

Introduction

Decision Supports Systems 2017/18, Lecture 01

Marko Tkalčič

Alpen-Adria-Universität Klagenfurt

Introduction

Decision Making Examples

Course Structure

Who am I?

Marko Tkalčič

- 2016 now : assistant professor at Free University of Bozen-Bolzano
- 2013 2015: postdoc at Johannes Kepler University, Linz
- 2011 2012: postdoc at University of Ljubljana
- 2008 2010: PhD student at University of Ljubljana



My research explores ways in which **psychologically-motivated user characteristics**, such as emotions and personality, can be used to improve **recommender systems** (personalized systems in general). It employs methods such as **user studies** and **machine learning**.

Book, 2016

- Tkalčič, M., Carolis, B. De, Gemmis, M. de, Odić, A., & Košir, A. (Eds.). (2016). Emotions and Personality in Personalized Services. Springer International Publishing. https://doi.org/10.1007/978-3-319-31413-6
- Authors from
 - Stanford, Cambridge, Imperial College, UCL ...
- topics:
 - psychological models
 - acquisition of emotions/personality
 - personalization techniques
- http://www.springer.com/gp/book/9783319314112

Human–Computer Interaction Series

Marko Tkalčič Berardina De Carolis Marco de Gemmis Ante Odić Andrej Košir *Editors*

Emotions and Personality in Personalized Services

Models, Evaluation and Applications

🖉 Springer

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Assume that every one of you are the employees of the same company. The company is trying to create a product and you need to put some effort for that. You can select your effort level between 1(least effort)–7(most effort), however your gain would be twice of the average of total effort regardless of your personal effort. How much effort would you be willing you put? [2 min thinking]

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[switch to excel]

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[switch to excel]

The results are always close to 2. An intuitive reason is the **lack of trust**. People don't want to spend effort because their gain depends on the average, and their effort has very small effect on that. Even though they all can win a lot, their potential loss is more important for the most.

There is a runaway trolley barreling down the railway tracks. Ahead, on the tracks, there are five people tied up and unable to move. The trolley is headed straight for them. You are standing some distance off in the train yard, next to a lever. If you pull this lever, the trolley will switch to a different set of tracks. However, you notice that there is one person on the side track. You have two options:

- Do nothing, and the trolley kills the five people on the main track.
- Pull the lever, diverting the trolley onto the side track where it will kill one person.

Which is the most ethical choice?



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Alternative solution

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https://www.youtube.com/watch?v{=}{-}N\_RZJUAQY4
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Version 2:

As before, a trolley is hurtling down a track towards five people. You are on a bridge under which it will pass, and you can stop it by putting something very heavy in front of it. As it happens, there is a very fat man next to you – your only way to stop the trolley is to push him over the bridge and onto the track, killing him to save five. Should you proceed?

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Version 3:

... the fat man is, in fact, the villain who put these five people in peril.

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When engineers working on the very first iPod completed the prototype, they presented their work to Steve Jobs for his approval. Jobs played with the device, scrutinized it, weighed it in his hands, and promptly rejected it. It was too big.

The engineers explained that they had to reinvent inventing to create the iPod, and that it was simply impossible to make it any smaller. Jobs was quiet for a moment. Finally he stood, walked over to an aquarium, and dropped the iPod in the tank. After it touched bottom, bubbles floated to the top.

"Those are air bubbles," he snapped. "That means there's space in there. Make it smaller."

Example - intuitive decision: Steve Jobs - bad intuitive decision - NeXT

- in 1985, Steve Jobs left Apple and founded NeXT
- NeXT computer:
 - powerful hardware
 - included DSP
 - unix+windowed GUI
 - CD player
 - ethernet
 - super design

Example - intuitive decision: Steve Jobs - bad intuitive decision - NeXT

- in 1985, Steve Jobs left Apple and founded NeXT
- NeXT computer:
 - powerful hardware
 - included DSP
 - unix+windowed GUI
 - CD player
 - ethernet
 - super design
- commercially, it was a failure (but important technological legacy)

Why? Speculations:

- too expensive hardware
- bad timing (too early solving problems people didn't know they have)

[video of lie detector]

Technological support for decisions: Lie To Me

[video of lie detector]

- how much can we trust technology?
 - can we use it to support our decisions?

Amazon will start selling a new product in a month from now. How much pieces of the new product should Amazon buy from the manufacturer?

Amazon Job Example

Amazon will start selling a new product in a month from now. How much pieces of the new product should Amazon buy from the manufacturer?

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Amazon will start selling a new product in a month from now. How much pieces of the new product should Amazon buy from the manufacturer?

- find similar products from the past
- define similar
- price of too small/big stock?

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Course Overview

Pre-requisites

- no particular pre-requisites
- appreciation of working with data
- background in probability is helpful
- spreadsheet tools experience is an advantage

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The course consists of three parts

- 1. Decision Analysis: Theoretical decision making (Robert Clemen, Making Hard Decisions)
- 2. Data-driven Examples (Supercrunchers, Freakonomics)
- 3. Data-driven Decision making support with Weka

Syllabus

Decision Analysis: Theoretical decision making

- 1. Introduction
- 2. Modeling Decisions 1
- 3. Modeling Decisions 2
- 4. Modeling Uncertainty 1
- 5. Modeling Uncertainty 2
- 6. Modeling Preferences 1
- 7. Modeling Preferences 2

Data-driven Examples

- 8. Supercrunchers 1
- 9. Supercrunchers 2
- 10. Psychological Aspects of Decision Making

Data-driven Decision making support with Weka

- 11. Data Mining 1
- 12. Data Mining 2
- 13. Data Mining 3
- 14. Case Study
- 15. Conclusion

Exam

- There will be a written exam
- Exam-like quick quizzes throughout the course
- Optional: Project (50% of the total exam score)
- Grading:
 - score = project assessment score [0-50] + exam score [0-100]
 - if score>100 then score=100
 - pass score (1,2,3,4) >= 50

Project

- · Further instructions will be provided
 - pick a decision problem
 - find an appropriate dataset
 - use decision analysis tools to model the decision problem
 - use data mining tools to support the decision model
 - submit a report
 - · template will be provided

Course resources

- UNI webpage: https://campus.aau.at/studium/course/91810?lang=en
- Iccture slides: http://www.markotkalcic.com/teaching.html
- all the information are in the lecture slides

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Contact:

marko.tkalcic@aau.at

Schedule

Tag	von - bis	Raum
Fr, 20.10.2017	10:00 - 12:00	E.1.37
Fr, 20.10.2017	13:00 - 16:00	E.1.37
Fr, 03.11.2017	10:00 - 12:00	E.1.37
Fr, 03.11.2017	13:00 - 16:00	E.1.37
Fr, 17.11.2017	10:00 - 12:00	E.1.37
Fr, 17.11.2017	13:00 - 16:00	E.1.37
Fr, 15.12.2017	08:00 - 13:00	V.1.02

Issue: 17. November is overlapping with another course

Alternatives

- 15. December
- other?

Part of the material has been taken from the following sources. The usage of the referenced copyrighted work is in line with fair use since it is for nonprofit educational purposes.

- https://www.youtube.com/watch?v=-N_RZJUAQY4
- https://en.wikipedia.org/wiki/Trolley_problem
- https://www.quora.com/How-have-you-applied-Game-Theory-inlife/answer/Cihan-Oklap?srid=p7hT
- https://www.quora.com/What-are-some-great-stories-about-Steve-Jobs/answer/Amit-Chaudhary
- https://www.quora.com/Why-did-NeXT-fail