



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics

MASTER'S THESIS PRESENTATION

---

YAO WANG

Department of Statistics  
The University of Chicago

An Experimental Exploration of Transformation Invariance of  
Convolutional Neural Networks

THURSDAY, February 18, 2016, at 9:30 AM  
Eckhart 110, 5734 S. University Avenue

ABSTRACT

Compared to other image classification algorithms, convolutional neural network model (CNN) requires little pre-processing of image data as it is invariant to certain transformations of input. In this paper, we investigate the transformation invariance by classifying two simulated classes of images. We find that training with transformed data is a necessity of the model to cope with transformation. We further investigate the difference between models trained with untransformed and transformed data in terms of parameters and sample processing. Finally, we conduct experiments to verify that both convolutional and inner product layers are helpful in dealing with data transformation.

---

For information about building access for persons with disabilities, please contact Laura Rigazzi at 773.702-0541 or send an email to [lrigazzi@galton.uchicago.edu](mailto:lrigazzi@galton.uchicago.edu). If you wish to subscribe to our email list, please visit the following web site: <https://lists.uchicago.edu/web/arc/statseminars>.