GeoAI 2017 Workshop Report
The 1st ACM SIGSPATIAL International Workshop on GeoAI: AI and Deep Learning for Geographic Knowledge Discovery, Redondo Beach, CA, USA - November 7, 2016

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Deep Learning and Artificial Intelligence (AI) techniques are transforming a range of sectors from computer vision and natural language processing to autonomous driving and healthcare. In particular, deep learning methods achieve great success in many computer vision problems, such as image classification and object detection. Deep neural networks are very powerful to capture the hierarchical representation of features in massive and complex data by adopting multiple layers of non-linear information processing. Due to the availability of vast and high-resolution geospatial data and efficient high-performance computing architectures, deep learning techniques empower the geospatial system to provide fast and near-human level perception. For example, recent studies have shown deep learning techniques coupled with volunteered geographic information (such as OpenStreetMap data) can accurately extract buildings from satellite imagery for humanitarian mapping in rural African areas. Also, deep learning helps assimilate autonomous vehicles and intelligent transport system by incorporating a great amount of information gathered by traffic cameras and sensors. Moreover, deep learning technology facilitates the discovery of geographic information within unstructured text data across different languages. There are also many other applications of deep learning in the domain of GIS, such as the prediction for spatial diffusion patterns in epidemiology, urban expansion prediction, and hyperspectral image analysis. The 1st GeoAI workshop aims to bring geoscientists, computer scientists, engineers, entrepreneurs, and decision makers from academia, industry, and government to discuss the latest trends, successes, challenges, and opportunities in the field of deep learning for geographical data mining and knowledge discovery.

GeoAI 2017 (https://udi.ornl.gov/geoai) was held in conjunction with the 25th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems on Nov. 7, 2017 in Redondo Beach, California, USA. This workshop received in total 14 submissions, and after a rigorous review process, 8 papers were accepted, reaching an acceptance rate of about 57%. Each accepted full paper was allocated 20 minutes for a presentation, while accepted short papers were assigned 15 minutes. In addition, Dr. Shawn Newsam from the University of California at Merced gave a keynote titled "Geographic knowledge discovery using ground-level images and videos", and Dr. Saikat Basu, from Facebook gave another keynote on "Using AI to help generate roads for OpenStreetMap". The workshop attracted in average 70 participants, with a maximum of about 100 participants in the room.

We sincerely thank the keynote speakers for their keynote talks, and the authors for submitting and presenting their papers in GeoAI 2017. We also thank the program committee members for their time and efforts in reviewing and evaluating the submitted papers. We hope that the proceedings of GeoAI will make a contribution to this field and can stimulate new research in the near future.

1st International Workshop on GeoAI

8:00 am	9:00 am	**Breakfast**
9:00 am	9:05 am	**Welcome and announcements**
9:10 am	9:50 am	**Keynote: Geographic Knowledge Discovery Using Ground-Level Images and Videos** Shawn Newsam, *University of California at Merced*
9:50 am	10:10 am	**An application of convolutional neural network in street image classification** Stephen Law, *Alan Turing Institute and University College London* Yao Shen, *University College London* Chanuki Seresinhe, *Alan Turing Institute and Warwick*
10:10 am	10:30 am	**Deep Learning for Multisensor Image Resolution Enhancement** Charles Collins, *University of Alabama in Huntsville* John Beck, *University of Alabama in Huntsville* Susan Bridges, *University of Alabama in Huntsville*
10:30 am	11:00 am	**Coffee break**
11:00 am	11:20 am	**Image-based Classification of GPS Noise Level using Convolutional Neural Networks for Accurate Distance Estimation** James Murphy, *Lyft* Yuanyuan Pao, *Lyft* Asif Haque, *Lyft*
11:20 am	11:40am	**Automatic Alignment of Vector Data with Geographic Features for Feature Recognition in Historical Maps** Weiwei Duan, *University of Southern California* Yao-Yi Chiang, *University of Southern California* Craig A. Knoblock, *University of Southern California*
11:40 am	12:00 pm	**Visual Landmark Sequence-based Indoor Localization** Qing Li, *University of Nottingham* Jiasong Zhu, *Shenzhen University* Tao Liu, *Wuhan University* Jonathan Garibaldi, *University of Nottingham* Qingquan Li, *Shenzhen University*
12:00 pm	1:30 pm	**Lunch (not provided)**
1:30 pm	2:10 pm	**Keynote: Using AI to help generate roads for OpenStreetMap** Saikat Basu, *Facebook* Drishtie Patel, *Facebook*
2:10 pm	2:30 pm	**Finding equivalent attributes: semantic similarity computation based on extensional definitions** Ivan Majic, *The University of Melbourne* Stephan Winter,*The University of Melbourne* Martin Tomko, *The University of Melbourne*
2:30 pm	2:45 pm	**Generating Synthetic Mobility Traffic using Recurrent Neural Networks** Vaibhav Kulkarni, *University of Lausanne* Benoît Garbinato, *University of Lausanne*

2:45 pm	3:00 pm	**Recognizing terrain features on terrestrial surface using a deep learning model -- An example with crater detection** Wenwen Li, *Arizona State University* Bin Zhou, *Brisky Inc*. Chia-Yu Hsu, *Arizona State University* Yixing Li, *Arizona State University* Fengbo Ren, *Arizona State University*
3:00 pm	3:30 pm	**Wrap up discussion – Future Direction and Collaboration Opportunities**
3:30 pm	4:00 pm	**Coffee break**

Table of Content