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ihealth



# From User Control and Explainability in Recommendation Interfaces to Visual XAI

Denis Parra

PUC Chile & CENIA, iHealth, IMFD

IntRS Workshop co-located at ACM RecSys

Seattle, WA, USA

September 22nd, 2022



@denisparra

# Presents ...

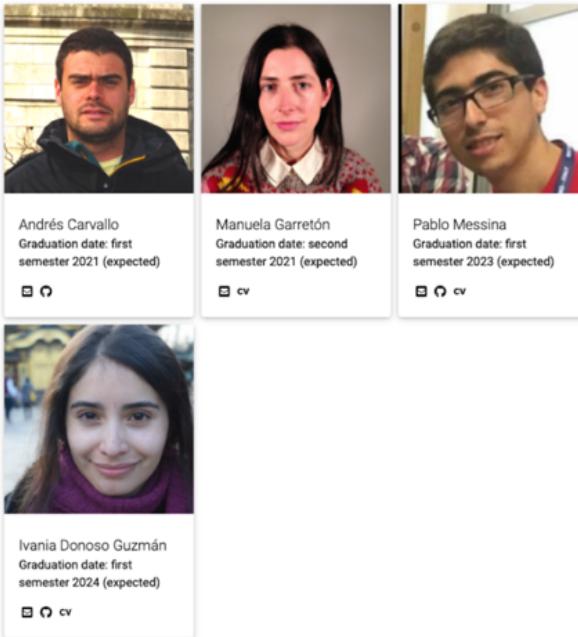
- Associate Professor, CS Department, PUC Chile
- Teaching: Recommender Systems, Information Visualization
- Research: HAIVis Lab ⊂ IA Lab
  - Machine learning applications (RecSys, Medical & Creative AI), intelligent user interfaces, information visualization
  - Students: 5 PhD, 5 Master, 1 Undergraduate
- Principal Researcher at:
  - Chile's National Center on Artificial Intelligence (CENIA, 2021 - )
  - Millennium Institute for Healthcare Engineering (iHealth, 2021 - )
  - Millennium Institute Foundational Research on Data (IMFD, 2018 - )



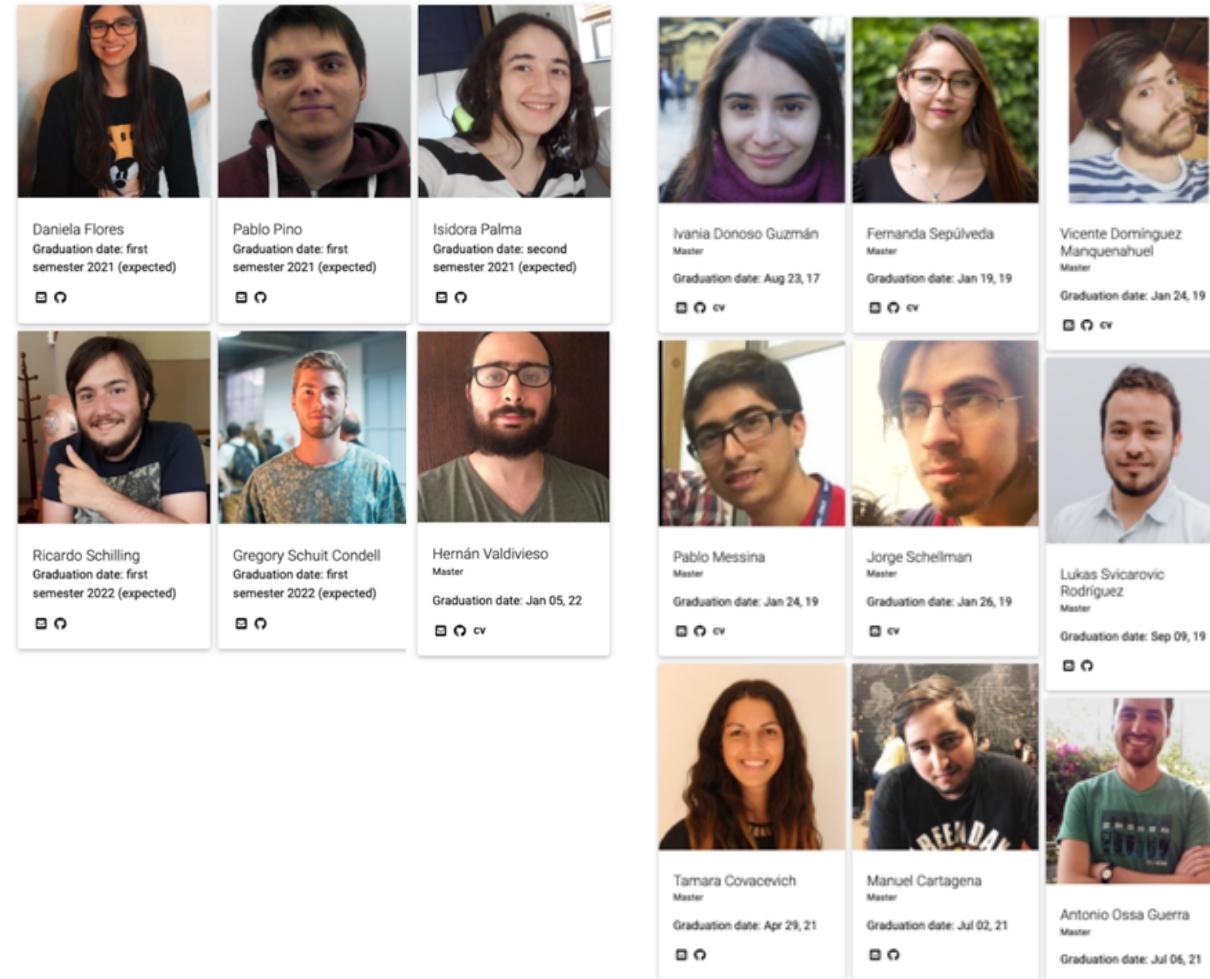
**Denis Parra**

# HAIVis UC: This research has been possible thanks to

PhD Students

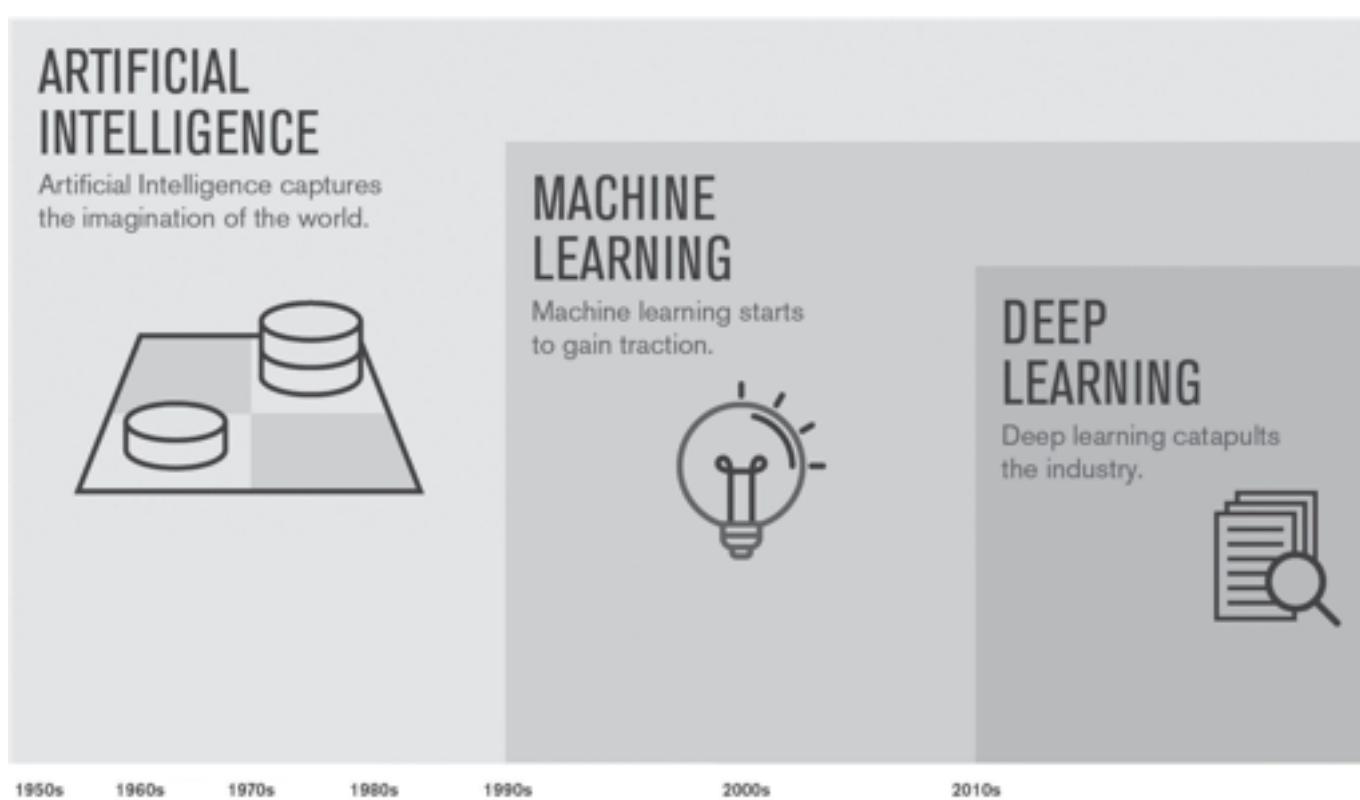
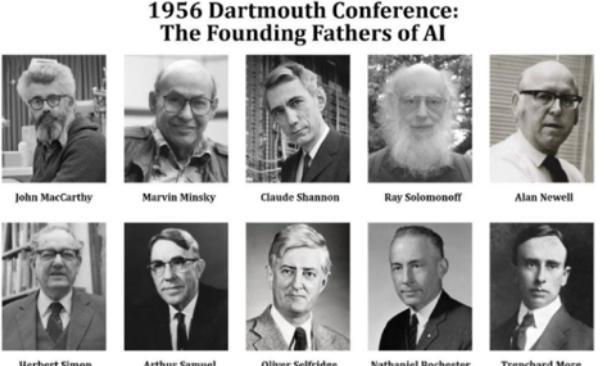


Master's students



# We are living incredible days...

- Technology is showing results which resemble science fiction, specially in the area of Artificial Intelligence.



# Self-Driving Cars



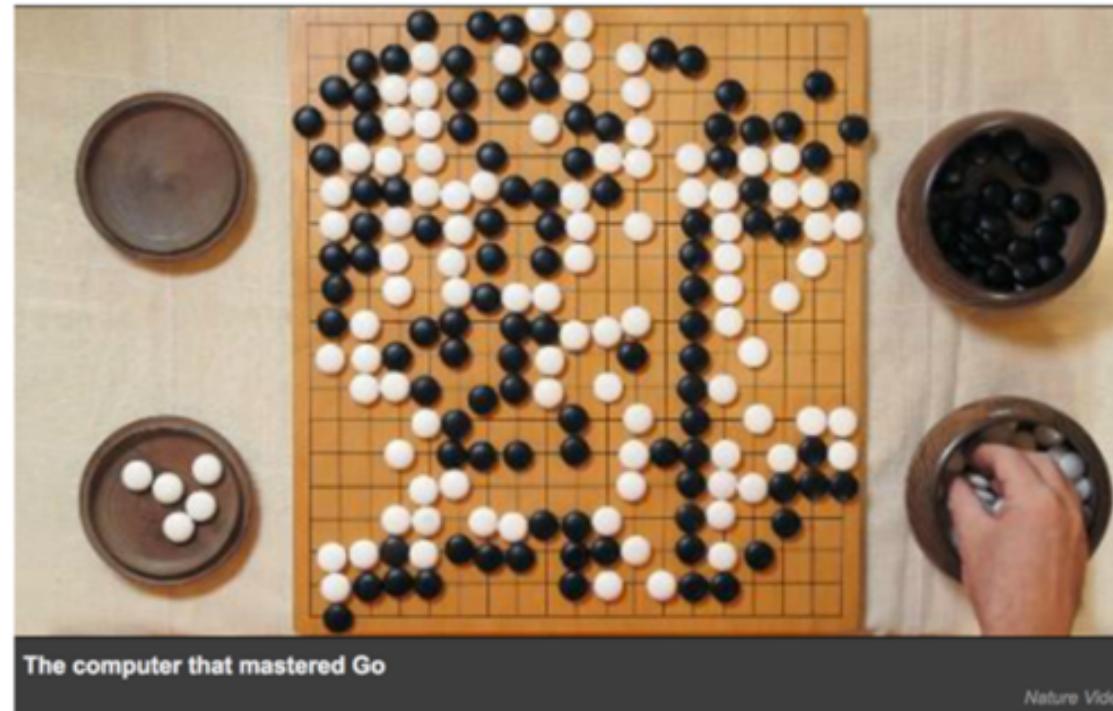
# Mastering Go

Google AI algorithm masters ancient game of Go

Deep-learning software defeats human professional for first time.

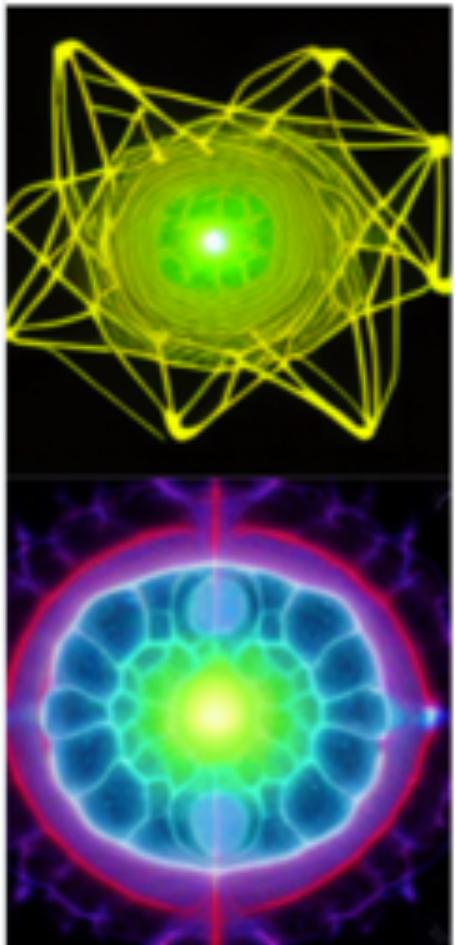
Elizabeth Gibney

27 January 2016



# Text-to-Image Generation

*'An illustration of a slightly conscious neural network'*



*'A painting of a squirrel eating a burger'*



*'A watercolor painting of a chair that looks like an octopus'*



*'A shirt with the inscription: "I love generative models!"'*



<https://github.com/CompVis/stable-diffusion/blob/main/assets/txt2img-preview.png>

# But there are some problems with AI



## Machine Bias

There's software used across the country to predict future criminals. And it's biased against blacks.

by Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, ProPublica  
May 25, 2016

**O**N A SPRING AFTERNOON IN 2014, Brisha Borden was running late to pick up her god-sister from school when she spotted an unlocked kid's blue Huffy bicycle and a silver Razor scooter. Borden and a friend grabbed the bike and scooter and tried to ride them down the street in the Fort Lauderdale suburb of Coral Springs.

Just as the 18-year-old girls were realizing they were too big for the tiny conveyances — which belonged to a 6-year-old boy — a woman came running after them saying, "That's my kid's stuff." Borden and her friend immediately dropped the bike and scooter and walked away.

- When the COMPAS system correctly predicts recidivism, it does it similarly to black and white,
- But, when it fails to predict correctly:

### Prediction Fails Differently for Black Defendants

	WHITE	AFRICAN AMERICAN
Labeled Higher Risk, But Didn't Re-Offend	23.5%	44.9%
Labeled Lower Risk, Yet Did Re-Offend	47.7%	28.0%

Overall, Northpointe's assessment tool correctly predicts recidivism 61 percent of the time. But blacks are almost twice as likely as whites to be labeled a higher risk but not actually re-offend. It makes the opposite mistake among whites: They are much more likely than blacks to be labeled lower risk but go on to commit other crimes. (Source: ProPublica analysis of data from Broward County, Fla.)

