Module 04 - Data-Driven Decision under Uncertainty Module 04 - Data-Driven Decision under Uncertainty item options

October 1 - October 14

Learning outcomes for this module:

1. Analyze decisions with Decision Tree tool
2. Construct decision tree with MS Excel add-in
3. Incorporate both value and uncertainty in decision making
4. Quantify business risk tolerance in decision analysis

Textbook:
Chapter 14 "Decision Analysis" of Ragsdale "Spreadsheet Modeling and Decision Analysis" textbook

Announcement

"Howdy, we are about to complete the Decision Tree Analysis module, which marks about 40% of the course progress. It's the time to made some adjustment based on your feedback and our experience. We will implement the following changes to our teaching, grading and learning practices.

1. Add a TA office hour session: 11am-12pm every Saturday, starting on October 20th. SAM will conduct an interactive session to help you understand the homework and the course contents. SAM will send out WebEx call-in numbers for you to join so that he can share his computer screen to show the solutions to questions. In addition, I will continue participate the group discussions and answer emails.
   Action for students: please email Sam your doubts and questions during the week, and then during the office hour session, Sam will address them one-after-the-other.
2. We will extend the quiz time from the current 10 minutes to at least 15 minutes so that students will have more time to complete the questions.
3. Course grading and feedback time: within three days after the due day of an assignment, scores and feedback will be provided to students.

Please feel free to let us know if you want to suggest other actions to improve your learning experience.

Thanks in advance.

Dr. Xiaomin Yang"

Topic 1 - The 4 Steps in Data Driven Decisions Duration about 4 minutes. Download: Transcript

Topic 2 - Biodiesel Business Case Duration about 5 minutes. Download: Transcript

Topic 3 - Expected Value Duration about 3 minutes. Download: Transcript

Topic 4 - Biodiesel Business Case Revisited Duration about 3 minutes. Download: Transcript

Quiz 6 Time: 10 minutes Due: October 3

As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality. Albert Einstein

Recommended reading Attached Files:

DecisionTheory.pdf (269.466 KB)
Make sure that you read this article before moving to the next unit.

Topic 5 - Analytical Approach to Support Decision Making Duration about 4 minutes. Download: Transcript

Topic 6 - Introduction to Decision Trees Duration about 4 minutes. Download: Transcript

Topic 7 - Building and Solving Decision Trees Duration about 3 minutes. Download: Transcript

Topic 8 - Software for Decision Trees Duration about 14 minutes. Download: Transcript

Decision Tree Models Attached Files:

Bio-fuels plant (12.677 KB)
Decision tree under uncertainty (13.96 KB)
Decision tree with certainty (17.914 KB)
Bio-fuels plant utility function (13.205 KB)
Above is a list of Decision Tree Models that we will discuss in this module. Please feel free to download and use them. Note: Analytic solver is required to revise the decision tree models.

Topic 9 - Decision Tree Assessment Duration about 1 minute. Download: Transcript

Decision Tree Assessment - 1

As a product manager, you need to decide whether to do a marketing campaign before launching a product. The product on social network will cost $0.45m and will increase the product profit from $3m to $3.5m. If the company decides to cancel the project, it will cost the company nothing.

Build your own decision tree of the problem using Analytic Solver and submit your Excel file.
Due: October 4

Topic 10 - Decision Trees Under Uncertainty Duration about 7 minutes. Download: Transcript

Topic 11 - Decision Trees with Sequential Decisions Duration about 14 minutes. Download: Transcript

Decision Tree Assessment - 2

As a product development executive of an oil well drilling control device company, you have decided to develop a disruptive product that will leapfrog competing products on the market. The estimated outcome is: 20% of losing $10 million, 60% of chance of making $100 million, 20% chance of making $120 million. A consulting firm proposed a comprehensive market survey to test market response to the product. The market study will cost $5m. Do you want to approve the market study?

Build a decision tree for the problem using Analytic Solver and make an analytical decision accordingly. Submit the excel file on eCampus.
Due: October 6

Topic 12 - Decision Trees Advantages Duration about 3 minutes. Download: Transcript

Topic 13 - Biodiesel Business Case with Decision Tree Duration about 15 minutes. Download: Transcript

Decision Tree Assessment - 3

As a product development executive of an oil well drilling control device company, you have decided to develop a disruptive product that will leapfrog competing products on the market. Now you are facing three design options. 1. 20% of losing $10 million, 80% of chance of making $100 million 2. 50% of losing $10 million, 50% of chance of making $166 million 3. 20% of losing $15 million, 80% of chance of making $102 million **Build a decision tree for the problem using Analytic Solver and calculate the expected value of each option. Submit the Excel file on eCampus.** Due: October 10

Topic 14 - Decision Trees and Risk Duration about 7 minutes. Download: Transcript

Topic 15 - Risk Tolerance Duration about 5 minutes. Download: Transcript

Topic 16 - Risk Tolerance in Organizations Duration about 3 minutes. Download: Transcript

"The biggest risk is not taking any risk". Mark Zuckerberg

Topic 17 - Utility Function Duration about 7 minutes. Download: Transcript

Topic 18 - Utility Function and Risk Tolerance Duration about 5 minutes. Download: Transcript

Topic 19 - Risk Tolerance Parameter and Financial Measures Duration about 3 minutes. Download: Transcript

Topic 20 - Biodiesel Business Case with Utility Function Duration about 5 minutes. Download: Transcript

Decision Tree Assessment - 4

As a product development executive of an oil well drilling control device company, you have decided to develop a disruptive product that will leapfrog competing products on the market. Now you are facing three design options. The net income of the company is $120 million. 1. 20% of losing $10 million, 80% of chance of making $100 million 2. 50% of losing $10 million, 50% of chance of making $166 million 3. 20% of losing $15 million, 80% of chance of making $102 million Risk tolerance parameter (R) = 124% of net income.

Using Analytic Solver Decision Tree tool to build a decision tree for the problem and calculate the certain equivalent value of each option based on the given exponential risk utility function. Submit the Excel file on eCampus. Due: October 14

Topic 21 - Module Summary Duration about 2 minutes. Download: Transcript