



Research Plan

Honors Seminar



Research Plan

Today's goal:

Prepare you to write a good research plan

Outline:

- We will mostly just go over the essential elements
- Have a broader discussion about your research ideas



Essential elements

A good research plan has:

...a motivation

What problem am I trying to solve?

...a description of your system solution

What am I going to build?

...an evaluation plan

How am I going to claim success?



Motivation

Your motivation should answer the question “Why am I doing this?”

Usually describes a need or a problem

Could be societal; could also be a gap in the literature;
ideally both

Explicitly describes your goal or claim

What is the scope of your solution?

Does it have limitations?



Motivation

Example:

“Most existing automatic form fill-in tools that can be found in most modern browsers work in an all-or-nothing way: you either let the tool fill out the entire form, or you fill out the form manually. FormFiller works like these tools, but makes it easier to disclose or withhold specific fields on the form, thus making it easier to control your disclosure.”



System/solution

Describe how your system/solution works

Provide enough details for someone else to build it

This ensures the replicability of your work!

Explain how your idea solves the problem

Be explicit about any assumptions you make

Describe multiple alternative versions (e.g. conditions in an experiment)

Make the comparisons fair!



System/solution

“The system can work in three different ways:

- 1. Regular form-filler: the form is filled-in by default, deleting the value means backspacing it.*
- 2. Filled-by-default: the form is filled-in automatically, and the participant can choose to delete with a button or edit the value manually.*
- 3. Empty-by-default: the form is empty by default, and the participant can choose to add the value via a button-click or by supplying it manually.”*



System/solution

The system you evaluate is not always the optimal production system

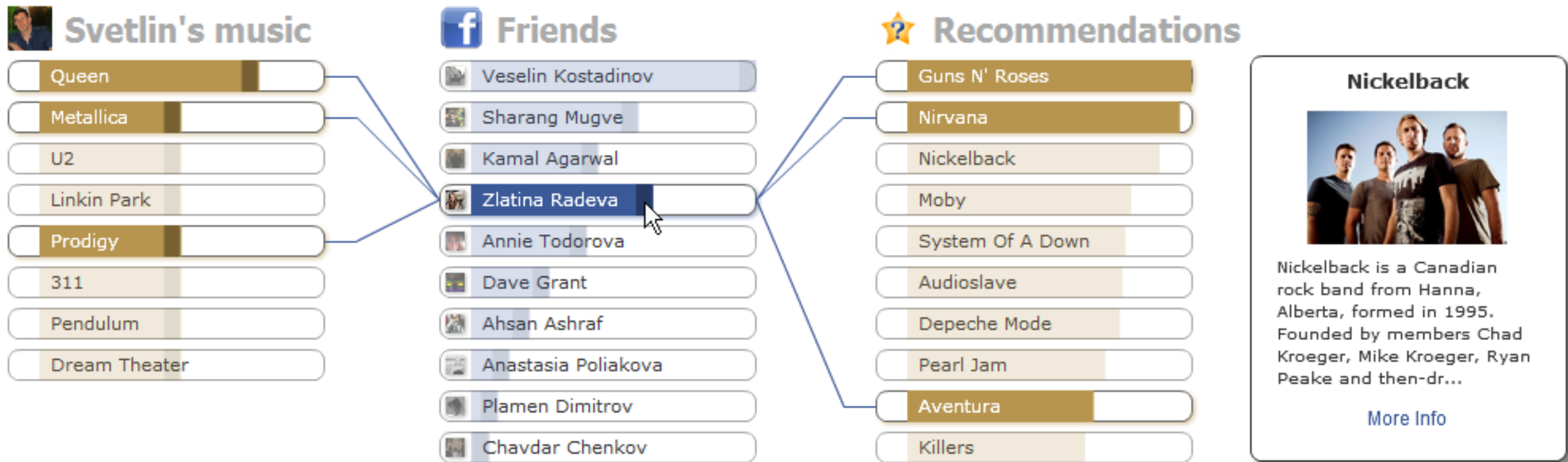
Usually we remove features that are not part of the test

Break things into stages to allow for manipulation



System/solution

Original system: inspectability and control





System/solution

control conditions:

- No control (just use likes)
- Item control (weigh likes)
- Friend control (weigh friends)

drag these sliders
↓

 **Svetlin's music**

- Queen
- Metallica
- U2
- Linkin Park
- Prodigy
- 311
- Pendulum
- Dream Theater

drag these sliders
↓

 **Friends**

- Veselin Kostadinov
- Sharang Mugve
- Kamal Agarwal
- Zlatina Radeva
- Annie Todorova
- Dave Grant
- Ahsan Ashraf
- Anastasia Poliakova

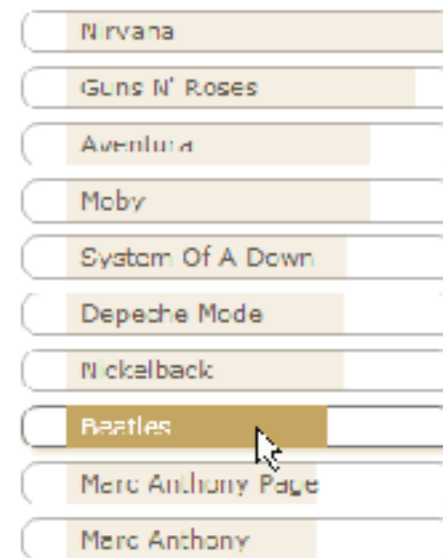


System/solution

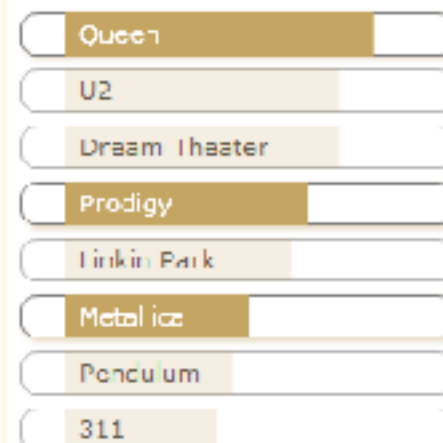
2 inspectability conditions:

- List of recommendations vs. recommendation graph

★ Recommendations



Svetlin's music



f Friends



★ Recommendations





System/solution

Tip: If your solution is complex, write pseudo-code and/or build a mock-up!

This helps others understand the exact workings of the system (replicability!)



Evaluation

Evaluation sets science apart from engineering

Demonstrate your success

Ideally, in a generalizable way

The best type of evaluation depends on the type of CS research you are doing

Examples: experiment, benchmark, case study, etc.
(see week 2 slides)



Evaluation

If you do an experiment, describe your conditions

- Apply ceteris paribus

- Whatever you keep equal should be chosen reasonably

Describe the procedures

- How many trials/participants?

- How will the test happen

Describe things in a lot of details

- For replicability sake!



Evaluation

We will gather 360 participants for this experiment via a recruitment tool such as Amazon Turk. Participants will provide their information to the FormFiller tool and then test it on three websites:

A. Health insurance company “CodaCare.com”

B. Friendship network “BlogHeroes.com”

C. Job search website “IHeartWork.com”

Afterwards, they will be asked about their experience with the FormFiller system and their reasons for disclosure



Evaluation

Participants will get an overview of the FormFiller functionalities, and an explanation of the goals of the experiment.

Participants will then disclose their information to the FormFiller tool. The tool will request 24 items, (internally) divided into 4 groups: the items in groups A, B and C will be most appropriate/expected for websites A, B and C respectively. The items in group D are more general in nature. The starred items are distractors, which are never requested on subsequent websites.



Evaluation

Participants will be told that this information would normally be gathered on-the-fly while they are filling out forms on the Internet, but that we do this beforehand for testing purposes. We will also assure them that this data is stored locally.

To test the tool, the system will then transfer participants to a “random” “external” website (A, B or C). The website will give them a form to fill out, which will request all items that are contained in the FormFiller tool, except the distractor items. Participants can choose to disclose each field or not, or to change the input to a different value than what they submitted to the FormFiller system.



Evaluation

What will you measure?

Describe both the construct (e.g. "precision") and the operationalization of the construct (e.g. $TP / TP + FP$)

Make sure your measures make sense

Make sure you cover everything!

What outcomes do you expect?

Tip: Already give examples of the graphs you expect!

Tip: Build a (causal) model!



Evaluation

We will administer the following questionnaires:

Movie expertise

Compared to my peers I watch a lot of movies.

Compared to my peers I am an expert on movies.