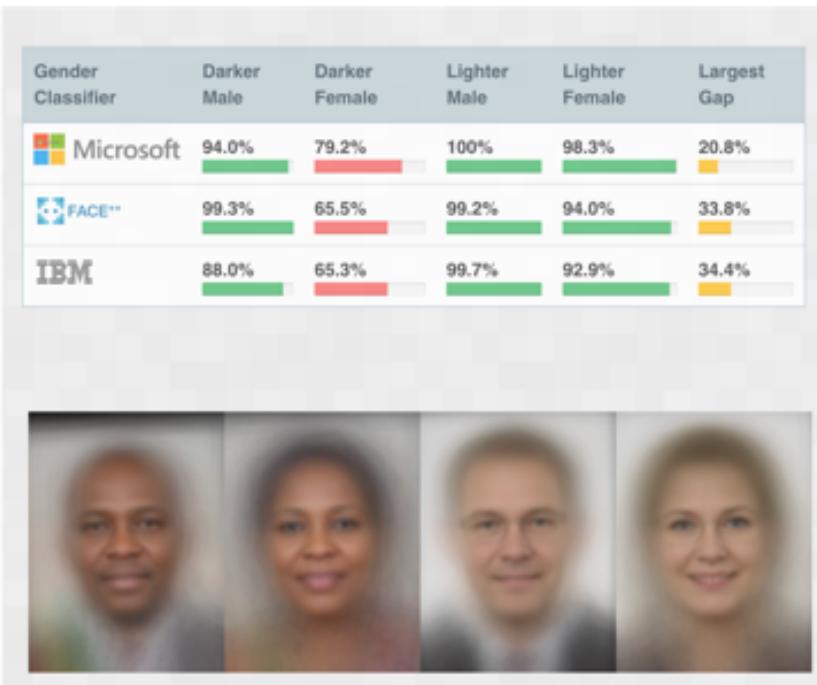
<https://www.propublica.org/article/how-we-analyzed-the-compas-recidivism-algorithm>

# Other case: Gender Shades

- A Project by Joy Buolamwini, researcher at MIT Media Lab
- Examination of facial-analysis software shows error rate of 0.8 percent for light-skinned men, 34.7 percent for dark-skinned women.

When we analyze the results by intersectional subgroups - darker males, darker females, lighter males, lighter females - we see that all companies perform worst on darker females.

IBM and Microsoft perform best on lighter males. Face++ performs best on darker males.



<http://gendershades.org/overview.html>

<https://www.media.mit.edu/projects/gender-shades/overview/>

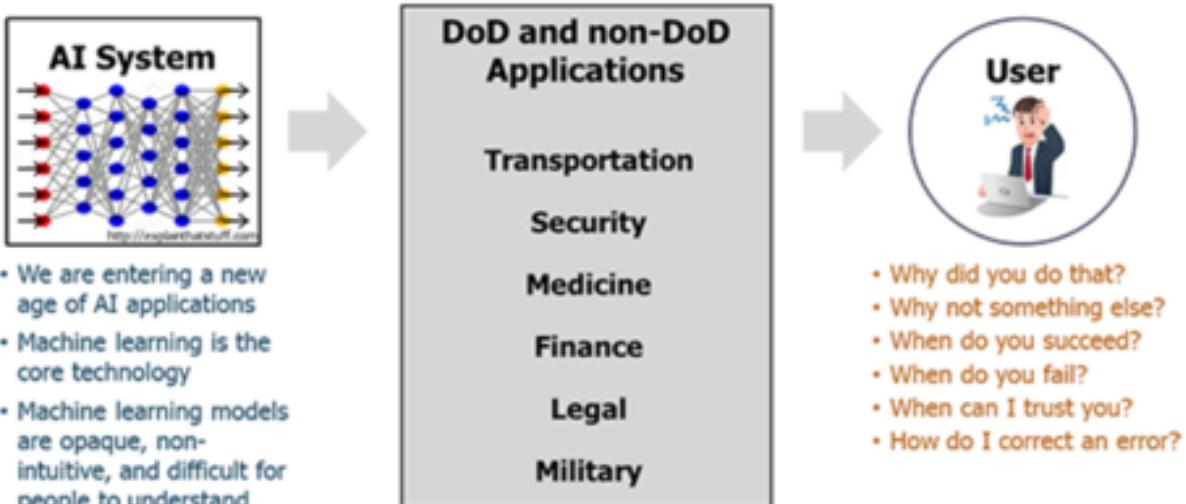
<https://news.mit.edu/2018/study-finds-gender-skin-type-bias-artificial-intelligence-systems-0212>



# XAI (2017)

- XAI is a term coined by David Gunning, program manager at DARPA

**Explainable Artificial Intelligence (XAI)**  
Mr. David Gunning



Mr. David Gunning  
Information Innovation Office (I2O)  
Program Manager

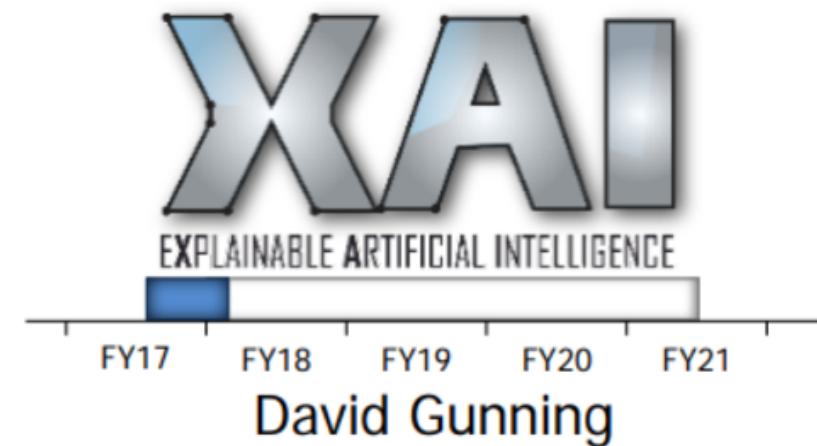


Figure 1. The Need for Explainable AI

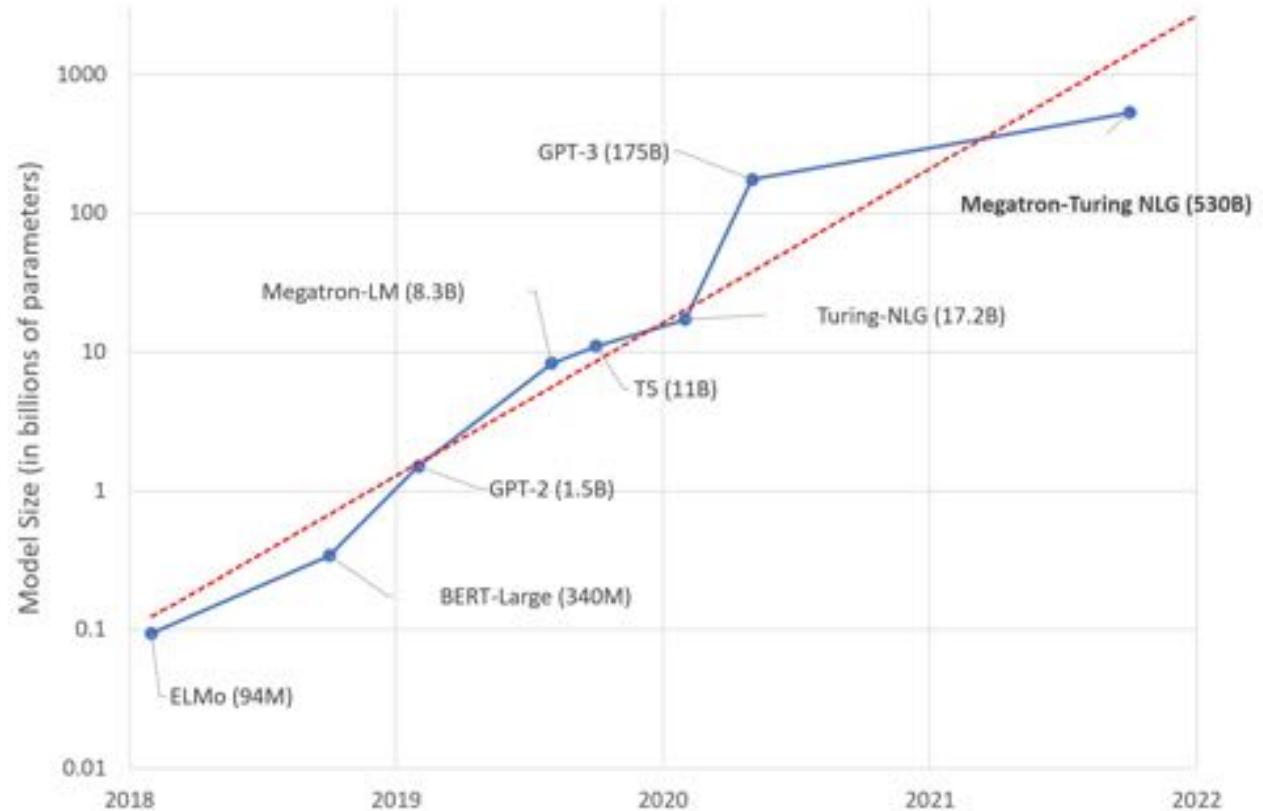
# What does XAI mean ?

- In Gunning et al (2019), an X-AI system is defined by its *Purpose*:
  - to make its behavior more intelligible to humans by providing explanations.
- Some general principles mentioned: The XAI system should be able to
  - explain its **capabilities** and **understandings**;
  - explain what it **has done**, what it is **doing now**, and what will **happen next**; and
  - **disclose the salient information** that it is acting on

Gunning, D., Stefik, M., Choi, J., Miller, T., Stumpf, S., & Yang, G. Z. (2019). XAI—Explainable artificial intelligence. *Science Robotics*, 4(37), eaay7120.

# AI growing complexity

- With the growing complexity of AI models, the need for understanding their inner-workings has increased



**Simon, J. (2021) Large Language Models: A New Moore's Law?**  
<https://huggingface.co/blog/large-language-models>

# One approach: Visual XAI

- With the growing complexity of AI models, the need for understanding their inner-workings has increased
- Information Visualization can play an important role to address this need:
  - [visxai.io – 5<sup>th</sup> VisXAI at IEEE Vis]

## 5<sup>th</sup> Workshop on Visualization for AI Explainability

October 16th or 17th, 2022 at IEEE VIS in Oklahoma City, Oklahoma

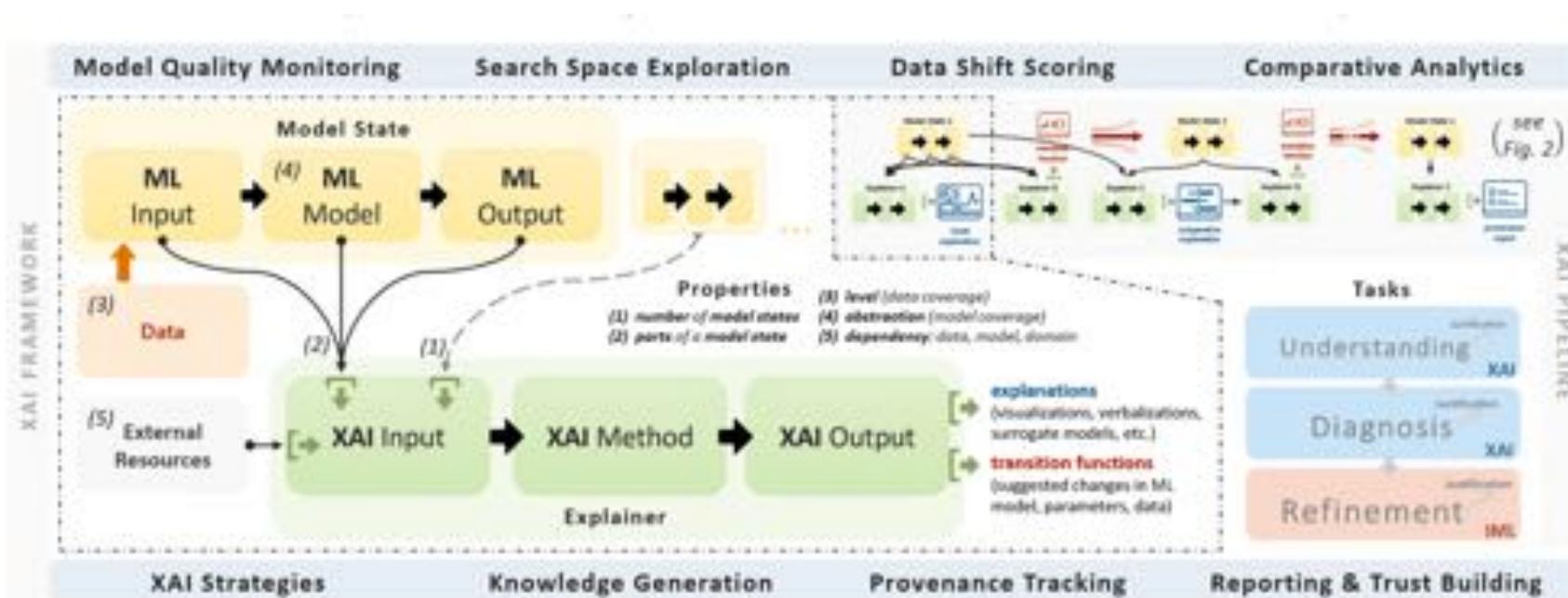
The role of visualization in artificial intelligence (AI) gained significant attention in recent years. With the growing complexity of AI models, the critical need for understanding their inner-workings has increased. Visualization is potentially a powerful technique to fill such a critical need.

The goal of this workshop is to initiate a call for "explainables" / "explorables" that explain how AI techniques work using visualization. We believe the VIS community can leverage their expertise in creating visual narratives to bring new insight into the often obfuscated complexity of AI systems.



# Visual XAI Frameworks

- Several approaches leveraging Visualization Systems have been introduced in the latest years, such as the **ExplAIner** framework proposed in 2019:

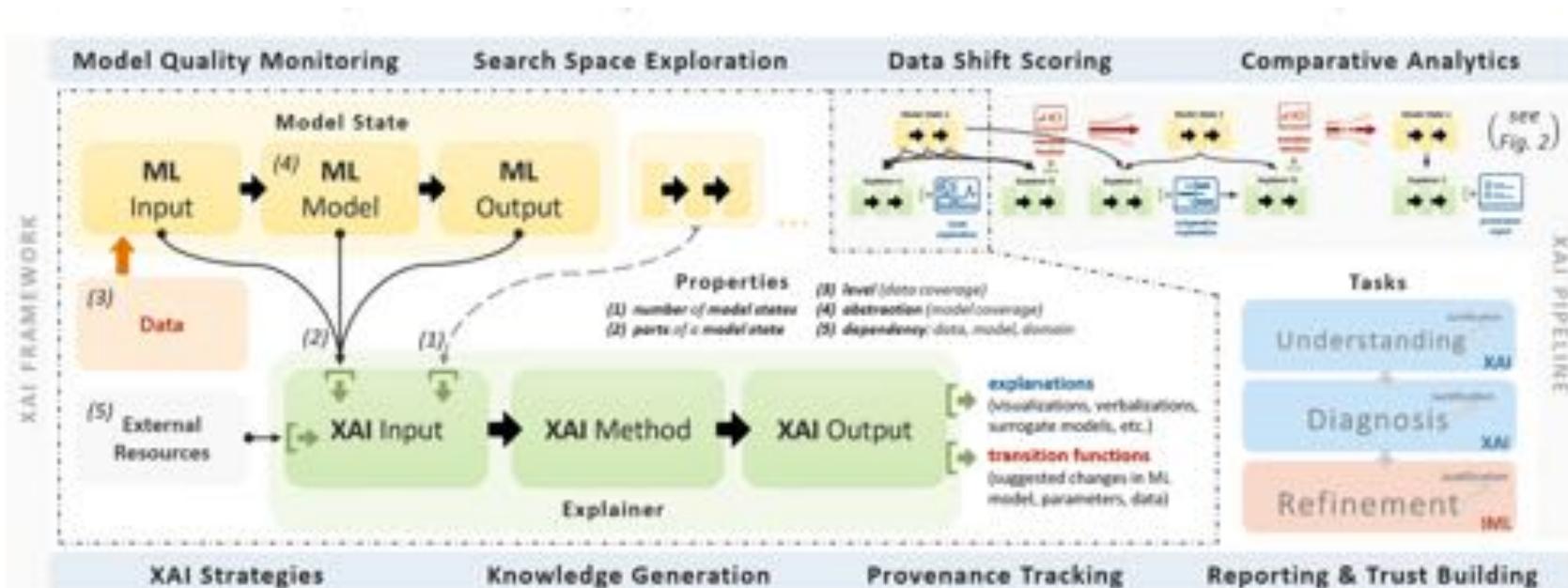


Spinner, T., et al (2019). explAIner: A visual analytics framework for interactive and explainable machine learning. IEEE TVCG, 26(1), 1064-1074.

