QA: Potpourri

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Administrivia

- Homework 5 released
- https://cmu-313.github.io/homeworks/Homework5.pdf
- Visitor Today!

QA for ML

Activity

Consider the different approaches to fairness. Can you come up with different scenarios where each fairness approach might be appropriate?

Remember the fairness approaches are:
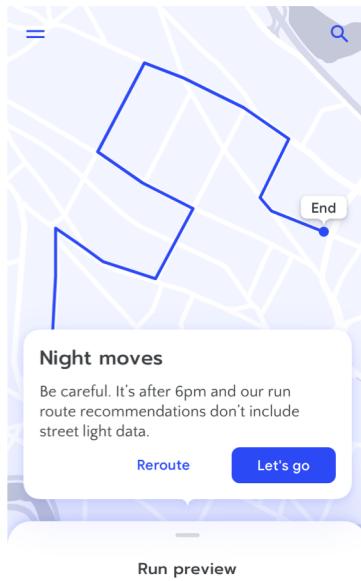
- Group unaware
- Group thresholds
- Demographic parity
- Equal opportunity
- Equal accuracy

Activity Results:
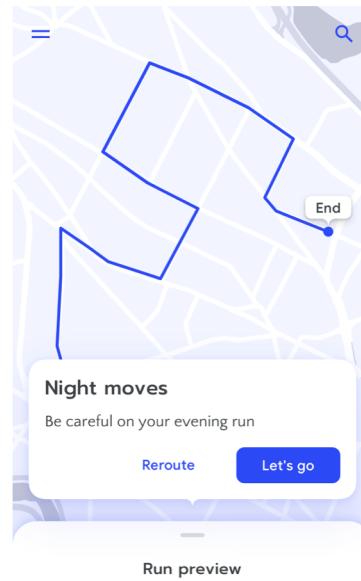
- Group unaware
  - Chess game, Froyo, Admissions, Translation (Languages)
- Group thresholds
  - Hackathons, Medical Systems, Disease Classification, Life expectancy, Admissions, Academic testing
- Demographic parity
  - State (e.g. PA, CA) level decisions, Credit score, Admissions, Hiring
- Equal opportunity
  - Employment, Admissions, Bail, Taxation, Job Promotion

