GSAW 2016 Tutorial B:

Data Analytics: From Data to Knowledge

Length: Half day

Overview:

Course details:

1. Background and Terminology
    a. What is Data Analytics, Data Science, Machine Learning and Predictive Analytics?
    b. Relevant Terms
    c. Summary of on-line resources (Instructional/ Software/ Data etc.)
2. Applications
    a. Motivational Examples of Real World Data Analytic Applications
    b. Overview of Current State-of-the-Art Techniques and where Industry is headed
3. Overview of the Data Analytic Process
    a. Exploratory Analysis/Visualization
    b. Data Preparation and Cleaning
    c. Modeling and Evaluation
    d. Deployment
4. Overview Data Analytic Techniques
    a. Supervised vs. Unsupervised Learning
    b. Regression Techniques
    c. Decision Trees/Random Forests
    d. Support Vector Machines
    e. Ensemble Techniques
5. Which Techniques for which Applications?
    a. An guide to which techniques are best suited to specific data analytic problems and data types
    b. Discussion of limitations and pitfalls
6. A Worked Example
    a. A Step-by-step walkthrough of the Data Analytics process using an open source data set and freeware.
7. Wrap Up and Conclusions

Instructors: Susan Vogel, Stuart Kerr, and Kurt Roettiger, The Aerospace Corporation

Biographies:

Susan Vogel has 30 years of experience working in the fields of remote sensing collection, processing, exploitation and analysis for The Aerospace Corporation and is currently the Principal Director for the Remote Sensing, Signals and Analytics Subdivision within the Electronics and Sensors Division at Aerospace. For the past several years, she has led a team of researchers and engineers in the application of machine learning techniques to address complex problems. Ms. Vogel also leads a corporate strategic initiative in the area of Data Analytics. She holds a BS in Mathematics/Computer Science and MS in Computer Engineering.

Stuart Kerr has numerous years of experience in software architecture development and technical computing. He is currently a Principal Scientist for the Remote Sensing, Signals and Analytics Subdivision in the Electronics and Sensors Division of The Aerospace Corporation. In recent years, Mr. Kerr has focused on the development of frameworks and architectures compatible with performing data analytics at scale while leading various data analytic activities. He is currently leading development of advanced Deep Learning applications supporting automation of the IC analyst workflow

Dr. Kurt Roettiger has a PhD in Astronomy with over 30 years of experience in the collection, analysis and integration of diverse data types. For the past 15 years, he has led teams of analysts and scientists in the development of analytical processes and tools. Dr. Roettiger is currently the Director of the Data Science and Predictive Analytics Department in the Electronics and Sensors Division at The Aerospace Corporation.

Description of Intended Students and Prerequisites:

This tutorial is intended for a general audience with an interest in Data Analytics. There is no prerequisite.

What can Attendees Expect to Learn:

This tutorial will provide an overview of the data analytic process, techniques, and applications, including an overview of the current state-of-the-art and available resources. Several examples of real-world applications of data analytics techniques will be provided. Discussions of the limitations and pitfalls in applying these techniques will also be included in the presentation.