# Visual XAI Frameworks

- Several approaches leveraging Visualization Systems have been introduced in the latest years, and even a framework was proposed in 2019: ExplAIner

ExplAIner tells you the steps towards creating a Visual XAI, but Not How to **design** and **analyze** a visualization for XAI



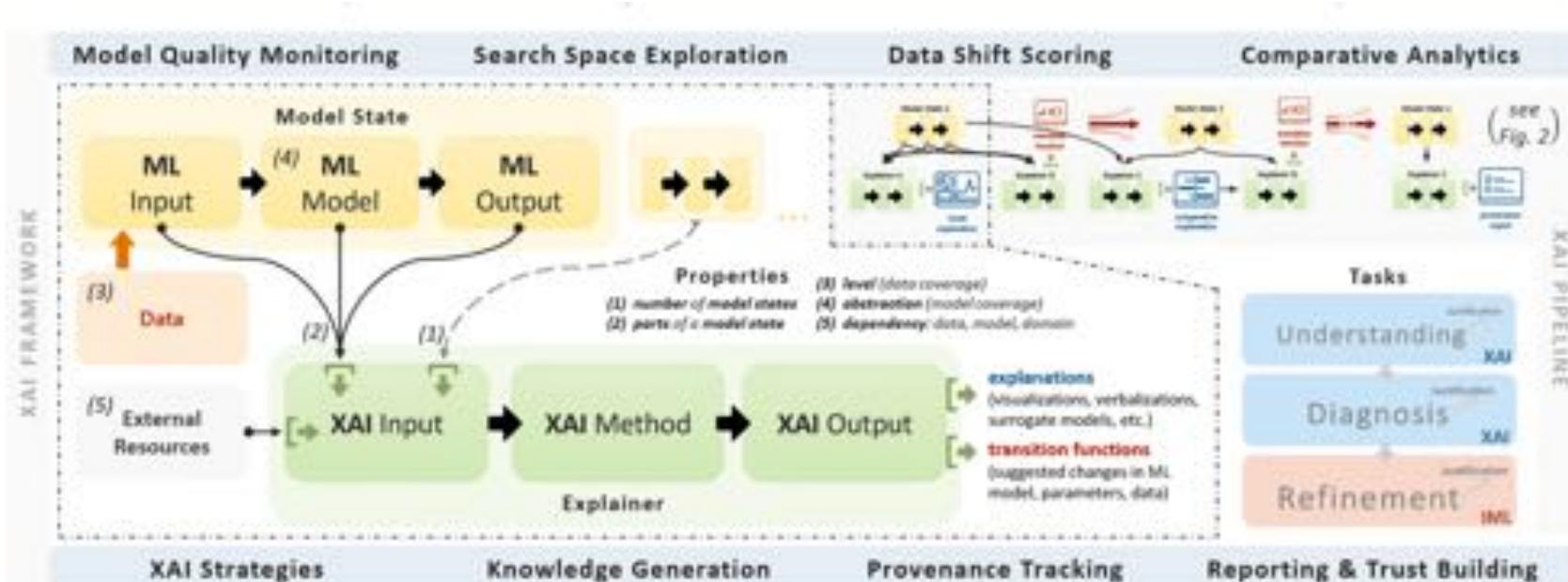
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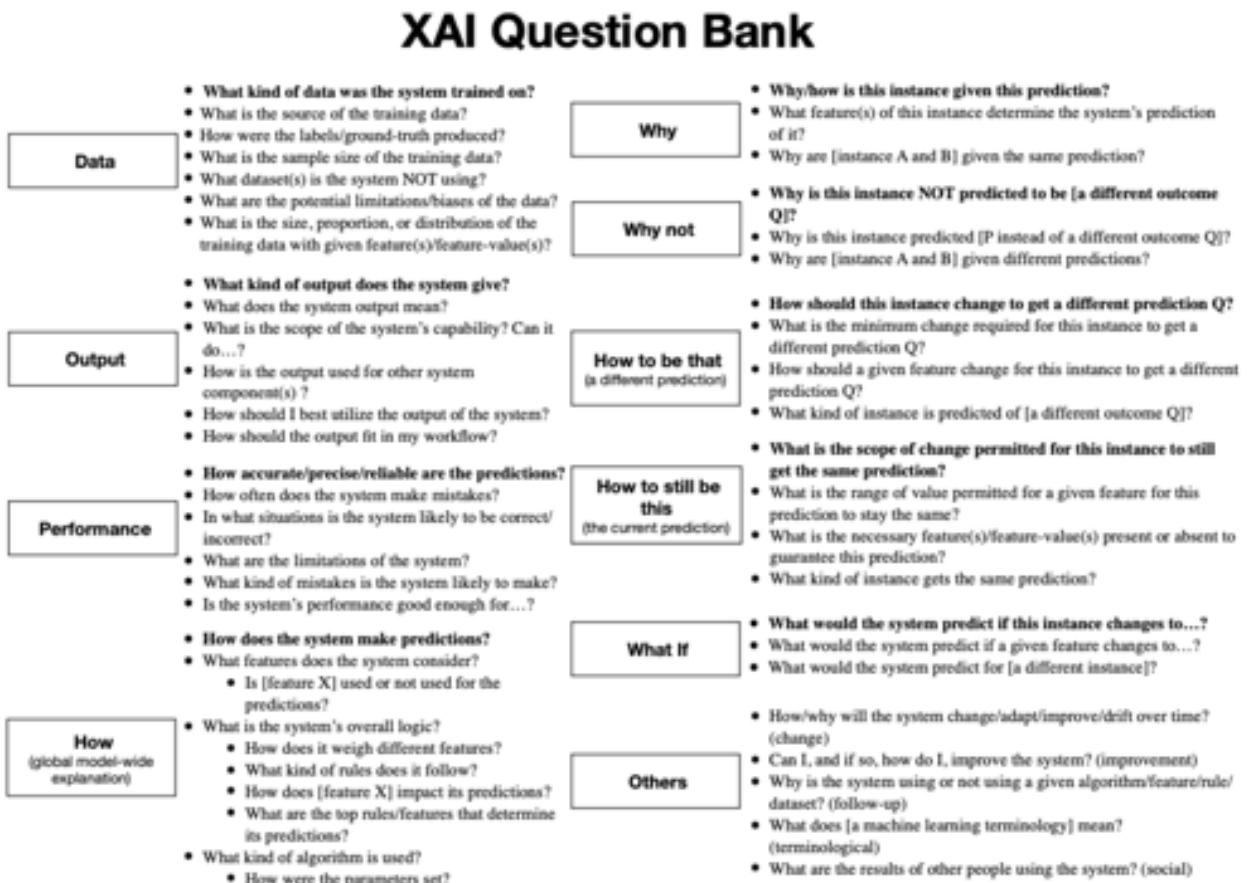
- Visual
- Interaction



Spinner, T., et al (2019). explAIner: A visual analytics framework for interactive and explainable machine learning. IEEE TVCG, 26(1), 1064-1074.

# XAI question bank

- Liao, Gruen and Miller introduced a XAI question bank to guide the design process of XAI systems
- But they still do not provide clear guidelines for visual XAI applications



Liao, Q. V., Gruen, D., & Miller, S. (2020). Questioning the AI: informing design practices for explainable AI user experiences. CHI 2020.

# XAI Challenges – Adaptation & Personalization

- An effective explanation will take the target user group of the system into account, **who might vary** in their **background knowledge** and **needs** for what should be explained.
  - How should we proceed under these circumstances ?
- Decision making for analysts, judges and operators: **Each user group may have a preferred explanation** type that is able to communicate information in the most effective way.

Gunning, D., Stefik, M., Choi, J., Miller, T., Stumpf, S., & Yang, G. Z. (2019). XAI—Explainable artificial intelligence. *Science Robotics*, 4(37), eaay7120.

# Recommender Systems (RecSys) and XAI

- Recommender Systems are a type of systems/technology which strongly relies on AI algorithms
- Explainability and Transparency in Recommender Systems has been studied for at least 20 years
- What can we learn from such research for XAI ?



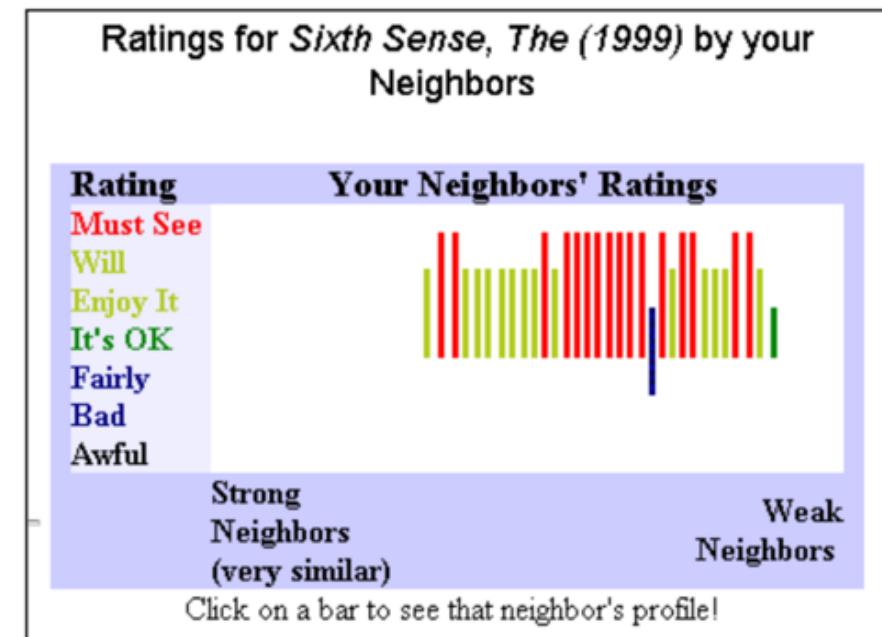
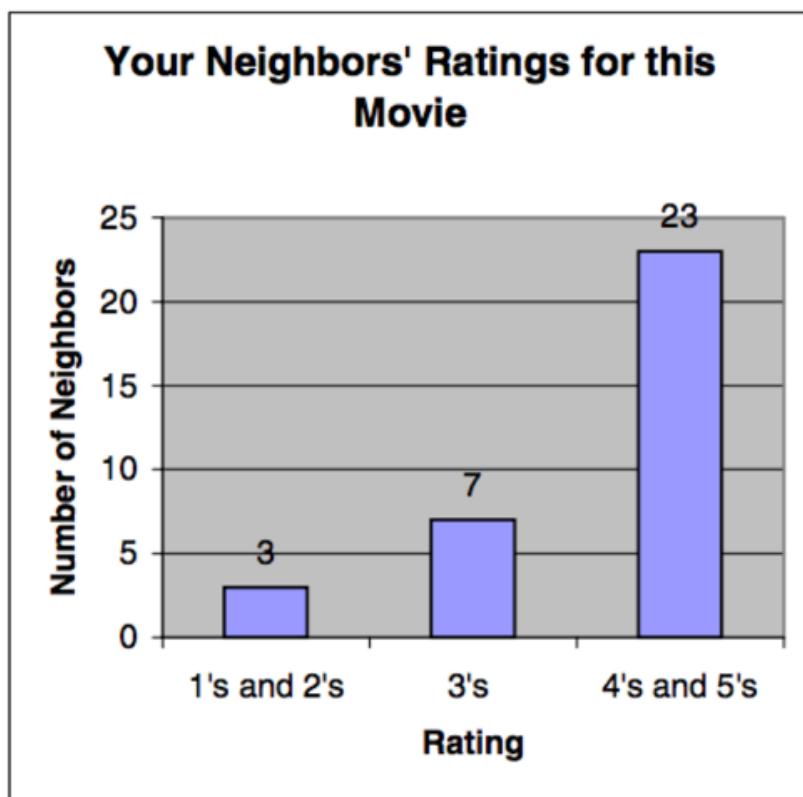
Picture licensed under CC  
<http://www.flickr.com/photos/meaganmakes/6769496875/sizes/m/>

# XAI in Recommender Systems: back to 2000s

- Herlocker, J. L., Konstan, J. A., & Riedl, J. (2000). *Explaining collaborative filtering recommendations*. In *Proceedings of the 2000 ACM conference on Computer supported cooperative work* (pp. 241-250). ACM.
- Sinha, R., & Swearingen, K. (2002). *The role of transparency in recommender systems*. In *CHI'02 extended abstracts on Human factors in computing systems* (pp. 830-831). ACM.

# XAI in Recommender Systems (movies)

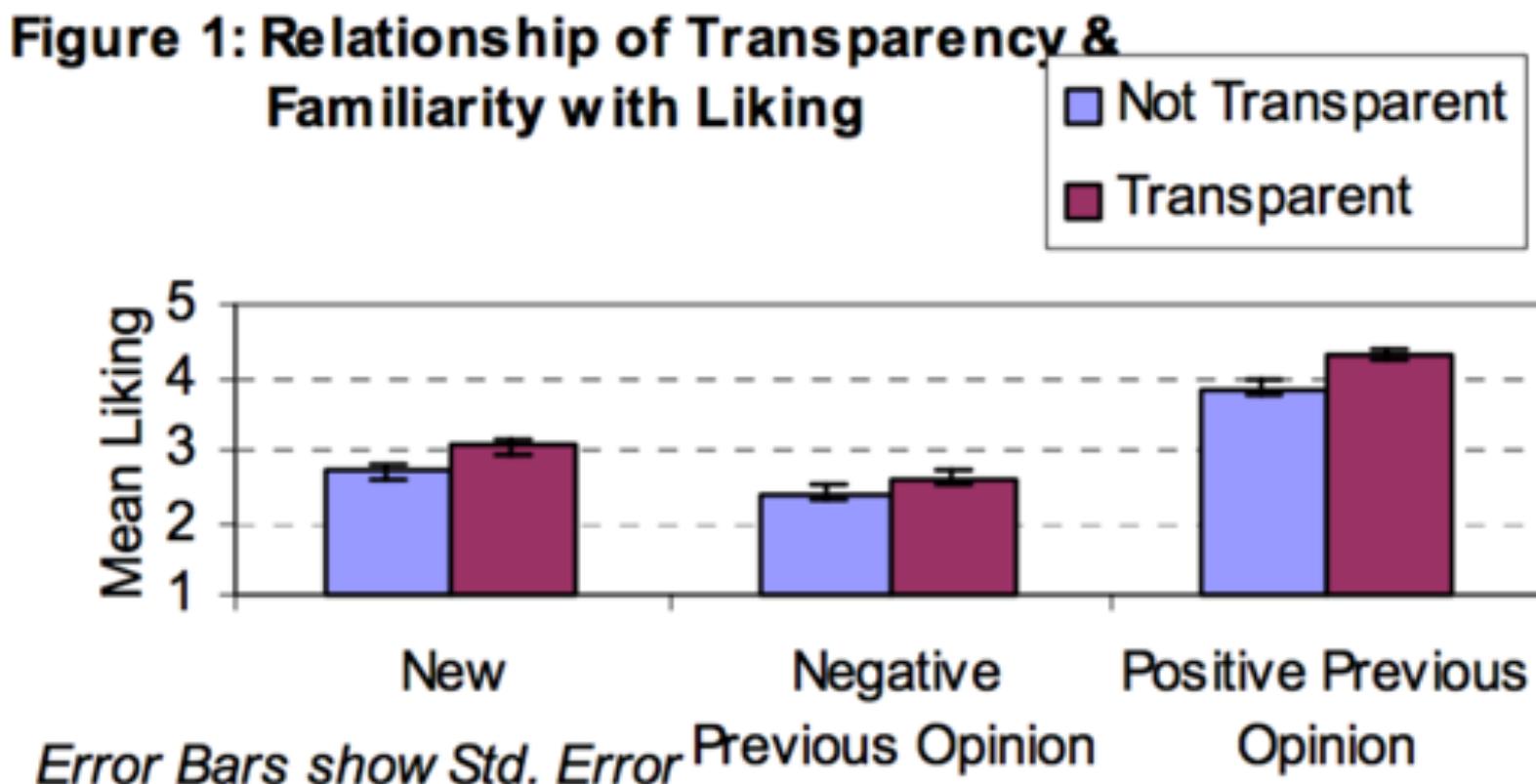
- Herlocker, J. L., Konstan, J. A., & Riedl, J. (2000). Explaining collaborative filtering recommendations. In *Proceedings of the 2000 ACM conference on Computer supported cooperative work* (pp. 241-250). ACM.