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Trust Calibration

- As a team, brainstorm what kinds of experiences and interactions would decrease, maintain, or inflate trust in your feature's AI. Identify the underlying data sources, system data and user knowledge, that could impact the calibration.
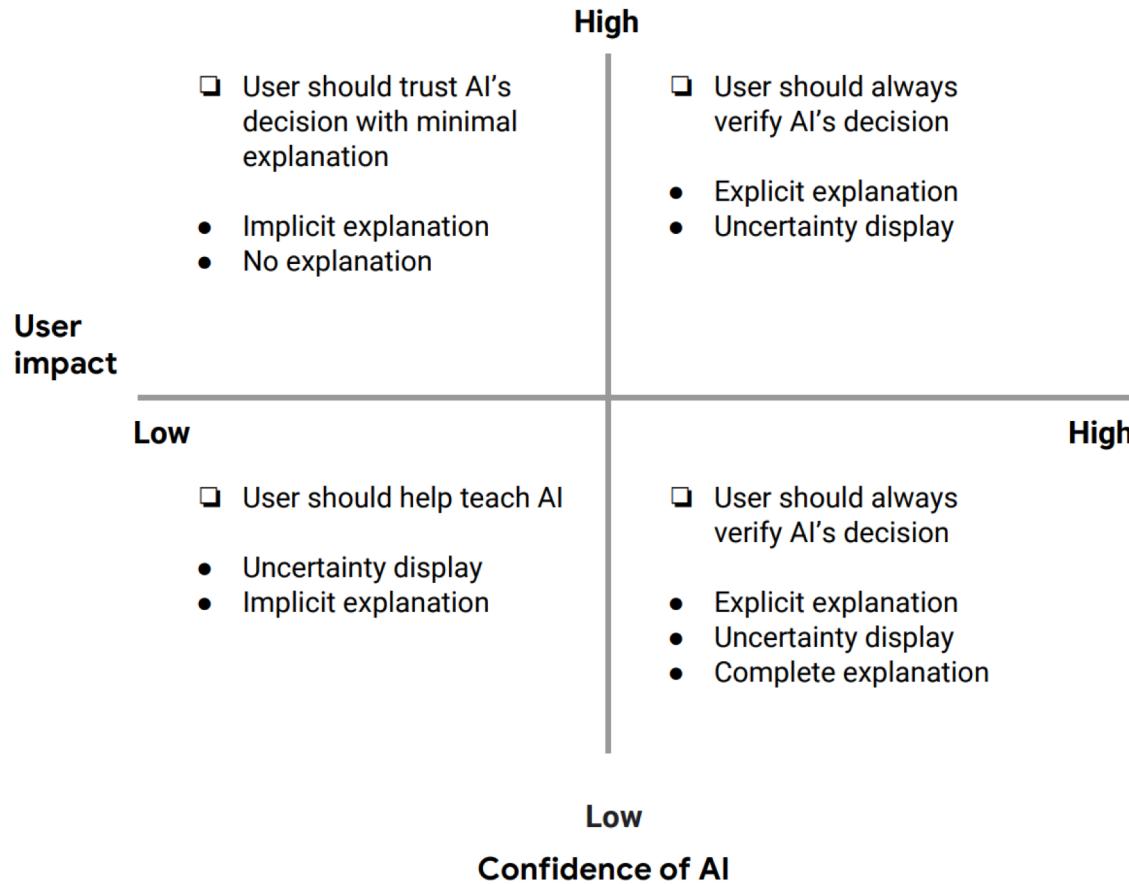

Vs

How to build trust

- Help users calibrate their trust
  - Articulate data sources
  - Tie explanations to user actions
  - Account for situational stakes
- Optimize for understanding
- Manage influence on user decisions

Explanation Strategy

High

❏ User should trust AI's decision with minimal explanation

● Implicit explanation
● No explanation

❏ User should always verify AI's decision

● Explicit explanation
● Uncertainty display

User impact

Low   High

❏ User should help teach AI

● Uncertainty display
● Implicit explanation

❏ User should always verify AI's decision

● Explicit explanation
● Uncertainty display
● Complete explanation

Low

Confidence of AI

#DisneyPlus

Celebrating 1 Year. Happy #Plusiversary

↗ Promoted by Disney+

Disney+ Lessons learned

Disney says its new Disney+ streaming service is so popular you can't stream it

"The consumer demand for Disney+ has exceeded our highest expectations." Translation: Whoops.

By Peter Kafka | Nov 12, 2019, 12:30pm EST

f 🐦 ↗ SHARE

A scene from *The Mandalorian*, a new Star War series streaming on Disney+. | Lucasfilm

Decision Making/ Tradeoffs

Life is all about tradeoffs

In this course, we have talked a lot about tradeoffs.

Some tradeoffs we have discussed:

    Writing Tests vs writing more features

    Choosing a familiar tech stack vs a "trendy one"

    Other tradeoffs…?

Think about structured ways to make decisions

Do what is ethical, legal, moral, obvious

Sometimes, there are multiple (legitimate) options, that all seem to have positives and negatives.

What to do?

People have studied this before...

