

# Zhi Cao

czhi.cz@gmail.com || +1 6173188334 || 860 Beacon st, Boston, MA || [linkedin.com/in/zcao](https://www.linkedin.com/in/zcao) || <https://www.cs.umb.edu/~zcao/>

## PROFESSIONAL SUMMARY

I am a self-motivated Ph.D. candidate in Computer Science and passionate about cutting-edge technologies. I have published papers on Edge Computing, IoT, Reinforcement Learning (RL) and computer networks. I am currently looking for an intern opportunity with a high tech company to design and develop innovative software applications.

## RESEARCH INTERESTS

- Edge Computing
- Deep Reinforcement Learning
- Internet of Things

## PROFESSIONAL SKILLS

- **Programming Languages:** Python, Java, SQL, C# and PHP.
- **Others:** Matlab, Numpy, TensorFlow, Open AI gym, Caffe, CPLEX, R, Mathematica and LaTeX.

## EDUCATION

<b>Doctor of Philosophy in Computer Science</b>	<b>September 2016 – Expected December 2020</b>
University of Massachusetts Boston, Boston, MA	Advisor: <i>Dr. Honggang Zhang</i>
<b>Master of Science in Mathematics</b>	<b>September 2014 – June 2016</b>
University of Science and Technology Beijing, Beijing, China	• GPA: 3.9/4.000
<b>Bachelor of Science in Mathematics</b>	<b>September 2010 – June 2014</b>
University of Science and Technology Beijing, Beijing, China	• GPA: 88.5/100.0
	• GPA: 3.81/4.00

## PROJECTS (Publications available at <https://www.cs.umb.edu/~zcao/>)

- |   |                                 |
|---|---------------------------------|
| <b>Research Assistant, University of Massachusetts Boston, Boston, MA</b>   | <b>September 2016 – Present</b> |
| ○ <b><i>Deep Reinforcement Learning (DRL) in mobile Edge-Cloud Computing System</i></b>   | <b>March 2019 – Present</b>     |
| • Created an <b>OpenAI gym</b> environment to develop and test the multi-component application jobs scheduling tasks, and to develop and compare various scheduling algorithms within this customized OpenAI gym environment in <b>Python</b> using <b>TensorFlow</b> . |                                 |
| • Implemented a DRL actor-critic algorithm to optimally schedule the collection of multi-component application jobs in a mobile Edge-Cloud computing system to minimize job completion time.  |                                 |
| • Proved through simulations that our design performs 7%-20% better than existing approaches on same benchmark datasets.  |                                 |
| • Extending this new design framework to enhance the application components placement and the current centralized DRL scheduling design to multi-agent collaborative DRL design.  |                                 |
| ○ <b><i>Machine Learning in Drone Indoor Self-localization</i></b>  | <b>April 2019 – June 2019</b>   |
| • Deep Learning for RSSI signal strength heatmap classification algorithm in <b>Python</b> with <b>Caffe</b> , using <b>color transforms</b> , <b>image rectification</b> , <b>CNN</b> etc.   |                                 |
| • Identified distinct access points based on RSSI signal strength heatmaps generated by multiple drones successfully with 98.9% accuracy.   |                                 |
| ○ <b><i>Application Placement in Mobile Edge-Cloud Computing System</i></b>   | <b>May 2018 - August 2018</b>   |
| • Developed a simulation platform in <b>Python</b> to design a new architecture for edge computing system that improved the application jobs admission scheduling, reducing the system cost and users' cost simultaneously.   |                                 |
| • Developed algorithms that enable users to execute self-optimization and make platform achieve near optimal performance (obtained by solving optimization function with <b>CPLEX</b> ).  |                                 |
| • Formulated the dynamic interaction of platform and provider as a game, and developed algorithms to make platform have best performance, resulting in enhancement for stability.   |                                 |
| ○ <b><i>Mobile Edge-Cloud Computing System with Game-theoretic Framework</i></b>  | <b>March 2017 - August 2017</b> |
| • Designed and developed a new architecture for edge computing system under a game-theoretic framework which modeled the competition among the providers as a game.   |                                 |
| • Built a simulation platform in <b>Python</b> and a prototype testbed (implemented with <b>Docker</b> containers, <b>image processing</b> , <b>network configuration</b> , <b>system scripting</b> , etc.).  |                                 |
| • Investigated various revenue sharing mechanisms at the Nash equilibria of the game between providers.   |                                 |

## SELECTED AWARDS

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|---|---------------|
| • Grace Hopper Celebration (GHC) Scholarship, Orlando, FL                   | October, 2019 |
| • CRA-W Grad Cohort Workshop Scholarship, San Francisco, CA                 | April, 2018   |
| • Merit Graduate Student (3%), University of Science and Technology Beijing | 2014 - 2015   |