**Figure 4.** A screen explaining the recommendation for the movie “The Sixth Sense.” Each bar represents a rating of a neighbor. Upwardly trending bars are positive ratings, while downward trending ones are negative. The x-axis represents similarity to the user.

# XAI in Recommender Systems (music)

- Sinha, R., & Swearingen, K. (2002). The role of transparency in recommender systems. In *CHI'02 extended abstracts on Human factors in computing systems* (pp. 830-831). ACM.



# XAI in Recommender Systems II

- Tintarev, N., & Masthoff, J. (2007). A survey of **explanations in recommender systems**. In *2007 IEEE 23rd international conference on data engineering workshop* (pp. 801-810). IEEE.
- Tintarev, N., & Masthoff, J. (2012). Evaluating the **effectiveness of explanations** for recommender systems. *User Modeling and User-Adapted Interaction*, 22(4-5), 399-439.
- Tintarev, N., & Masthoff, J. (2015). **Explaining recommendations: Design and evaluation**. In *Recommender systems handbook* (pp. 353-382). Springer, Boston, MA.

# RecSys: Explanatory Goals and Definitions

Aim	Definition
Transparency (Tra.)	Explain how the system works
Scrutability (Scr.)	Allow users to tell the system it is wrong
Trust	Increase users' confidence in the system
Effectiveness (Efk.)	Help users make good decisions
Persuasiveness (Pers.)	Convince users to try or buy
Efficiency (Efc.)	Help users make decisions faster
Satisfaction (Sat.)	Increase the ease of usability or enjoyment

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2007

2017



User with a Task

- Why did you do that?
- Why not something else?
- When do you succeed?
- When do you fail?
- When can I trust you?
- How do I correct an error?



User with a Task

- I understand why
- I understand why not
- I know when you'll succeed
- I know when you'll fail
- I know when to trust you
- I know why you erred

Tintarev, N., & Masthoff, J. (2007). A survey of explanations in recommender systems. In *2007 IEEE 23rd international conference on data engineering workshop* (pp. 801-810). IEEE.

# Did we do nothing between 2007-17 ?

- There were actually many works related to explainability, transparency, trust and user controllability in RecSys.
- In the coming slides, I will focus on research related **Visual User Interfaces** for recommendation Systems and how they contributed early to XAI and Visual XAI.

# Let's take a trip

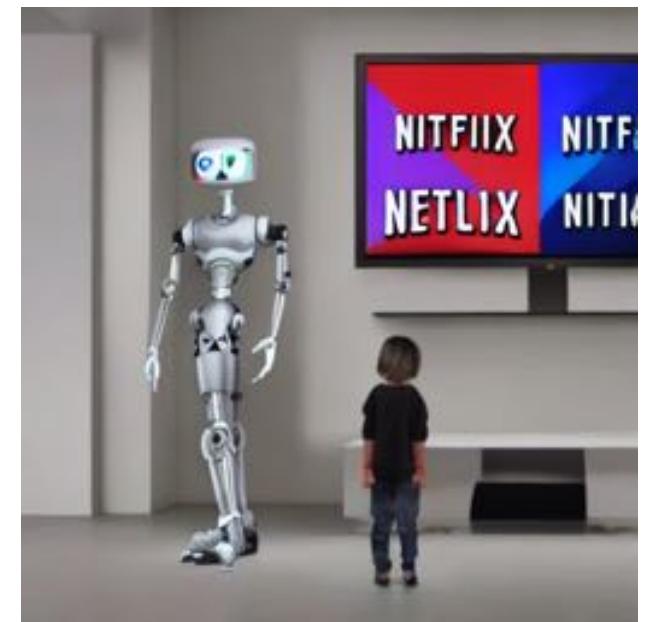
- ... through the history of visualizations for recommendation systems
- (images generated with S.D.)

## Stable Diffusion Demo

Stable Diffusion is a state of the art text-to-image model that generates images from text.  
For faster generation and forthcoming API access you can try [DreamStudio Beta](#)

A robot explains netflix algorithm to a human using deep neural networks

Generate Image

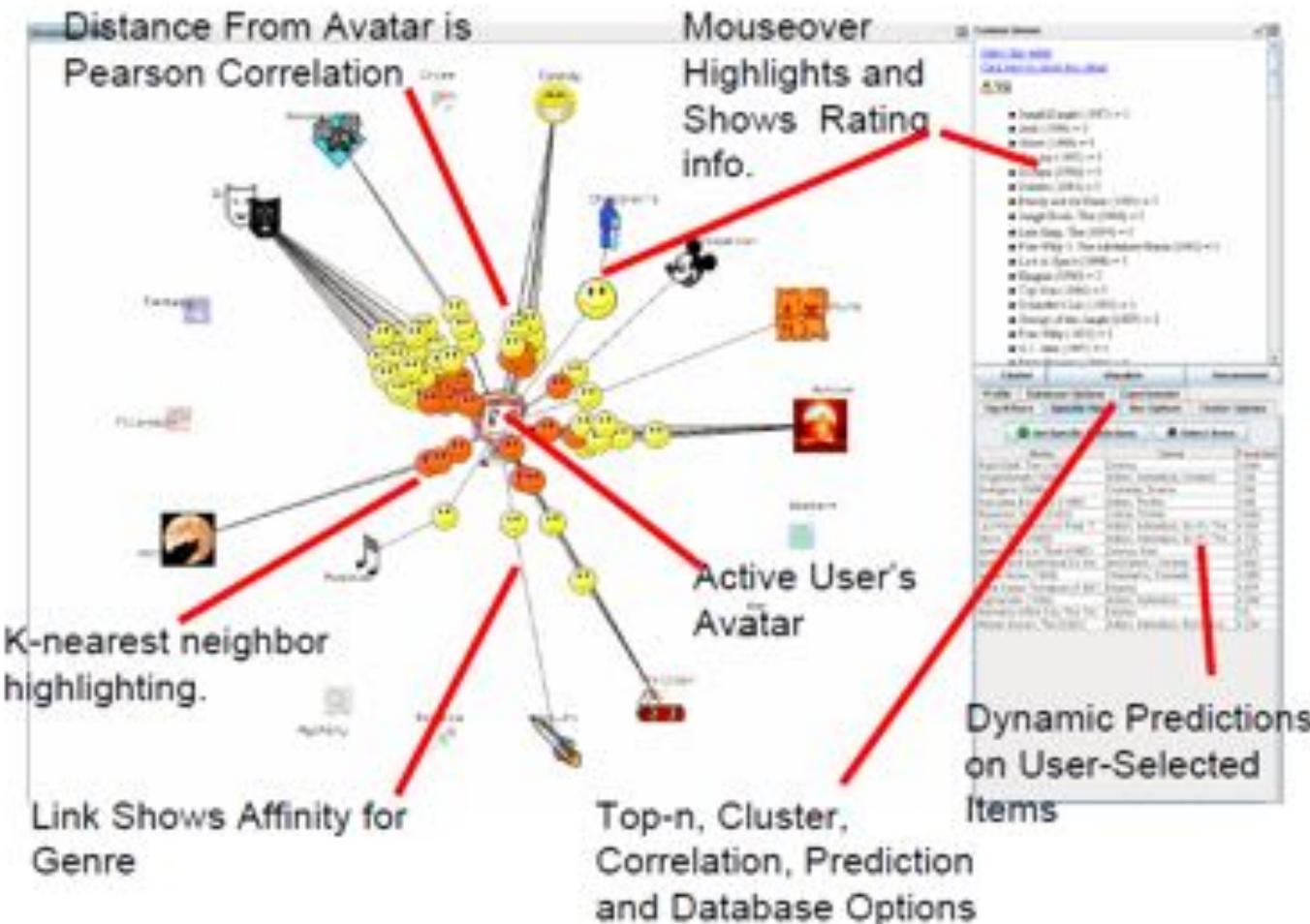


# The Role of Interactive Visualization in RecSys XAI

- PeerChooser (O'Donovan et al, 2008)
- SmallWorlds (Gretarsson et al, 2010)
- To each his own (Knijnenburg et al, 2010)
- TasteWeights (Bostandjev et al. 2012, Knijnenburg et al. 2012)
- TalkExplorer/Aduna (Verbert et al. 2013)
- SetFusion (Parra et al., 2014)
- Moodplay (Andjelkovic et al., 2016)
- 3D Inspector (Loepp et al, 2017)
- Tuner+ (Tsai et al, 2019)
- Explain or Not (Millecamp et al, 2019)

# Peerchooser

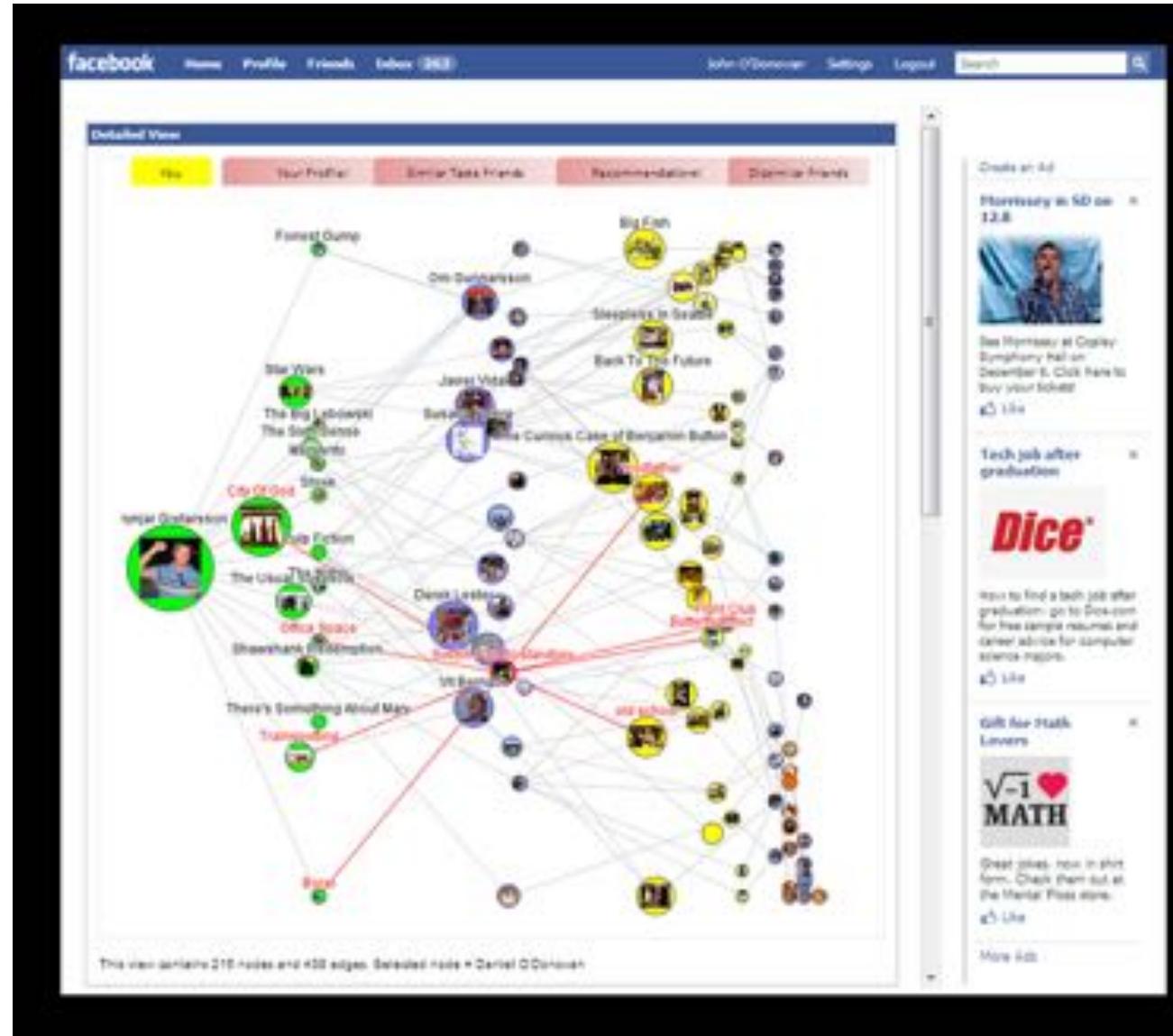
- PeerChooser  
(CHI 2008)
- John O'Donovan,  
Barry Smyth,  
Brynjar  
Gretarsson,  
Svetlin  
Bostandjiev,  
Tobias Hollerer



2: Annotated Screenshot of PeerChooser's Interactive Interface.

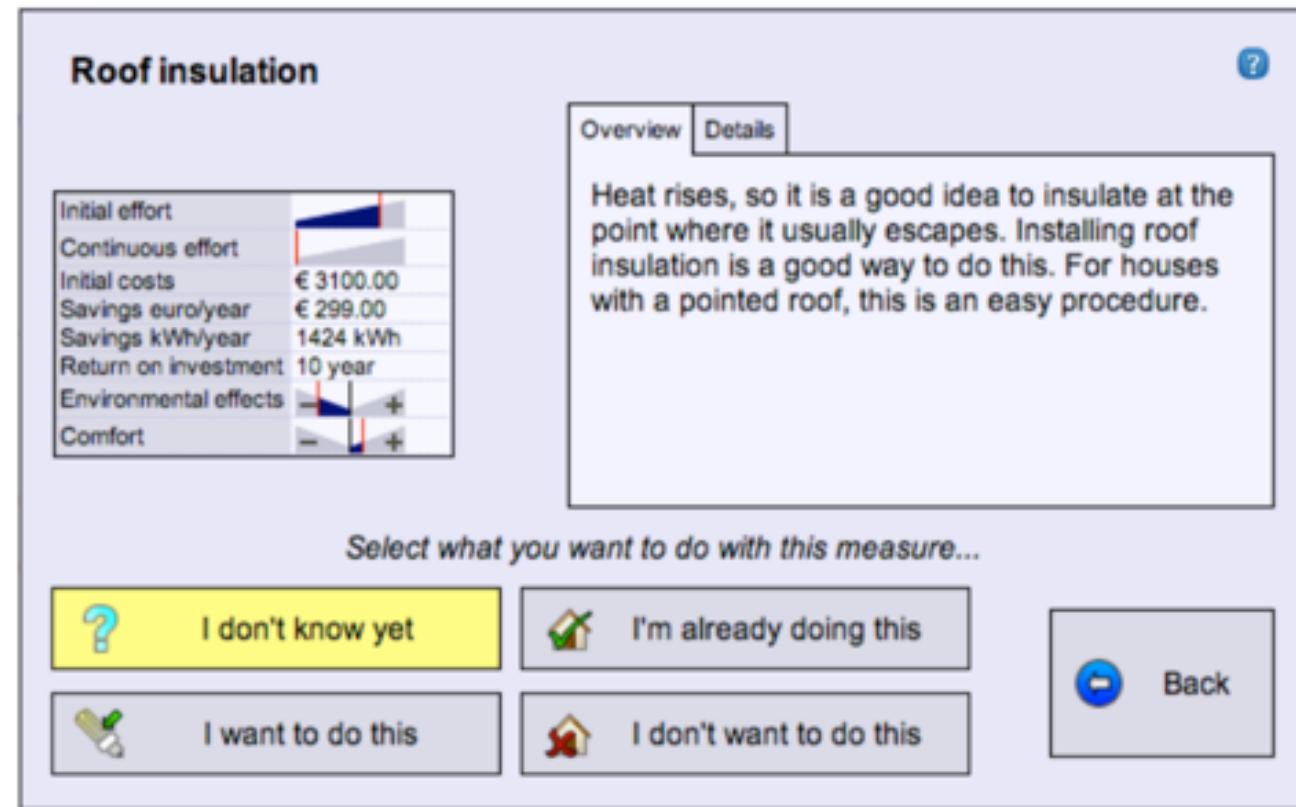
# Smallworlds

- SmallWorlds:  
Visualizing Social  
Recommendations  
(IEEE-TVCG 2010)
  - Brynjar Gretarsson,  
John O'Donovan ,  
Svetlin Bostandjiev,  
Christopher Hall,  
Tobias Höllerer
  - User study with 17  
users