Economics

Biology + Microbiology

Sociology

Engineering

Computer Science

Strategy Games
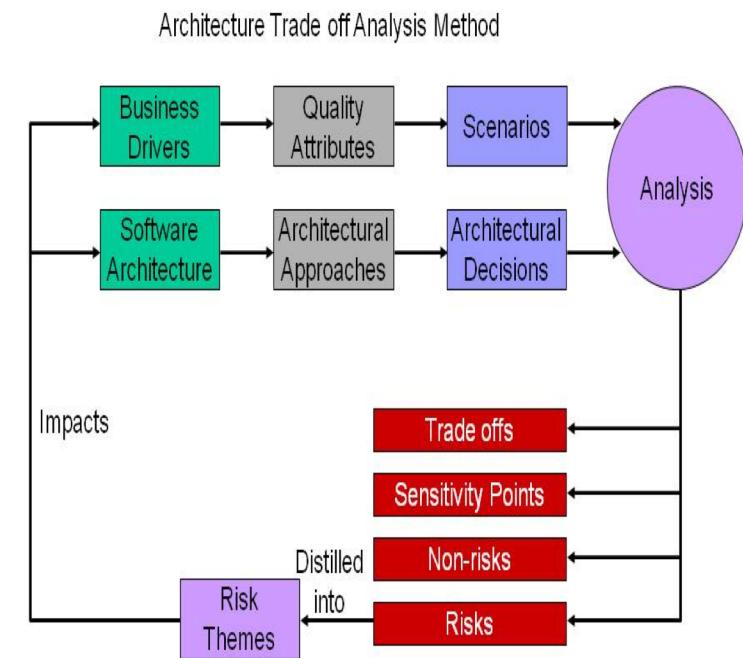
Ethics

Medicine

Politics
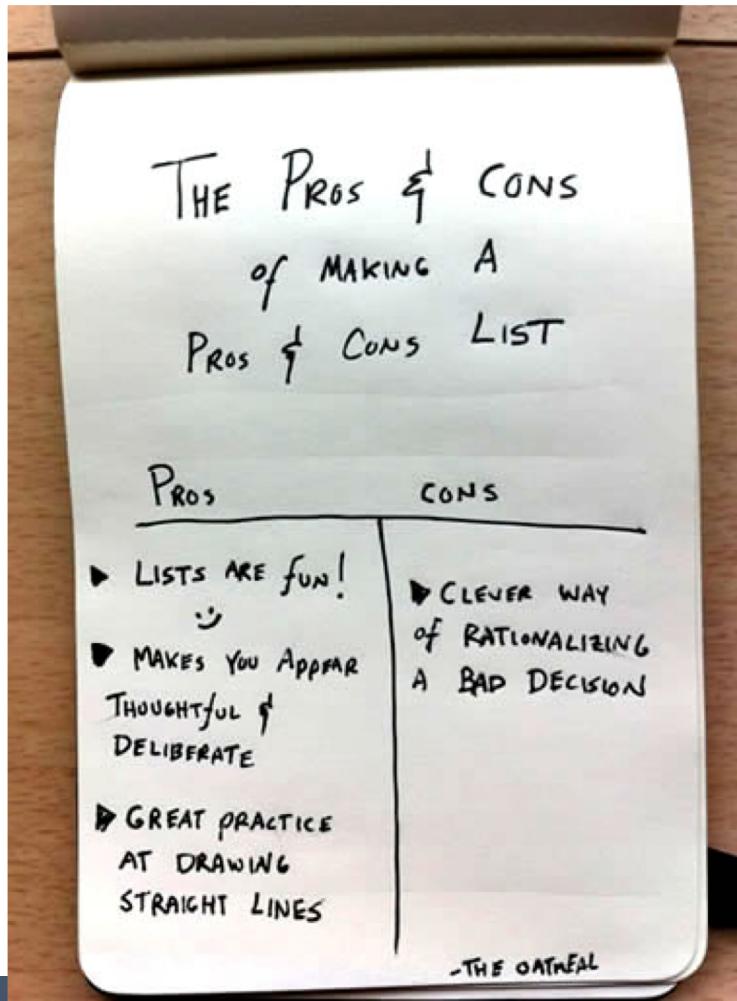
Architecture Tradeoff Analysis Method

1. Present the ATAM.
2. Present business drivers.
3. Present architecture.
4. Identify architectural approaches.
5. Generate quality attribute utility tree.
6. Analyze architectural approaches.
7. Brainstorm and prioritize scenarios.
8. Analyze architectural approaches.
9. Present results.

