INSTRUCTOR: Prof. Mark S. Fox  
Mechanical & Industrial Engineering Department  
40 St. George St., Room 8114  
Telephone: 416-978-6823; email: msf@eil.utoronto.ca  
Office Hours: by appointment

LOCATION: Mondays, 1pm to 3pm.  
SF1009

(Sebastopol, CA: O’Reilly Media Inc.)

SOFTWARE: Rapidminer (https://rapidminer.com/)

TITLE: Data Analytics and Cities

**Course Description**

This course provides an introduction to data analytics, including machine learning, illustrating by their application to cities. Topics include Data Discovery and Wrangling, Classification techniques, Similarity Analysis, Text Mining, and City Performance Measurement. The analysis techniques will be demonstrated using the Rapidminer data analytics software tool. Students will be required to present a case study of an existing application of data analytics to a city problem, and will work as part of a team to solve a city problem using the aforementioned techniques.

**Course Material:** Lecture slides and readings, except for the textbook, will be available via the course web site prior to each week's lecture.

**Individual Evaluation**

1. (10%) Each student will submit a written summary (using the provided HTML template) of a data science application in a city. The summary will be presented on October 1st. The summary will contain the following:
   a. Title, city/state/country, project start and end date
   b. Bibliographic reference for the application
   c. Summary of the application: problem, data science method, datasets used
   d. Issues, outcome and status

2. (35%) Final Exam – downloaded from the course website and to be submitted by via the course website within 2 hours.
Group Evaluation
Each group will choose a city and problem that they will solve using data science methods implemented in Rapidminer. Each group will be composed of 2-3 students to be selected in the second week.

Assignment 1 (Due on October 8) 10%
Assignment 2 (Due on October 29) 15%
Assignment 3 (Due on November 26) 20%
Presentation (December 3) 10%

Warnings:
1. If you don’t understand anything, ask questions in class – I am happy to answer them. You can also email me or schedule an appointment.
2. I tell jokes in class, but no one knows if I am joking as I always have a serious look on my face. My kids tell me I am not funny. Humor me by laughing!

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>10 Sep 18</td>
<td><strong>1. Introduction to Data Science and Cities, Rapidminer</strong></td>
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<tr>
<td></td>
<td>• Provost and Fawcett, Chapter 1.</td>
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<tr>
<td>17 Sep 18</td>
<td><strong>2. Data Discovery and Wrangling, and the Data Mining Process</strong></td>
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<td>• Provost and Fawcett, Chapter 2.</td>
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<td>24 Sep 18</td>
<td><strong>3. Predictive Modelling – Model Fitting</strong></td>
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<td>• Provost and Fawcett, Chapters 3 and 4</td>
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<td>1 Oct 18</td>
<td><strong>4. Student Presentations</strong></td>
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<tr>
<td>Date</td>
<td>Topic</td>
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<td>8 Oct 18</td>
<td><strong>5. Thanksgiving – no class</strong></td>
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<tr>
<td>5 Nov 18</td>
<td><strong>9 Text Mining</strong></td>
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| 26 Nov 18 | **12. Smart Cities**                                         | TBD                                                                       |
| 3 Dec 18  | **13. Team Presentations**                                   |                                                                           |
| 10 Dec 18 | **14. Final Exam**                                           |                                                                           |