# Each to his own

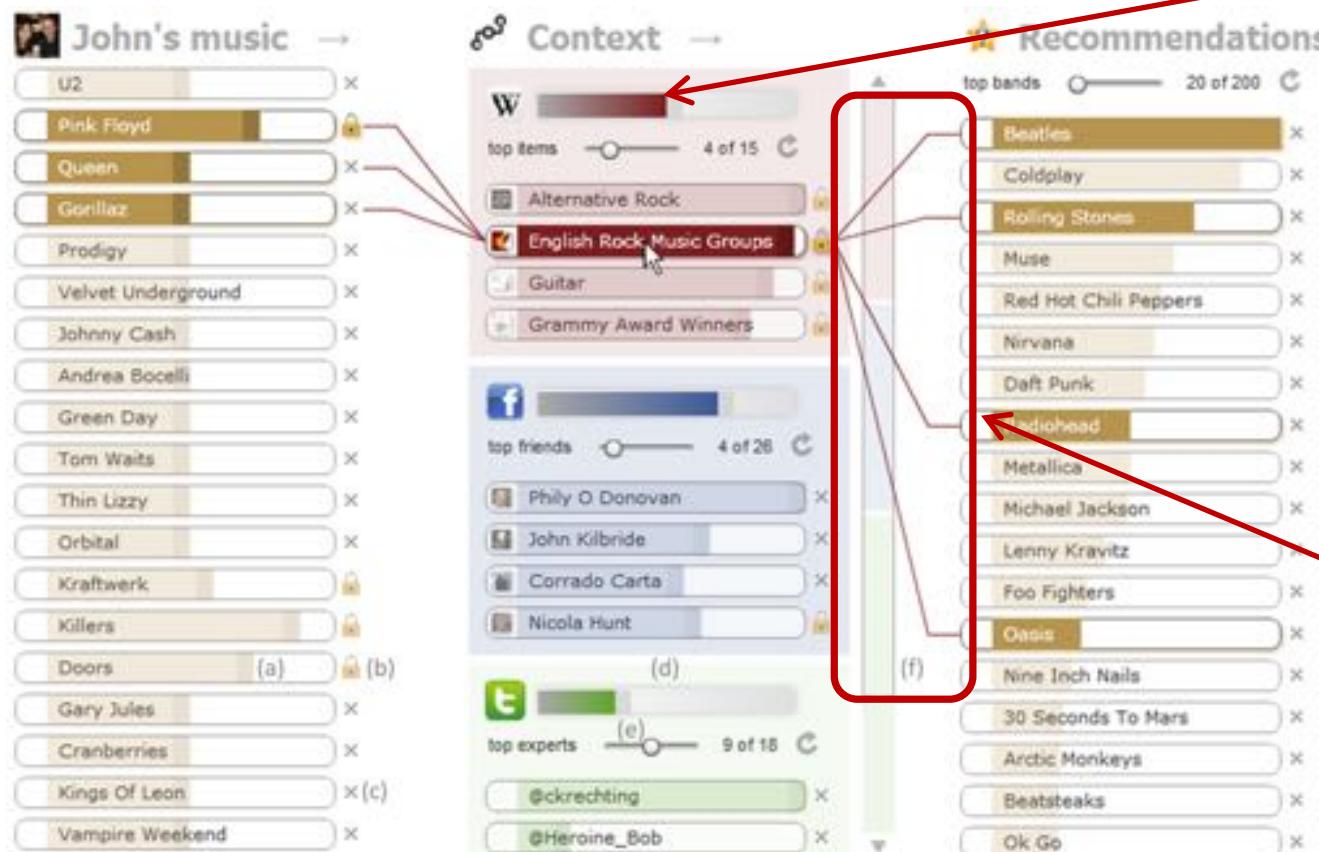
- Each to his own:  
how different users  
call for different  
interaction methods  
in recommender  
systems (RecSys  
2010)
- Knijnenburg, B. P.,  
Reijmer, N. J., &  
Willemsen, M. C.
- UX with Interface  
details depends on  
previous user  
knowledge of the  
topic



**Figure 2. Screen shown to users when they click on an item**

# TasteWeights

- TasteWeights: a visual interactive hybrid recommender system (RecSys 2012)
- Bostandjiev, S., O'Donovan, J., & Höllerer, T.



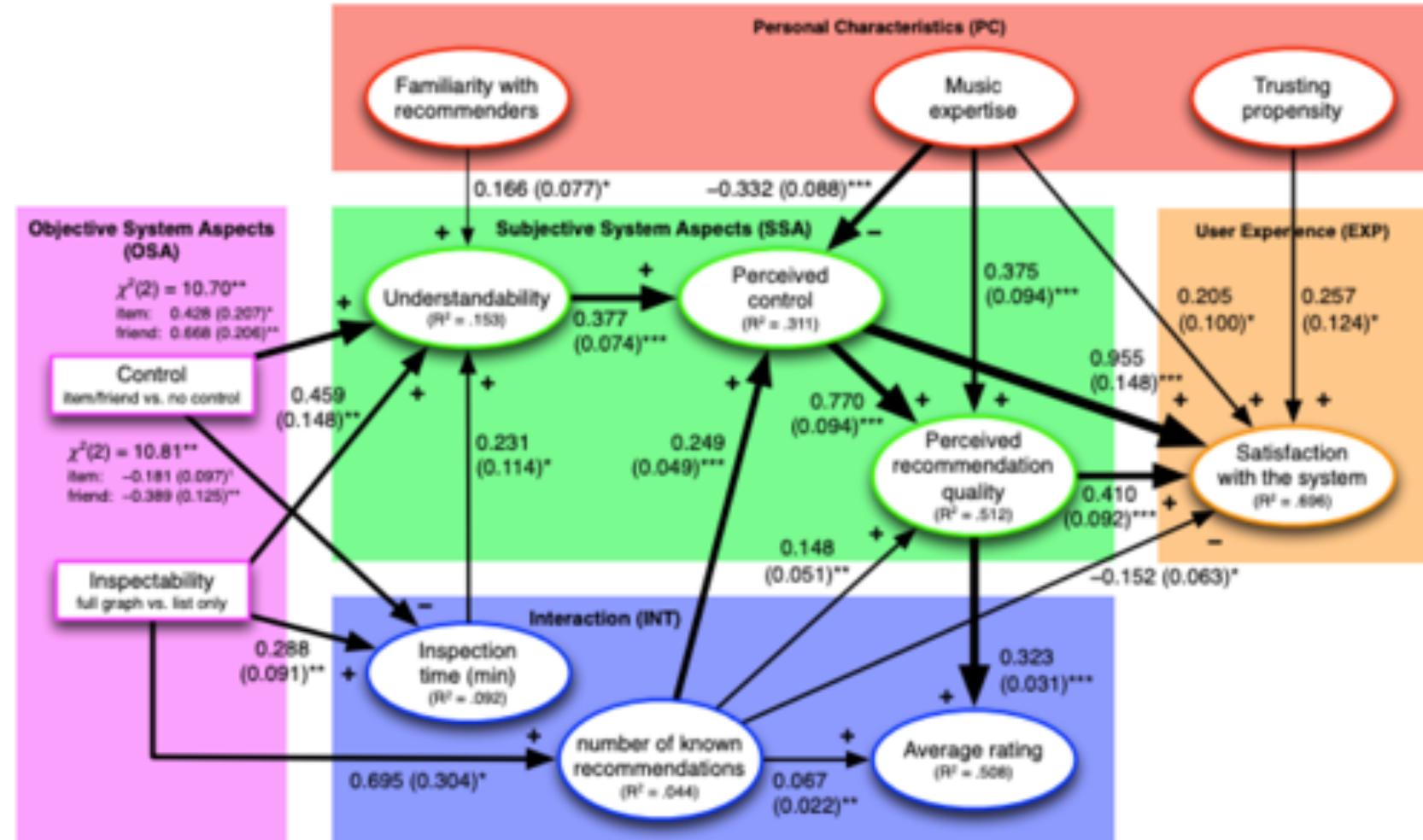
**Controllability:** Sliders that let users control the importance of preferences and contexts

**Inspectability:** lines that connect recommended items with contexts and user preferences

Also : Knijnenburg, B. P., Bostandjiev, S., O'Donovan, J., & Kobsa, A. (2012). Inspectability and control in social recommenders. In Proceedings of ACM RecSys.

# TasteWeights II

- TasteWeights: a visual interactive hybrid recommender system (RecSys 2012)
- Bostandjiev, S., O'Donovan, J., & Höllerer, T.



Also : Knijnenburg, B. P., Bostandjiev, S., O'Donovan, J., & Kobsa, A. (2012). Inspectability and control in social recommenders. In Proceedings of ACM RecSys.

# TalkExplorer

- Visualizing recommendations to support exploration, transparency and controllability
- Verbert, K., Parra, D., Brusilovsky, P., & Duval, E. (IUI 2013)

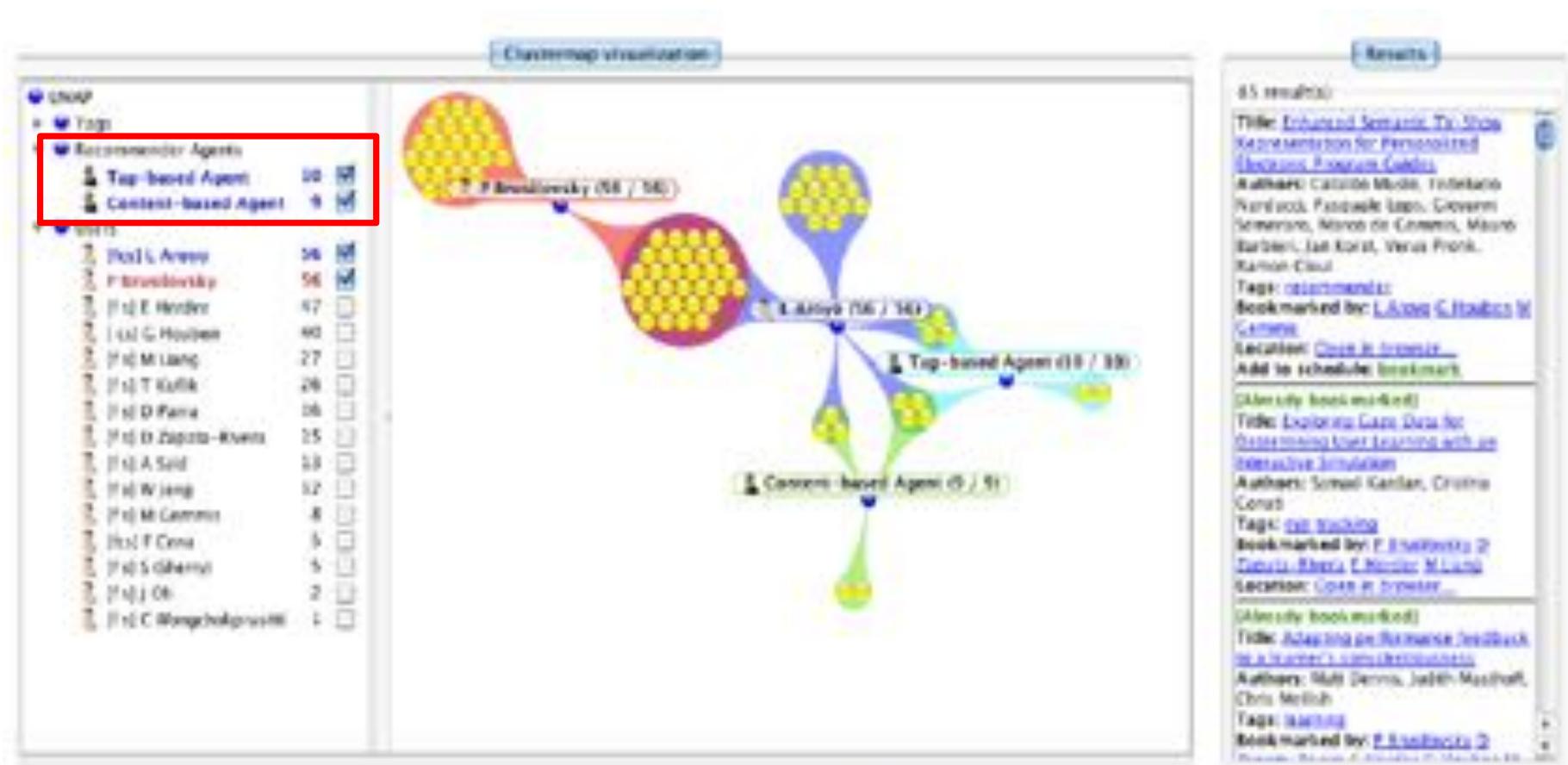


Figure 2: TalkExplorer

# SetFusion

- See what you want to see: visual user-driven approach for hybrid recommendation
- Denis Parra, Peter Brusilovsky, and Christoph Trattner (IUI 2014)

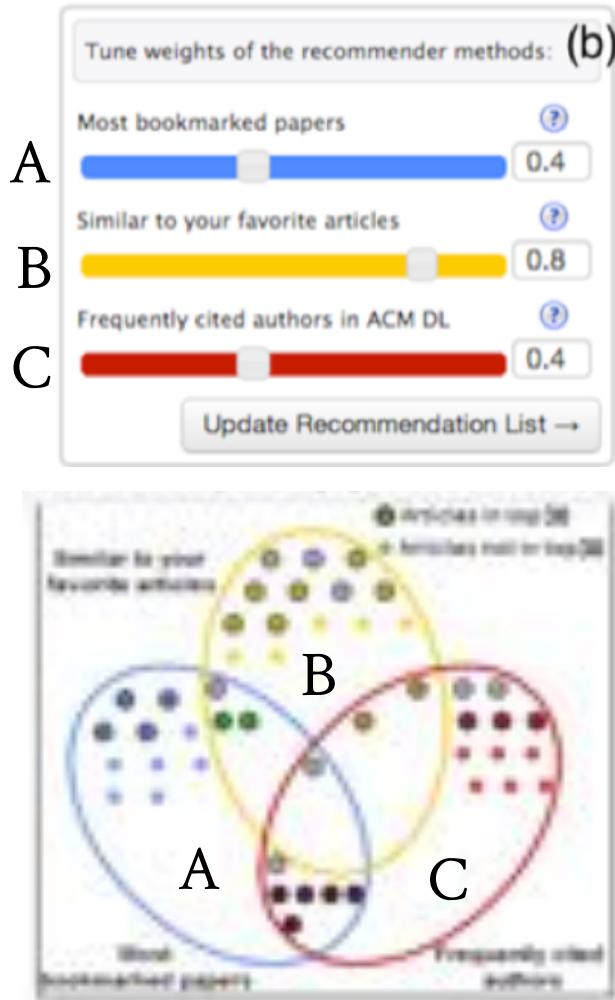


## SetFusion: A Controllable Hybrid Recommender

Parra, D., Brusilovsky, P., Trattner, C.