https://concisesoftware.com/architecture-tradeoff-analysis-method-atam/
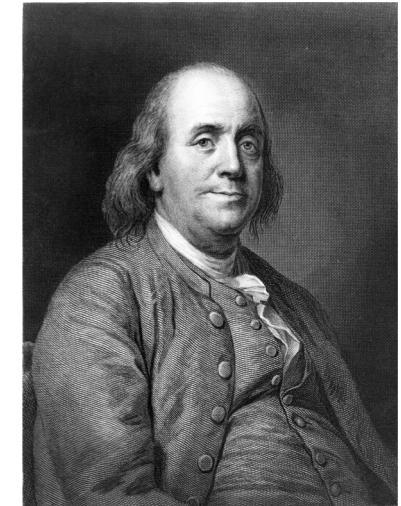
Pros and cons

Moral or Prudential Algebra

1. Make a list of Pros and Cons

2. Take a few days to think, forcing your brain to come up with all of the positive and negative aspects of taking the measure you're considering.

3. Assign weights to each item on your list depending on its importance.

4. When the weight of a item on your "pro" list is equal to the weight of an item on your "con" list, strike both of them out.

5. What is left in the balance is the choice you need to make. Wait a few more days and, if nothing new occurs to you, act on the decision you've made.

Even Swaps

Premise:

It is easy to make decisions when there is only one objective.

But having only one objective, as any decision maker knows, is a rare luxury.

Even swaps provides a practical way of making trade-offs among any set of objectives across a range of alternatives.

Overview - 3 step process

1. Create a Consequences Table

2. Eliminate "Dominated" Alternatives

3. Make Even Swaps

Running Example from research paper

Example: Alan Miller is a computer scientist who started a technical consulting practice three years ago.

For the first year, he worked out of his home, but as his business grew he decided to sign a two-year lease on some space in the Pierpoint office park.

Now that lease is about to expire. He needs to decide whether to renew it or move to a new location.

Define the objectives

Alan defines five overriding objectives that he needs his office to fulfill:

1. a short commute from home
2. good access to his clients
3. good office services (clerical assistance, copiers and fax machines, and mail service)
4. sufficient space
5. low costs

He finds five viable alternatives: Parkway, Lombard, Baranov, Montana, and his current building, the Pierpoint.

Create Consequences Table

MILLER'S CONSEQUENCES TABLE

Objectives	Alternatives				
	Parkway	Lombard	Baranov	Montana	Pierpoint
COMMUTE IN MINUTES	45	25	20	25	30
CUSTOMER ACCESS (%)	50	80	70	85	75
OFFICE SERVICES	A	B	C	A	C
OFFICE SIZE (SQUARE FEET)	800	700	500	950	700
MONTHLY COST ($)	1850	1700	1500	1900	1750

https://hbr.org/1998/03/even-swaps-a-rational-method-for-making-trade-offs

Eliminate "Dominated" Alternatives

MILLER'S RANKING TABLE

Objectives	Alternatives				
	Parkway	Lombard	Baranov	Montana	Pierpoint
COMMUTE	5	2 (tie)	1	2 (tie)	4
CUSTOMER ACCESS	5	2	4	1	3
OFFICE SERVICES	1 (tie)	3	4 (tie)	1 (tie)	4 (tie)
OFFICE SIZE	2	3 (tie)	5	1	3 (tie)
MONTHLY COST	4	2	1	5	3

