

Audit Analytics

--An innovative course at Rutgers

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A new certificate in “Analytic Auditing”

- Tentative courses:
 - Audit Analytics
 - Special Topics in Audit Analytics
 - Forensic Accounting
 - Information Risk Management
- MACCY students may specialize in the area taking these courses as optionals
- Non-enrolled students may take the 4 course certificate independently

Audit Analytics (Fall 2012)

- Purpose
 - Meet the demand for effective and efficient audit methodologies in profession.
 - Provide theoretical foundation and applied demonstration for advanced audit methodologies.
- Content
 - The application of analytical techniques in the (internal and external) audit process
 - All the analytical techniques will be discussed in the context of case examples, because the emphasis is on the usage of statistics and the interpretation of results rather than the mathematics of specific techniques

Key Objectives

- Gain a managerial overview of various analytical techniques
- Understand how information systems are used in organizations and industries
- Gain understanding of the evolving scenario of big data audit
- Perceive the progressive convergence of analytical methods, information processing, and auditing
- Link audit analytics to corporate continuous monitoring and business process support

Domains of knowledge to be attained

- Analytics techniques in the audit domain
- The usage of audit analytics tools (ACL&IDEA)
- The usage of statistical software (paid or public; SAS, WEKA, R for example)
- Data extraction methods
- Statistical result interpretation

Analytical techniques to cover

- Descriptive statistics
- Basic data analysis
- Benford's law
- Belief function
- Clustering
- Text mining
- Continuity Equations
- Data Visualization
- Duplicate analysis
- Sampling
- Regression
- Neural Network
- Process mining

Course Structure

- Online course (using Pearson ecollege as the platform for the course): no specific class hour
- Course materials (PowerPoint slides, lecture videos, and sample data) as well as discussion topics will be posted online at the beginning of each week, students can study the course materials and participate in the discussion at any time during the week.
- 2/3 lectures are given by the primary instructor and the other 1/3 lectures are given by the guest lecturers from various areas

Assignments, Project, and Final Exam

- Three assignments:
 - One using R
 - One using ACL&IDEA
 - One about advanced audit analytics techniques
- Course Project:
 - The topic can be decided by students but should be related to class topics.
 - 20-minute presentation (using Eluminate live as the tool to do the presentations)
- Final Exam:
 - Remote exam lasting for three hours
 - Exams will include six essay questions; students need to choose four of them to answer

Feed backs from students

- ✧ I liked that I learned a lot about different softwares
- ✧ Learn a lot of new topics
- ✧ Difficult to get used to different software without the assistance of a teacher
- In addition to the online lectures, we need one or more physical hands-on sessions.
- ✧ I would be more detailed about how to use different softwares
- Maybe we need to add more detailed tutorial on tools
- ✧ Spend less time on tools and more on analysis
- It is difficult to satisfy every student...

Special Topics in Audit Analytics (Spring 2013)

Course Objectives:

- The first part of the course is intended to develop students' understanding of what statistical inference is and how it is related to audit and audit data. Students will learn how to apply some basic statistical models to the auditing problems, how to interpret the results, and troubleshoot some common problems.
- The second part of the course covers some specialized audit analytic techniques such as visualization, neural networks and continuity equations.

Introduction

- **Audit data**
- **Audit evidence**
- **Probability**
- **Data distribution**

Statistical Inference I

- **Statistical Hypothesis**
- **Null and alternative hypotheses**
- **Statistics, P-Values**
- **Interpreting results**

Statistical Inference II

- Tests involving means
- Tests involving variances
- Other tests

Simple Linear Regression

- Least squares method
- R^2
- Demonstration with Weka

Generalized Linear Model

- Logistic regression
- Demonstration with R

Diagnostics

- Outliers
- Residual Plots

Visualization Techniques

- **Tableau**
- **Qlikview**

Classification

- **Decision Trees**
- **Rules**
- **Demonstration with Weka**

Association Analysis

- **Frequent Itemsets**

Process Mining

- **Business Processes**
- **Workflows**

Neural Networks

- **Perceptron**
- **Demonstration with R**

Continuous Auditing I

- **Introduction to CA**

Continuous Auditing II

- **Analytics in CA**
- **Continuity Equations**