Bemidji State University

GEOG 5150: Applications of Machine Learning

A. COURSE DESCRIPTION

Credits: 3
Lecture Hours/Week: 0
Lab Hours/Week: 0
OJT Hours/Week: *.*
Prerequisites: None
Corequisites: None
MnTC Goals: None

The uses of machine learning, data science and artificial intelligence are everywhere today. Much of the data we create through our daily activities gets processed and used to customize services, offer better health care, or target you for specific advertising. Although there are many benefits of using data in these ways, there can be pitfalls and caution is always warranted when employing these tools. As such this class attempts to teach you the basic foundations of machine learning with particular emphasis to its application in environmental and spatial analysis. To this end, we will use the python development environment and we will emphasize the most commonly used tools including supervised learning algorithms (logistic regression, linear regression, neural networks), unsupervised learning algorithms (k- means, principal component analysis). In addition, we also cover anomaly detection, natural language processing and building recommender systems. A central focus will be building this foundation so students can successfully participate in a Kaggle competition which is a premier venue for testing your machine learning skillset.

B. COURSE EFFECTIVE DATES: 12/16/2023 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Machine Learning
2. Ethical use of machine learning
3. Producing models
4. Interpretation of machine learning model results
5. Application of work to real world problems

D. LEARNING OUTCOMES (General)

1. develop a solid foundation of what machine learning is and apply this knowledge to social and environmental problems.
2. build basic code in python.
3. make use of the python libraries pandas, numpy, sklearn, matplotlib, and scipy.
4. summarize the ethical issues surrounding the use of machine learning.
5. take part in and submit model results to a Kaggle competition.
6. develop the capacity to apply machine learning to discipline specific research. (graduate only)

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus
G. SPECIAL INFORMATION

None noted