIP 2021*

**Zekun Li**, Runyu Guan, Qianmu Yu, Yao-Yi Chiang, and Craig A. Knoblock. **Synthetic Map Generation to Provide Unlimited Training Data for Historical Map Text Detection**. In Proceedings of the 4th ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery, pp. 17-26. 2021.

Junyu Luo, **Zekun Li**, Jinpeng Wang and Chin-Yew Lin, **ChartOCR: Data Extraction from Charts Images via a Deep Hybrid Framework**. In *Proceedings of the IEEE/CVF WACV* pp. 1917-1925, Virtual Conference.

**Zekun Li**, Yao-Yi Chiang, Sasan Tavakkol, Basel Shbita, Johannes H. Uhl, Stefan Leyk and Craig A. Knoblock **An Automatic Approach for Generating Rich, Linked Geo-Metadata from Historical Map Images**. In *Proceedings of the 26th ACM SIGKDD*, pp. 3290-3298, Virtual Conference.

**Zekun Li**, **Generating Historical Maps from online Maps**. In *Proceedings of the 27th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, pp. 610-611, Chicago, USA.

**Zekun Li**, Yue Wu, Wael Abd-Almageed, and Prem Natarajan **Weighted Feature Pooling Network in Template-Based Recognition**. In *Proceedings of the 14th ACCV*, pp. 436-451, Perth, Australia.

## PROJECTS

**Geo-entity Feature Representation on Geographic Data** — Aug 2021 - June 2022
*Research Assistant* — *Knowledge Computing Lab*

- Proposed an approach to linearize 2D geo-entities, encode their spatial relations, and use a language model to produce spatial varying feature representations of geo-entities
- Showed that the learnt general-purpose representations can achieve better or competitive results on the geo-entity typing and geo-entity linking tasks compared to SOTA pretrained language models

**Text Detection and Recognition for Historical Maps** — Aug 2019 - Aug 2020
*Research Assistant* — *Spatial Sciences Institute*

- Built a deep neural network for detecting text of various font size, style and orientation angles on historical map patches. The network is able to handle text regions of arbitrary shapes
- Designed the network to highlight probable text regions and then predict accurate bounding boxes given both map features and text probability distributions in a coarse-to-fine manner

**Synthetic Face Generation for Facial Landmark Detection** May 2020 - Aug 2020
*Applied Scientist Intern* *Amazon Alexa AI*

- Built a pipeline to generate synthetic face images with landmark annotations using 3D modeling application Makehuman and rendering application Blender
- Rendered the images from 3D models with various poses, camera setting, lighting conditions and backgrounds
- Verified that the 2D landmark detection task and the 3D mesh prediction task can both benefit from the large amount of generated synthetic images

**Automated Visual Data Extraction from Chart Images** May 2019 - Aug 2019
*Research Intern* *Microsoft Research Asia*

- Built a pipeline to automatically infer numerical values for each chart given the column chart images
- Applied trident-net to extract the chart object heights. Designed a ruler encoding module to interpret the y-axis information to convert the objects from pixel-space to ruler space to generate reading.
- The ruler encoding module focuses on the minimum and maximum values of the ruler to decide the numerical range that the charts represent

**Generating Historical Maps from online Maps** Aug 2018 - Dec 2018
*Research Assistant* *Spatial Sciences Institute*

- Synthesized historical maps from Open Street Map tiles with conditional generative adversarial networks
- The network generated background and foreground separately using different targets to solve the content mismatch problem in online maps and historical maps
- Used the synthesized historical maps as the base-map and automatically place text labels on them to provide a large amount of training data for text detection networks

**Weighted Feature Pooling Network for Template-based recognition** Dec 2017 - Aug 2018
*Research Assistant* *Information Sciences Institute*

- Generated fixed-sized template-level representations given templates that composed of a various number of images
- Built an end-to-end neural network to extract image-level features and then combine them with weights produced from attention-based prediction network, which evaluate the quality of each feature within the template
- Surpassed the state of the art performance on multiple tasks such as object classification, face recognition and action recognition with CIFAR, IJB-A/IJB-B and UCF101 datasets

## ACADEMIC ACTIVITIES

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| Reiviewer - European Conference on Computer Vision (ECCV) | Year 2022 |
| Reiviewer - International Conference on Pattern Recognition (ICPR) | Year 2020-2021 |
| Reiviewer - Asian Conference on Computer Vision (ACCV) | Year 2020-2021 |
| Reiviewer - IEEE Winter Conference on Applications of Computer Vision (WACV) | Year 2019-2021 |
| Teaching Assistant - Spatial Enabled Artificial Intelligence | Year 2022 Spring |
| Teaching Assistant - Foundations and Applications of Data Mining | Year 2020, 2021 Spring |
| Mentor - USC WiSE PhD Program | Year 2020 Fall |
| Guest Lecturer - Advanced Spatial Computing: *Introduction to PostGIS* | Year 2019 Fall |

## HONORS AND AWARDS

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| British Cartographic Society / Ordnance Survey Award | Year 2022 |
| SIGSPATIAL Student Travel Grant | Year 2018-2019 |
| University Academic Scholarship (consecutively 6 semesters) | Year 2011-2014 |
| Merit Graduate Student of Chongqing Universtiy | Year 2014 |
| National Academic Scholarship | Year 2013 |
| First Prize Winner, QianFang- Optoelectronics Innovation Contest | Year 2012 |
| QiuShi-LiuBiRu Scholarship | Year 2012 |
| Merit Student of Chongqing University | Year 2011 |