I only know a few movies.

I am a movie lover.

Trusting propensity

In general, people really do care about the well-being of others.

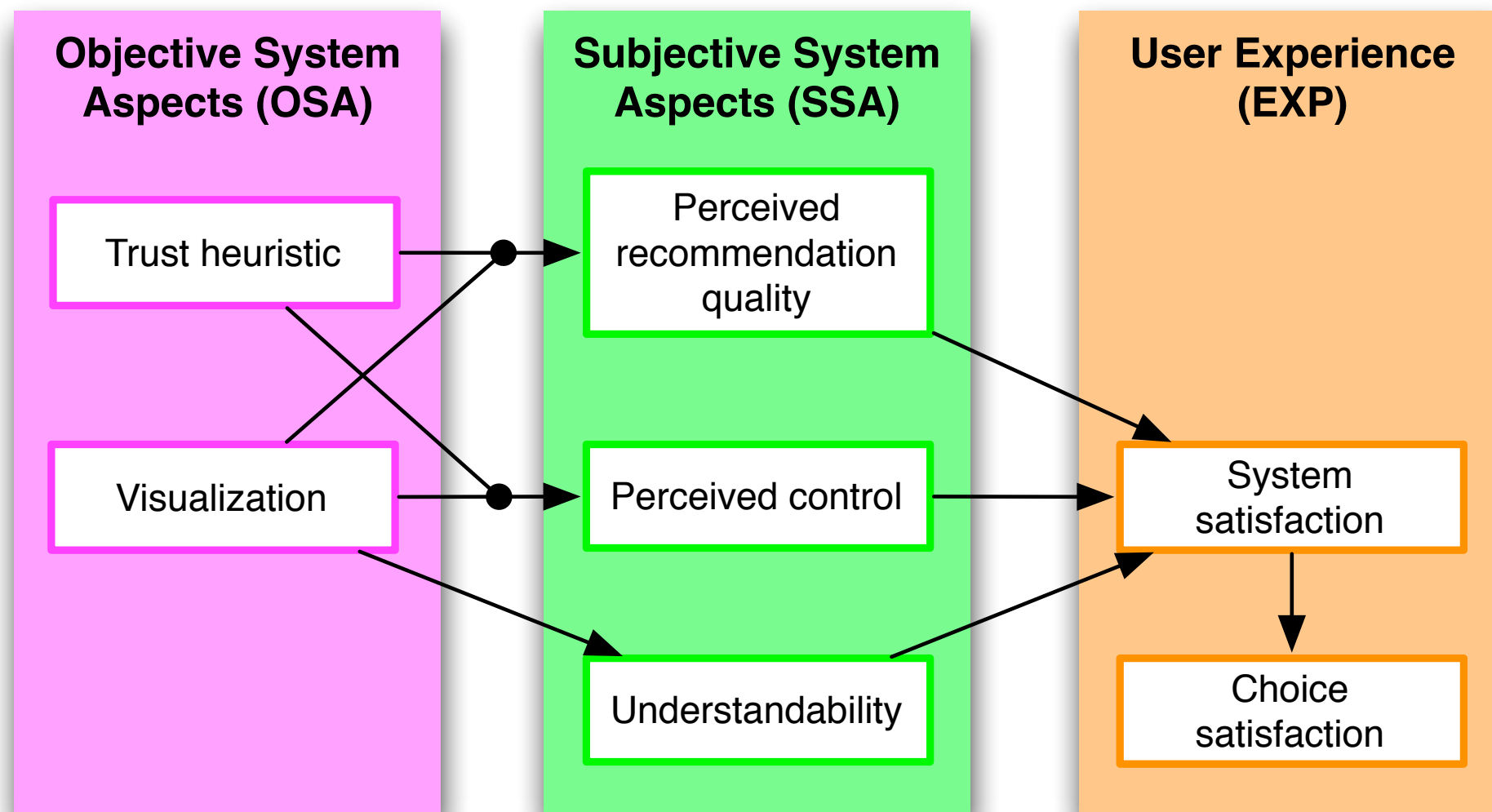
The typical person is sincerely concerned about the problems of others.

Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.

Most people are honest in their dealings with others (etc.)



Evaluation





Discussion

Did you find a possible advisor yet?

What topic would you want to work on with them?

Find 4 papers together!

Goal: write a research plan