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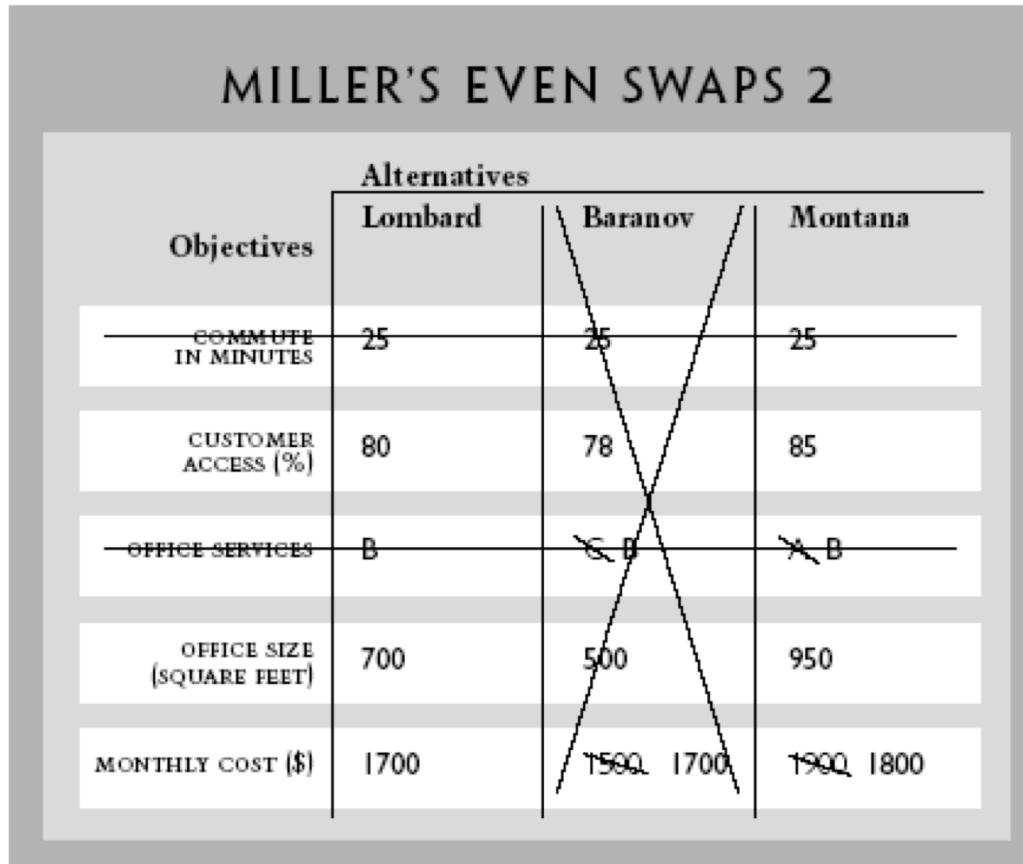
Make Even Swaps

1. Determine the change necessary to cancel out an objective.
2. Assess what change in another objective would compensate for the needed change.
3. Make the even swap.
4. Cancel out the now-irrelevant objective.
5. Select the dominant alternative.