IUI 2014, Haifa, Israel

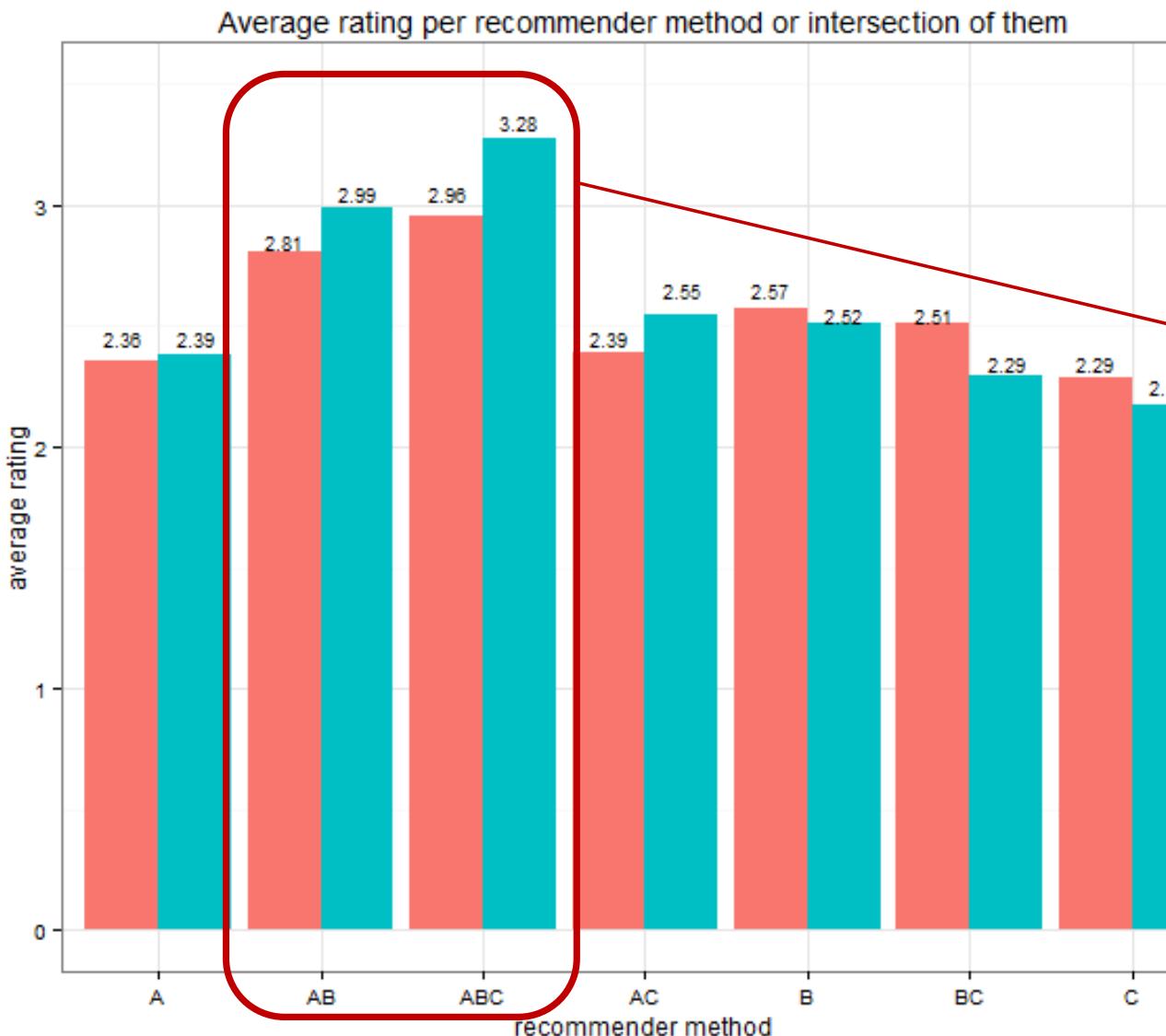
# SetFusion: User Control vs. non Control



## Recommender method

- A: Most popular
- B: Content-based
- C: Author popularity
- Combinations: AB, AC, BC, ABC

# SetFusion: User Control vs. non Control



**Lesson 1:** People prefer hybrid methods which combine several sources of information, either controllable or not:

ABC , AB

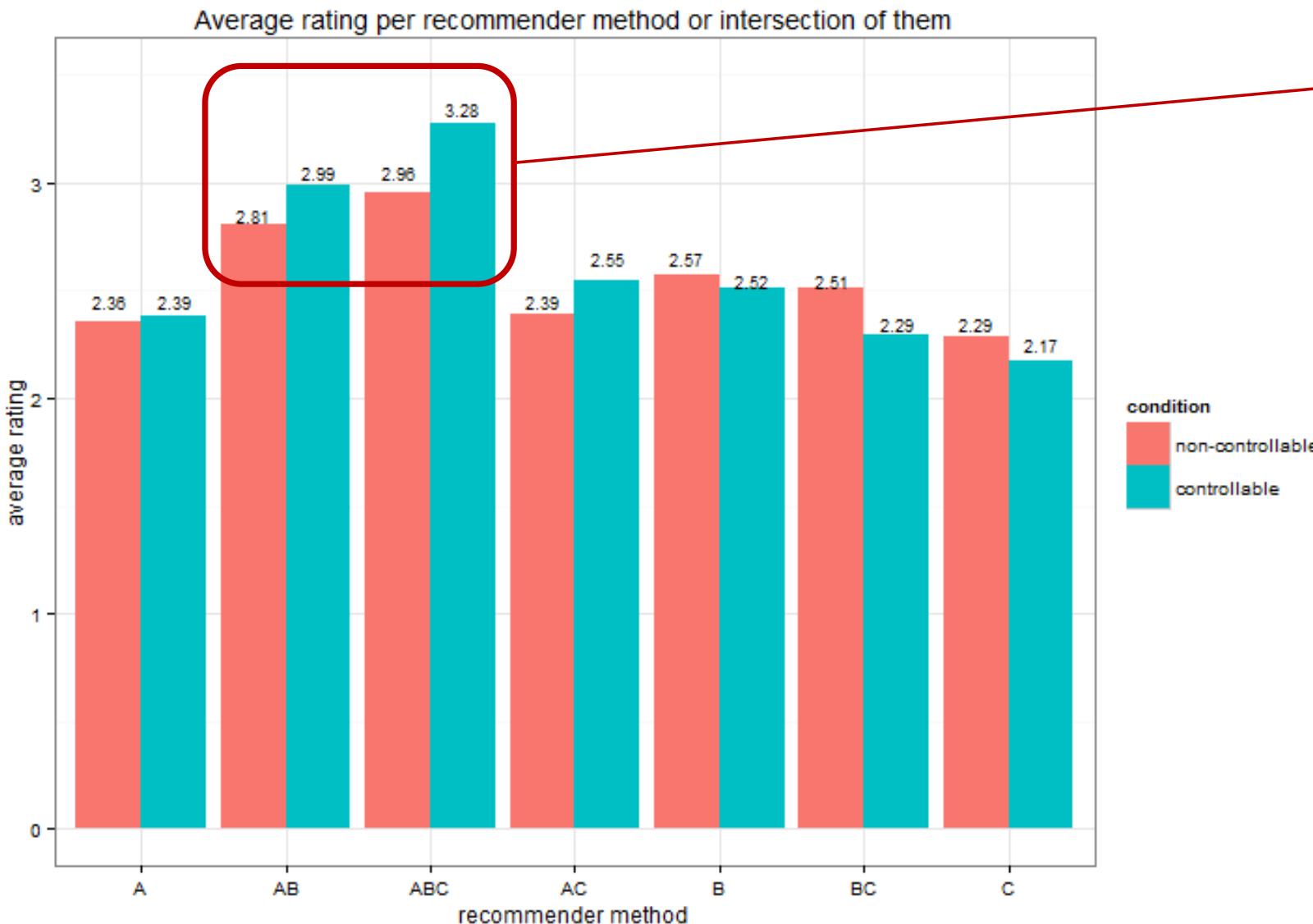
>

B, AC, BC

>

A, C

# SetFusion: User Control vs. non Control



**Lesson 2:** Within each condition (C and Non-C), the hybrids **ABC** and **AB** top the rest

**Lesson 3:** When comparing controlable vs. non-controllable in ABC and AB, **the controllable version is preferred.**

# Effect of Gender on Color Preference

## Infographic Aesthetics: Designing for the First Impression

Lane Harrison  
Tufts University  
[lane@cs.tufts.edu](mailto:lane@cs.tufts.edu)

Katharina Reinecke  
University of Michigan  
[reinecke@umich.edu](mailto:reinecke@umich.edu)

Remco Chang  
Tufts University  
[remco@cs.tufts.edu](mailto:remco@cs.tufts.edu)

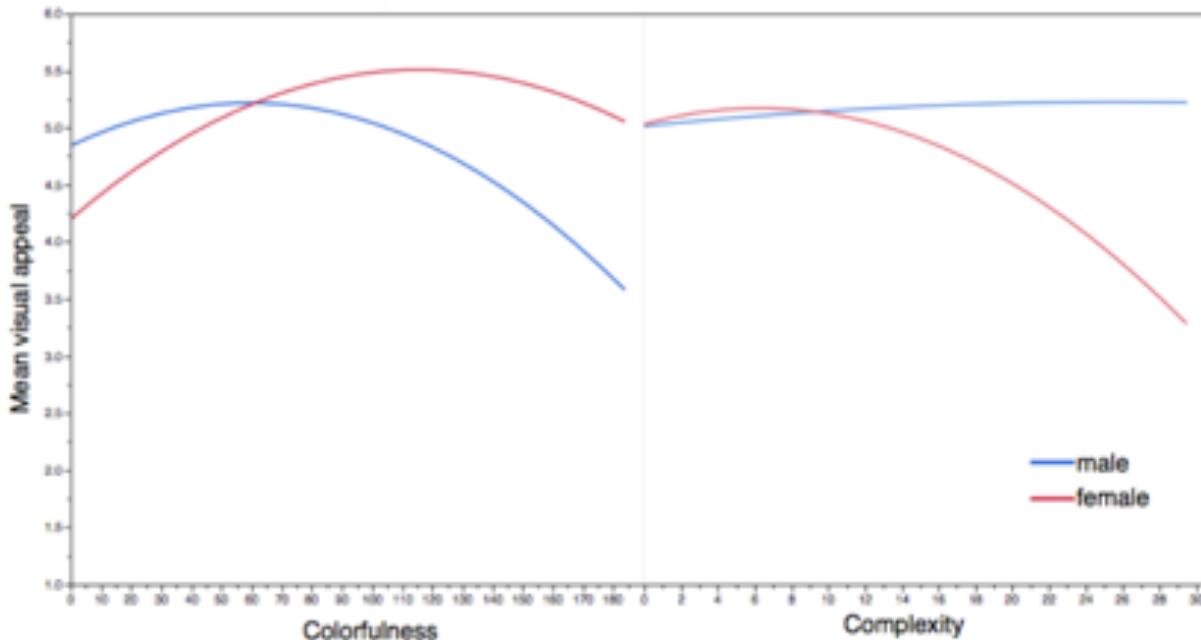
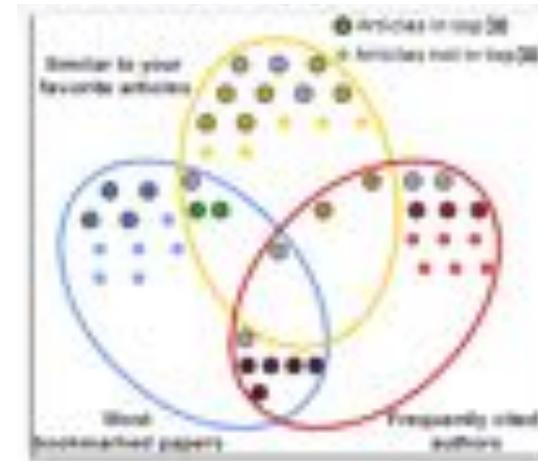
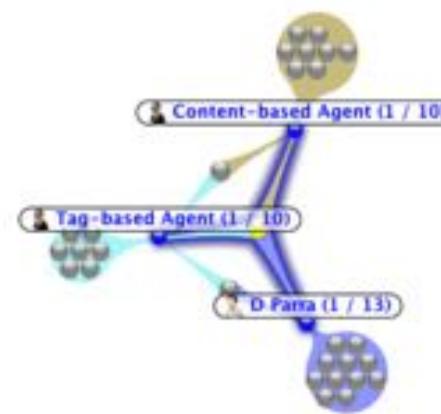
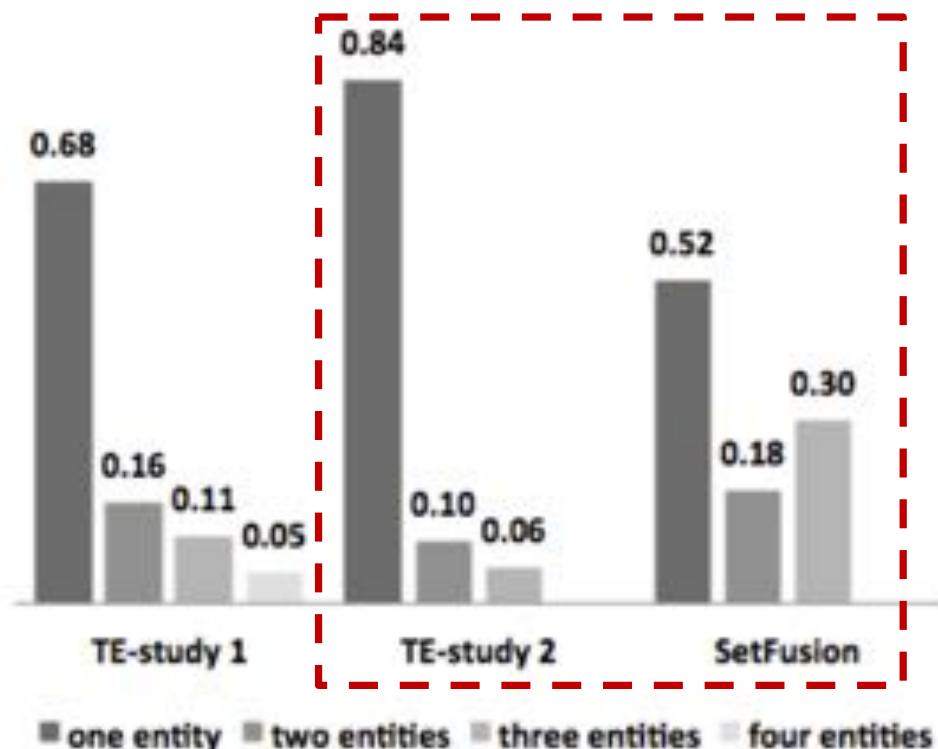


Figure 2: Average visual appeal ratings for different levels of colorfulness and complexity for females and males.