First Even Swaps
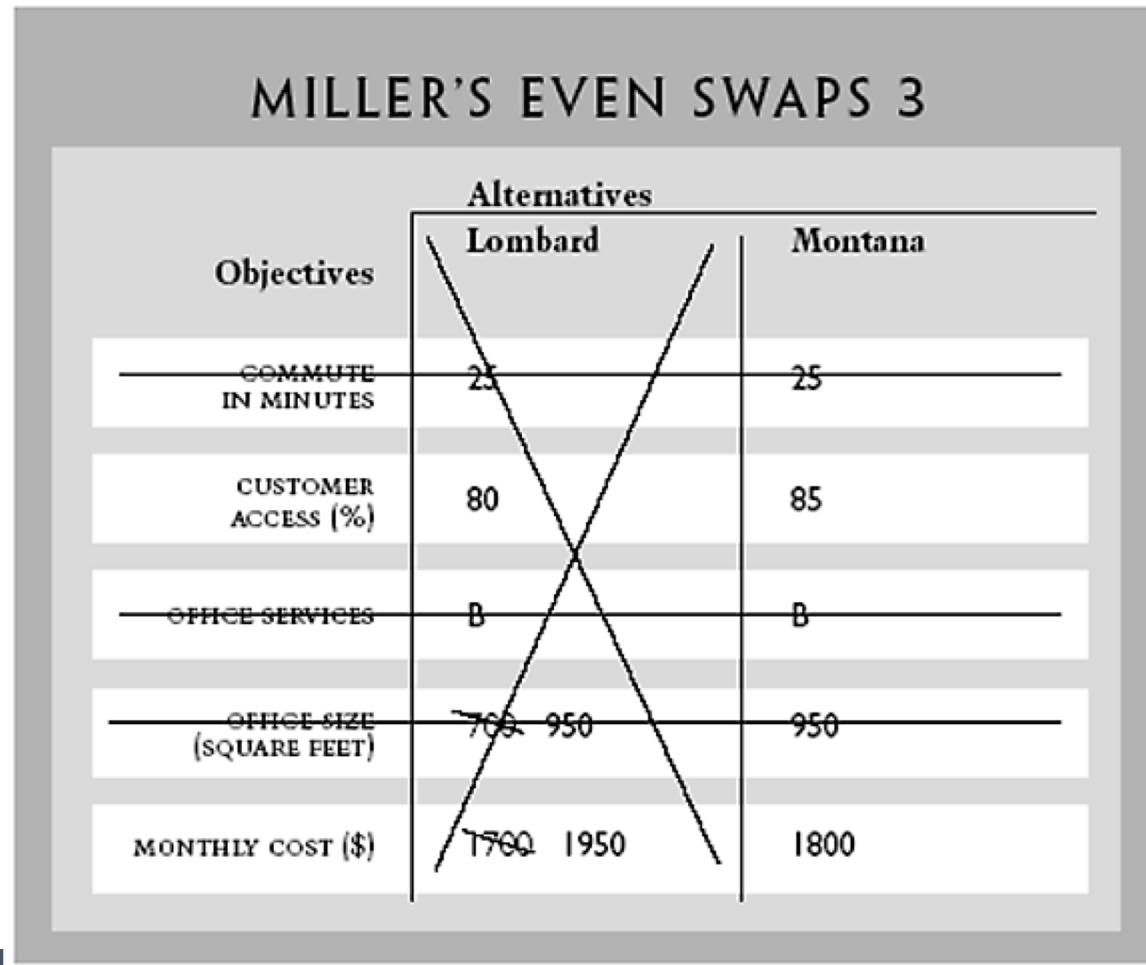
MILLER'S EVEN SWAPS 1

Objectives	Alternatives		
	Lombard	Baranov	Montana
COMMUTE IN MINUTES	~~25~~	~~20~~ 25	~~25~~
CUSTOMER ACCESS (%)	80	~~70~~ 78	85
OFFICE SERVICES	B	C	A
OFFICE SIZE (SQUARE FEET)	700	500	950
MONTHLY COST ($)	1700	1500	1900

Second Even Swaps

MILLER'S EVEN SWAPS 2

Objectives	Alternatives		
	Lombard	Baranov	Montana
COMMUTE IN MINUTES	~~25~~	~~25~~	~~25~~
CUSTOMER ACCESS (%)	80	78	85
~~OFFICE SERVICES~~	~~B~~	~~B~~ B	~~A~~ B
OFFICE SIZE (SQUARE FEET)	700	500	950
MONTHLY COST ($)	1700	~~1500~~ 1700	~~1900~~ 1800

Final Swap

MILLER'S EVEN SWAPS 3

Objectives	Alternatives	
	Lombard	Montana
~~COMMUTE IN MINUTES~~	~~25~~	~~25~~
CUSTOMER ACCESS (%)	80	85
~~OFFICE SERVICES~~	~~B~~	~~B~~
~~OFFICE SIZE (SQUARE FEET)~~	~~700~~ 950	~~950~~
MONTHLY COST ($)	~~1700~~ 1950	1800

Advice for swaps

- Make the easier swaps first

- Concentrate on the amount of the swap, not on the apparent importance of the overall objective.

- Remember that the value of an incremental change depends on what you start with.

- Make consistent swaps.

- Seek out solid information.

Guest Speaker

Matt Ranney

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