# TalkExplorer vs. SetFusion

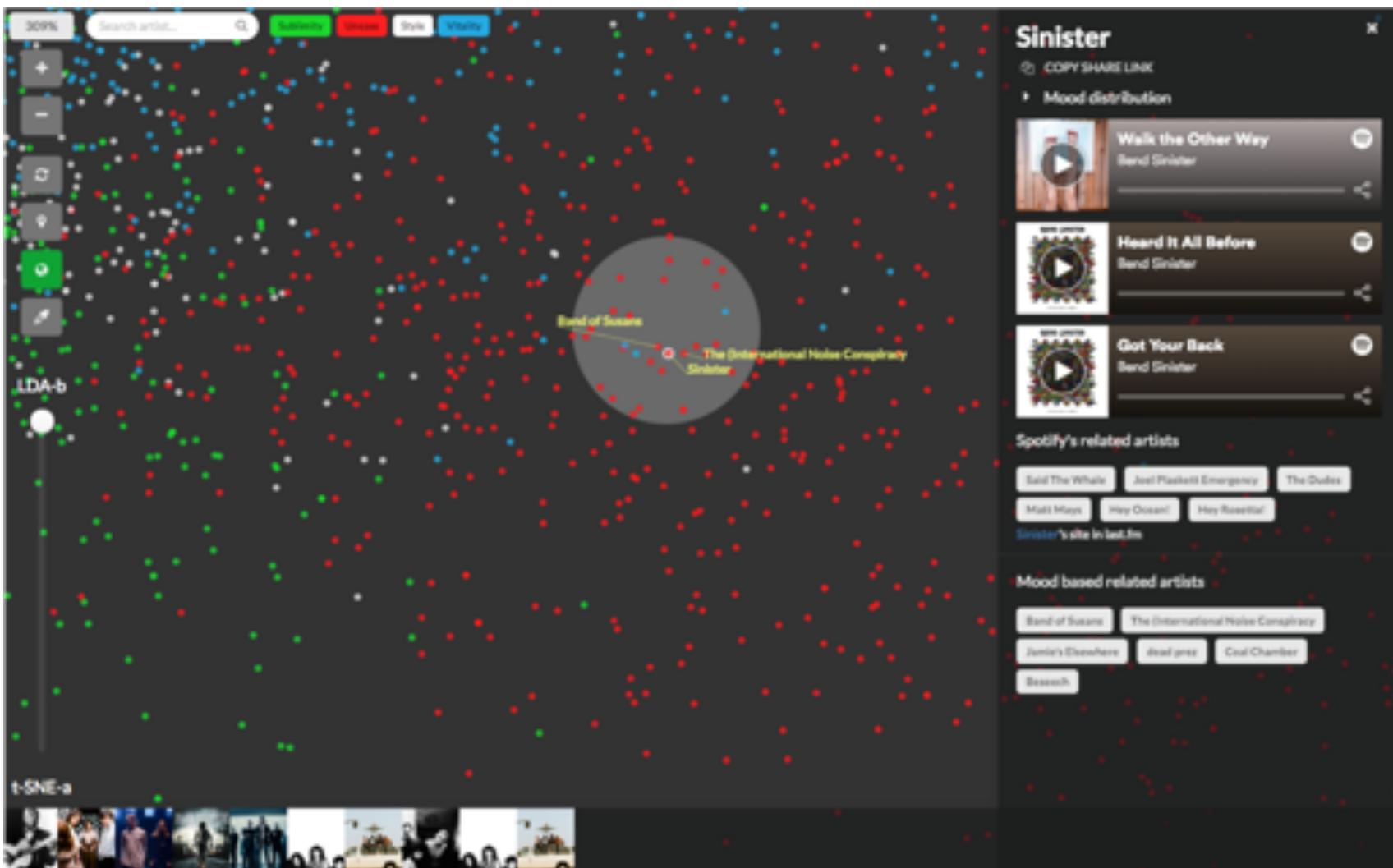
- How can we promote people's exploratory interaction?



- In **TalkExplorer**, only 16% of the explorations on set intersections were performed on **2 or more entities**.
- In **SetFusion**, **48%** ( $18\% + 30\%$ ) of explorations were performed over multiple intersections.

# Moodplay

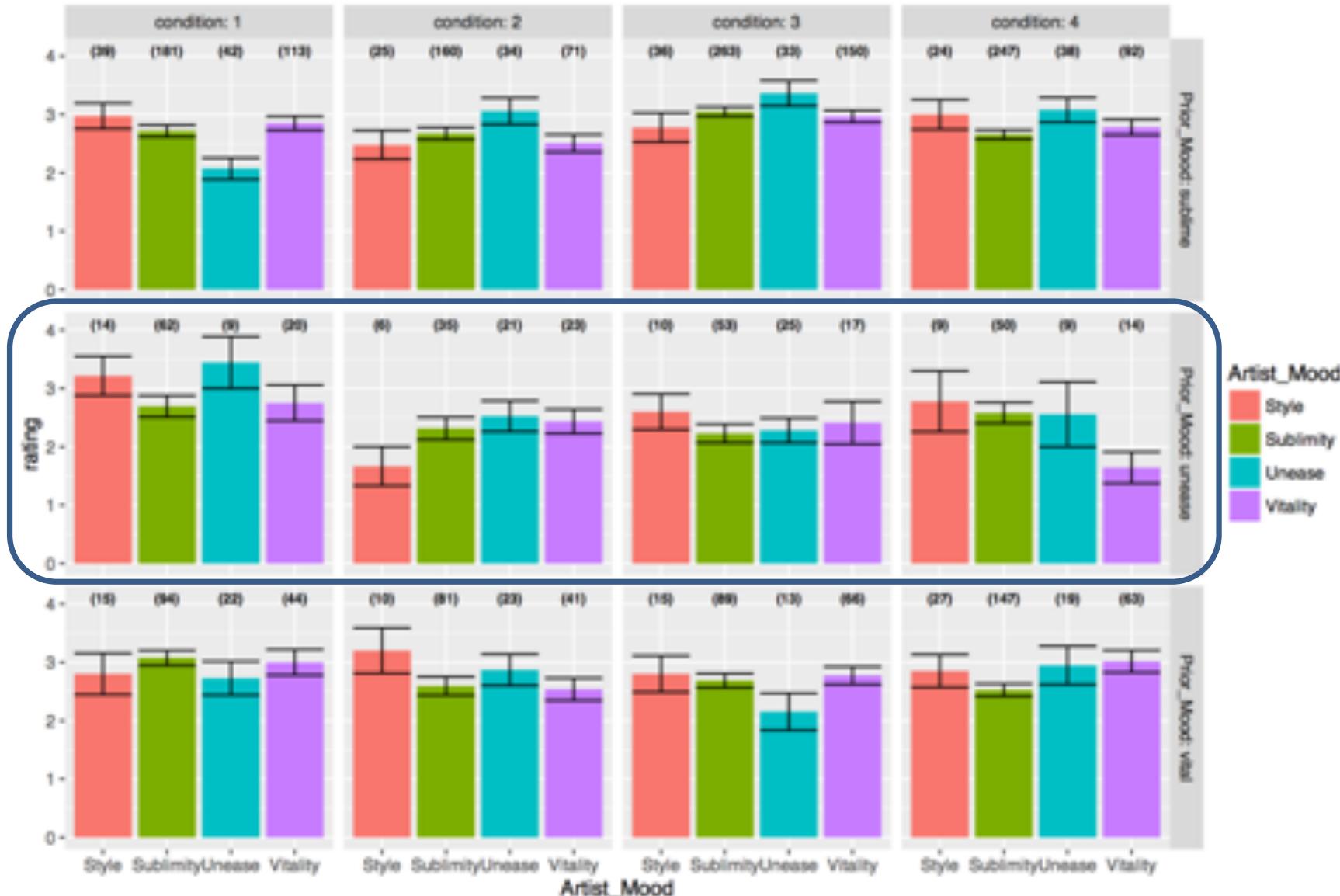
- Moodplay:  
Interactive Mood-based Music Discovery and Recommendation.
- Ivana Andjelkovic, Denis Parra, and John O'Donovan. (UMAP 2016; IJHCS 2019)



<http://moodplay.pythonanywhere.com/>

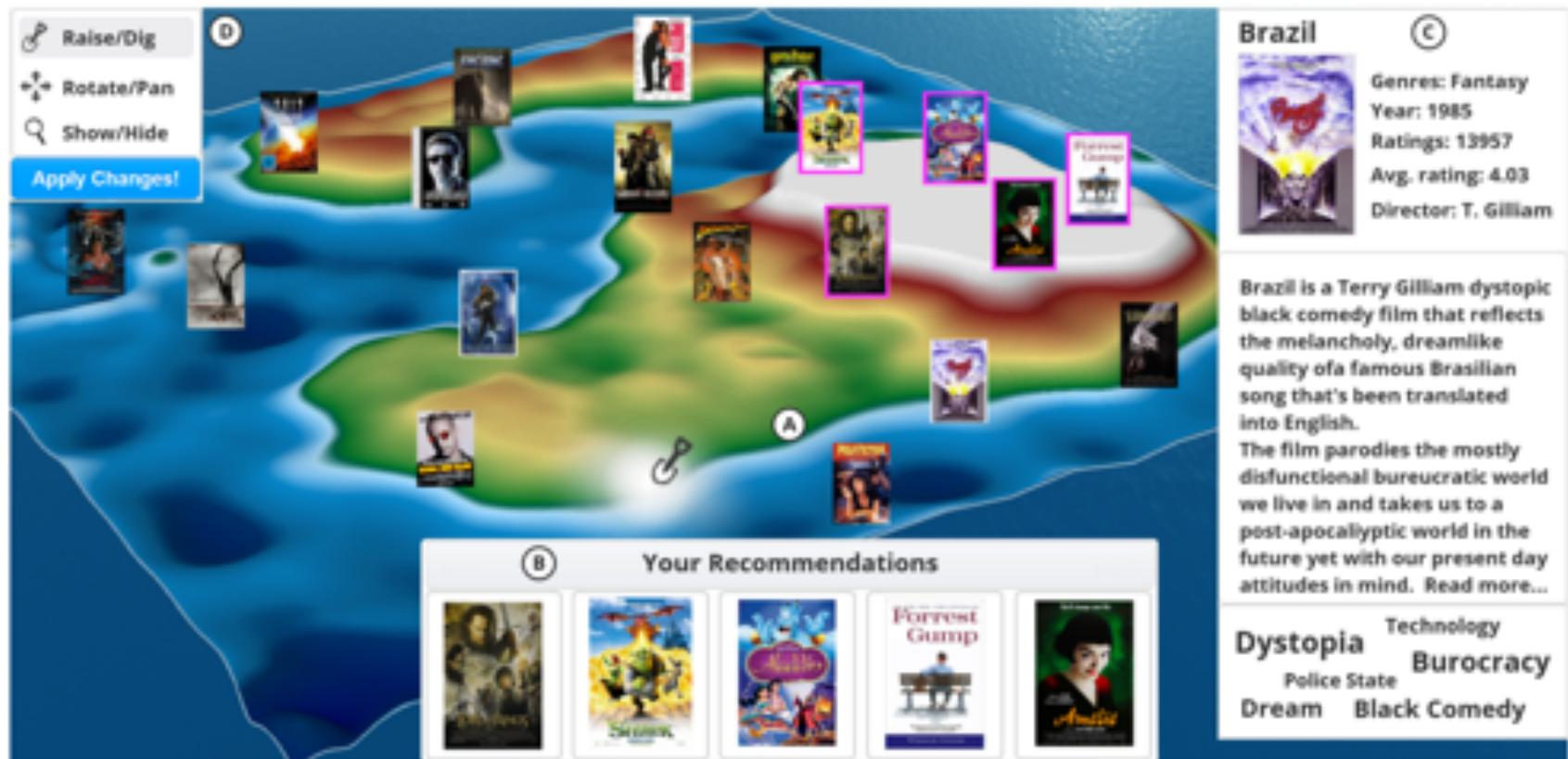
# Users' Prior Mood vs Artist Mood

Users' prior mood  
UNEASE decreases the ratings over the recommended artists



# 3D Landscape

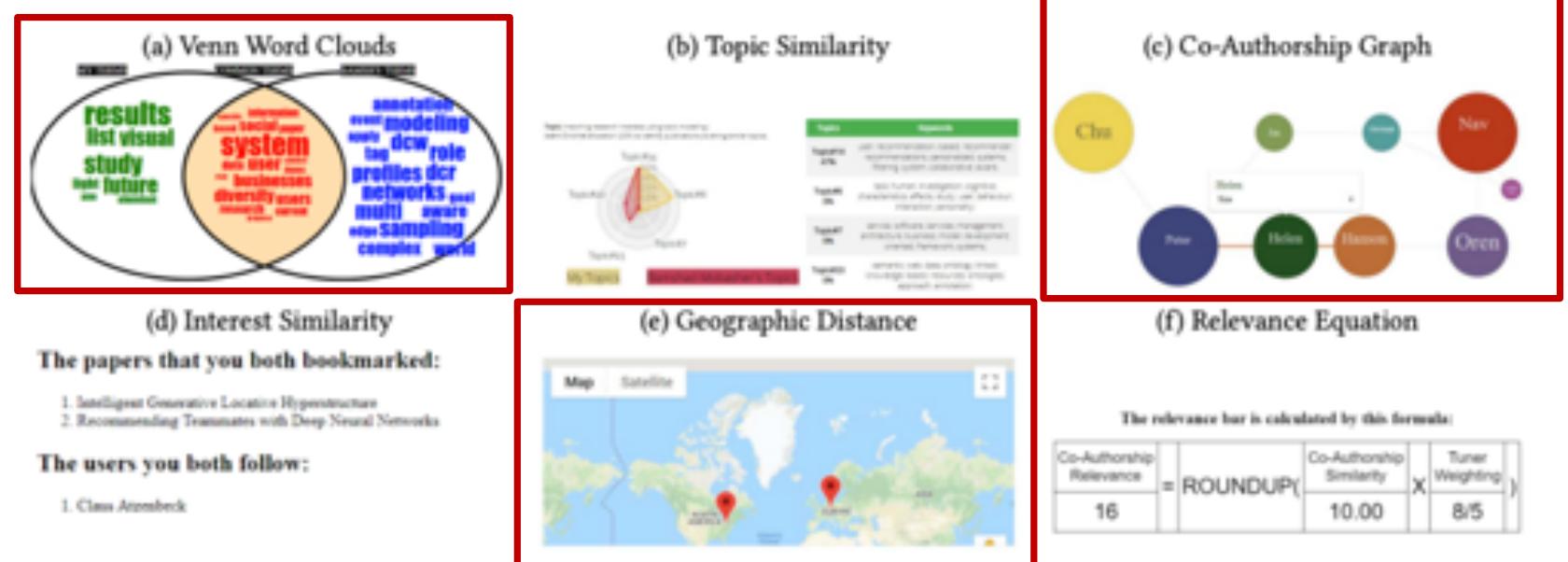
- A 3D item space visualization for presenting and manipulating user preferences in collaborative filtering
- Kunkel, J., Loepp, B., & Ziegler, J. (IUI 2017)



# Tuner+

- Explaining recommendations in an interactive hybrid social recommender
- Tsai, C. H., & Brusilovsky, P. (IUI 2019)

		Publication Similarity	Topic Similarity	Co-Authorship Similarity	CNJ Interest Similarity	Geographic Distance
Profile	Relevance	A	B	C	D	E
	10 8 6 10	5	5	5	Following X	Waiting confirmation
B	5 10 6 6	5	5	Lori	Follow	Add as connection



# To Explain or Not

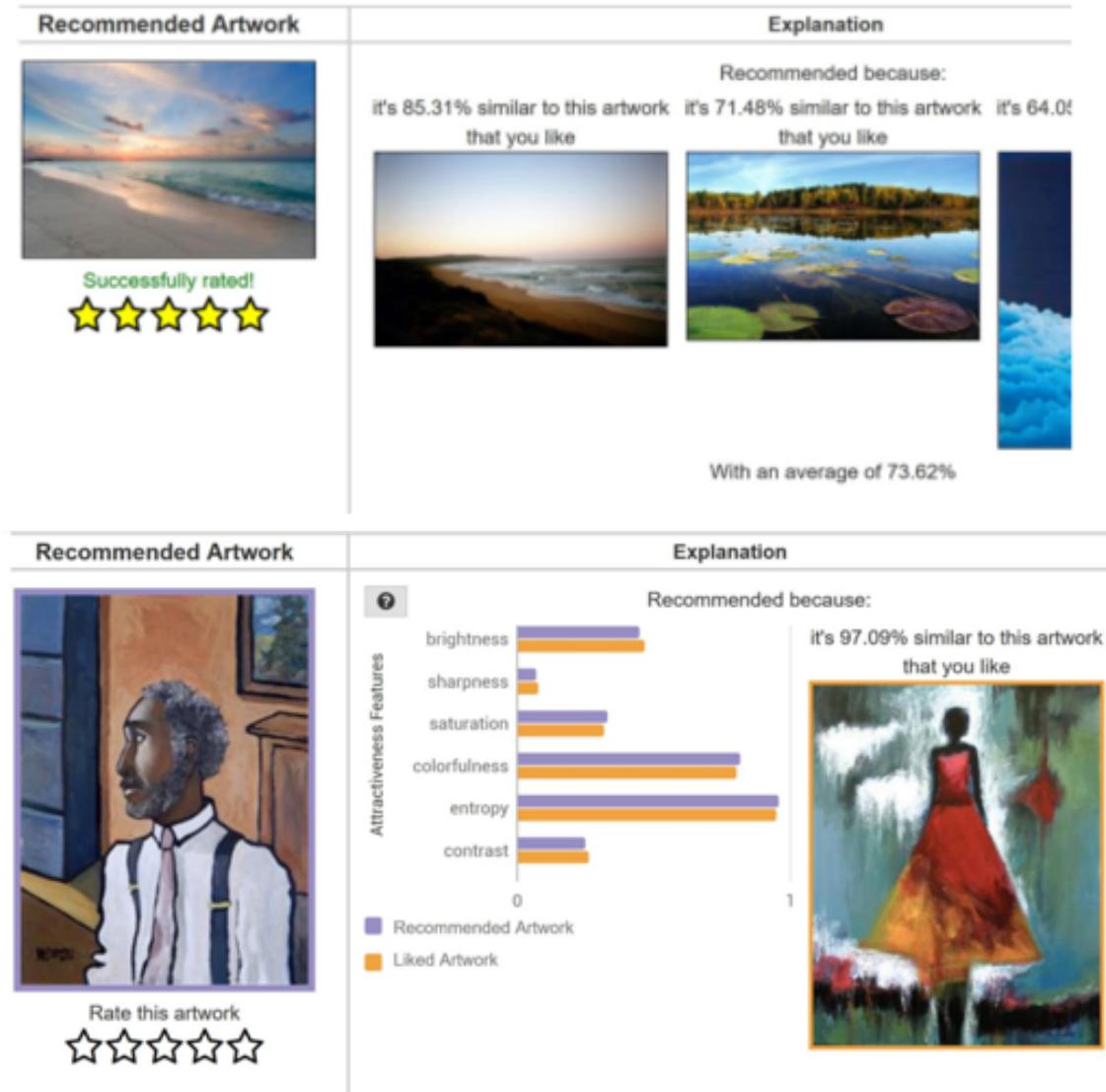
- To explain or not to explain: the effects of personal characteristics when explaining music recommendations
- Millecamp, M., Htun, N. N., Conati, C., & Verbert, K. (IUI 2019)



\* Locus of control, need for cognition, musical sophistication, visual literacy.

# “Explanations” only work with an accurate RecSys

- The Effect of Explanations and Algorithmic Accuracy on Visual Recommender Systems of Artistic Images (IUI2019)
- Dominguez et al.



# RecSys 2021- TTIR LoL item RecSys

- Interpretable Contextual Team-aware Item Recommendation: Application in Multiplayer Online Battle Arena Games (RecSys2020)
- Villa, Araujo, Cattan, Parra
- Explanation Usefulness: mostly for newer players



Question	Global M±SD (N=16)	Subjects by year of first play		
		2009-11 (N=5)	2012-14 (N=5)	2015-2017 (N=6)
Q1. How good were the recommendations for the <i>Blue team</i> ?	$7.98 \pm 1.22$	$7.7 \pm 1.24$	$7.7 \pm 1.16$	$8.46 \pm 1.3$
Q2. Is it understandable the influence of every team member upon each champion being recommended ?	$7.44 \pm 1.72$	$7.4 \pm 1.55$	$7.1 \pm 0.8$	$7.75 \pm 2.49$
Q3. Is it useful the information provided by the visualization in order to understand the item recommendations made ?	$6.9 \pm 2.15$	$6.7 \pm 1.98$	$6.6 \pm 1.65$	$7.33 \pm 2.87$

# What have we learned from this research?

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# What have we learned from this research?

- Perception of control is key, but how much depends on knowledge/literacy level of the users on the domain
- We should let users choose whether seeing explanations or not
- Explanations should present different levels of details, we should give users' control to explore them

*Overview first, details on demand*  
– Schneiderman mantra

# What have we learned from this research? II

- People **might prefer a less transparent recommender** if they are able to predict what the system is going to suggest

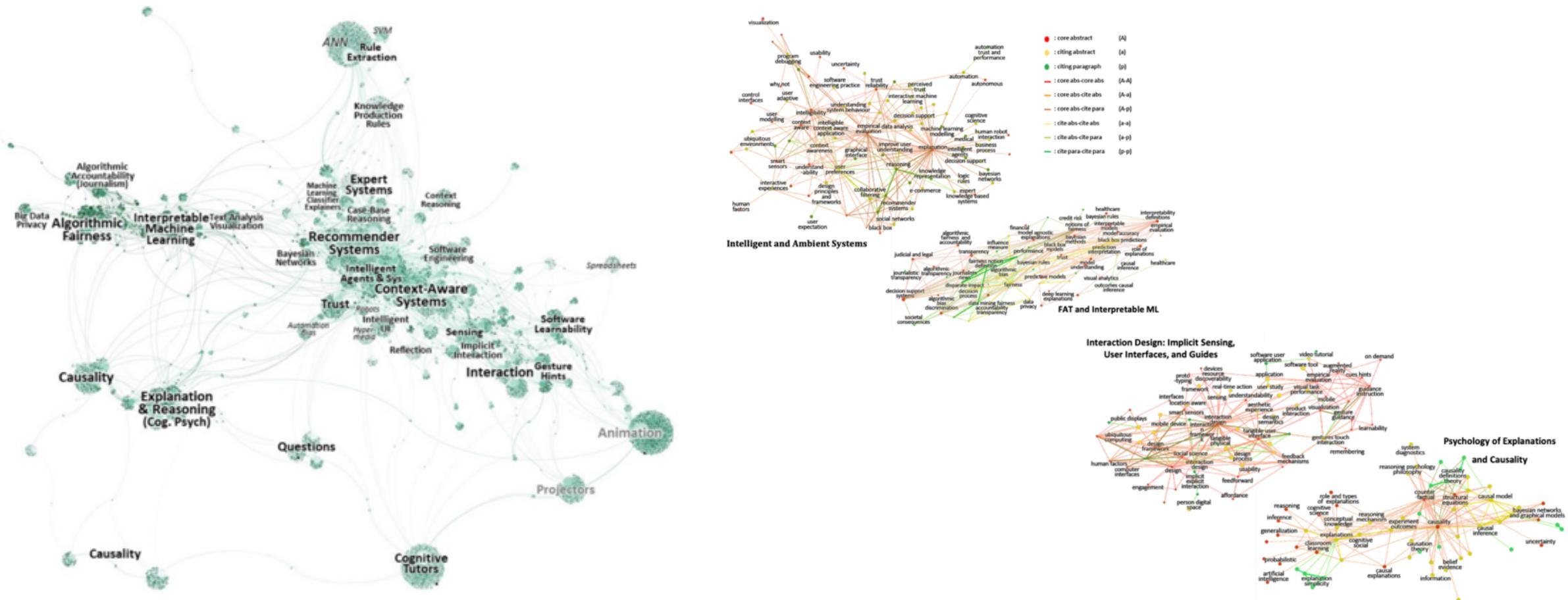
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- The **explanation** must provide something **beyond the obvious** (we need further research on this)

# What have we learned from this research? II

- People might prefer a less transparent recommender if they are able to predict what the system is going to suggest
- The explanation must provide something beyond the obvious! (we need further research on this)
- The **right visual encoding** can promote curiosity and exploratory behavior

# Need for further interaction between AI/HCI communities

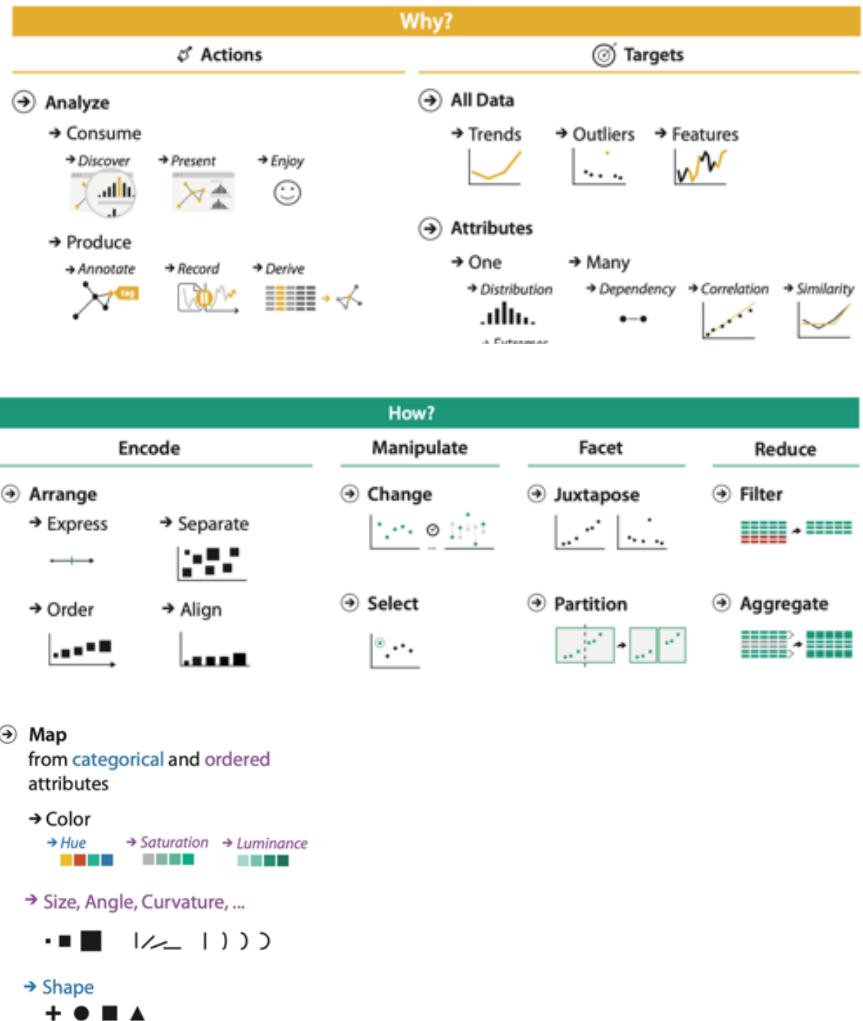


Abdul, A., Vermeulen, J., Wang, D., Lim, B. Y., & Kankanhalli, M. (2018). **Trends and trajectories for explainable, accountable and intelligible systems: An hci research agenda.** CHI 2018.

# Back to Visual XAI

- How do we analyze and design visualizations for XAI?
- There are frameworks and guidelines for designing visualizations (e.g. Munzer VAD framework)
- ... but there is no framework yet for designing Visual XAI

# Munzner InfoVis nested model



## Design Space

### Nested model Tamara Munzer (3 last steps)

**Threat:** Wrong task/data abstraction

**Threat:** Ineffective encoding/interaction idiom  
**Validate:** Justify encoding/interaction design

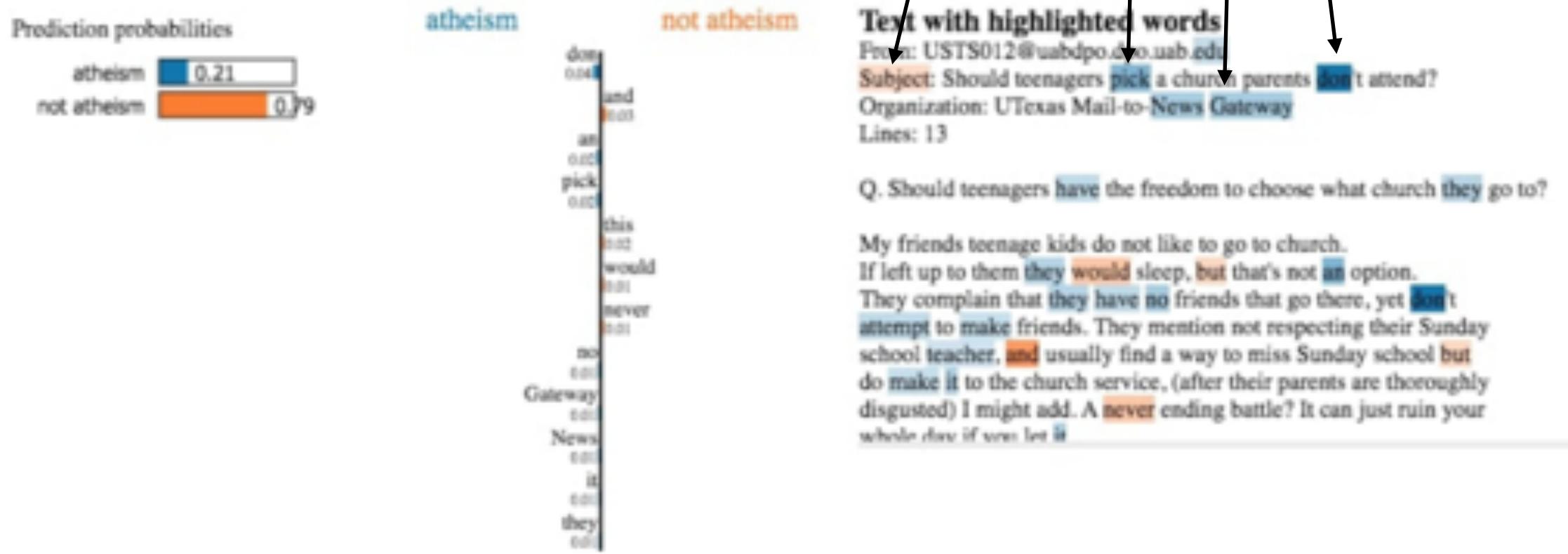
**Threat:** Slow algorithm  
**Validate:** Analyze computational complexity

Implement system

Validate Measure system time/memory

Validate Qualitative/quantitative result image analysis Test on any users, informal usability study  
**Validate:** Lab study, measure human time/errors for task

# Analyze LIME: why colored background ?



# Analyze LIME: Marks, channels and Interaction

## Text with highlighted words

From: USTS012@uabdpo.dpo.uab.edu

Subject: Should teenagers pick a church parents don't attend?

Organization: UTexas Mail-to-News Gateway

Lines: 13

Q. Should teenagers have the freedom to choose what church they go to?

My friends teenage kids do not like to go to church.

If left up to them they would sleep, but that's not an option.

They complain that they have no friends that go there, yet don't attempt to make friends. They mention not respecting their Sunday school teacher, and usually find a way to miss Sunday school but do make it to the church service, (after their parents are thoroughly disgusted) I might add. A never ending battle? It can just ruin your whole day if you let it

## Font property - Luminance

Title: a meta analysis of birth origin effects on reproduction in diverse captive environments

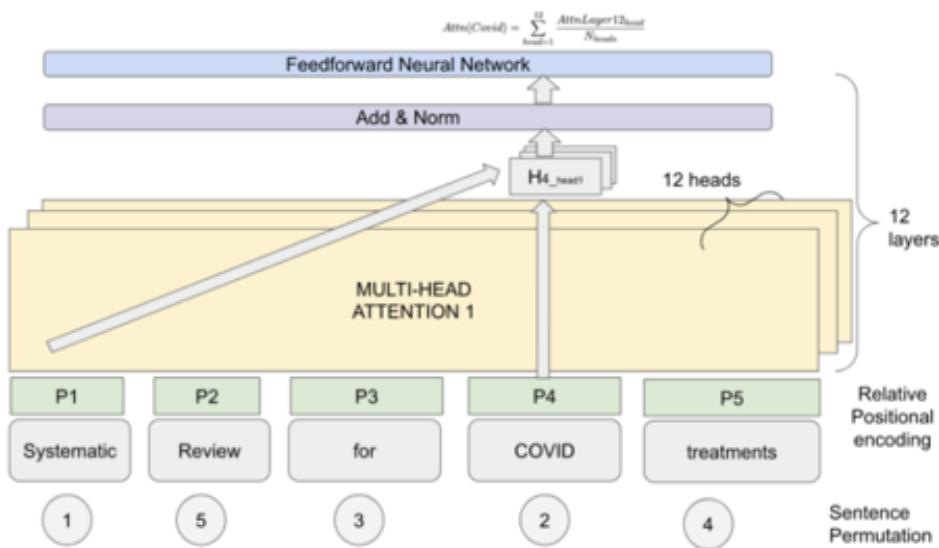
Abstract: successfully establishing captive breeding programs is priority across diverse industries to address food security demand for ethical laboratory research animals and prevent extinction differences in reproductive success due to birth origin may threaten the long term sustainability of captive breeding our meta analysis examining effect sizes from species of invertebrates fish birds and mammals shows that overall captive born animals have decreased odds of reproductive success in captivity compared to their wild born counterparts the largest effects are seen in commercial aquaculture relative to conservation or laboratory settings and offspring survival and offspring quality were the most sensitive traits although somewhat weaker trend reproductive success in conservation and laboratory research breeding programs is also in negative direction for captive born animals our study provides the foundation for future investigation of non genetic and genetic drivers of change

## Additional Mark - Bars Length (A)

Title: a meta analysis of birth origin effects on reproduction in diverse captive environments

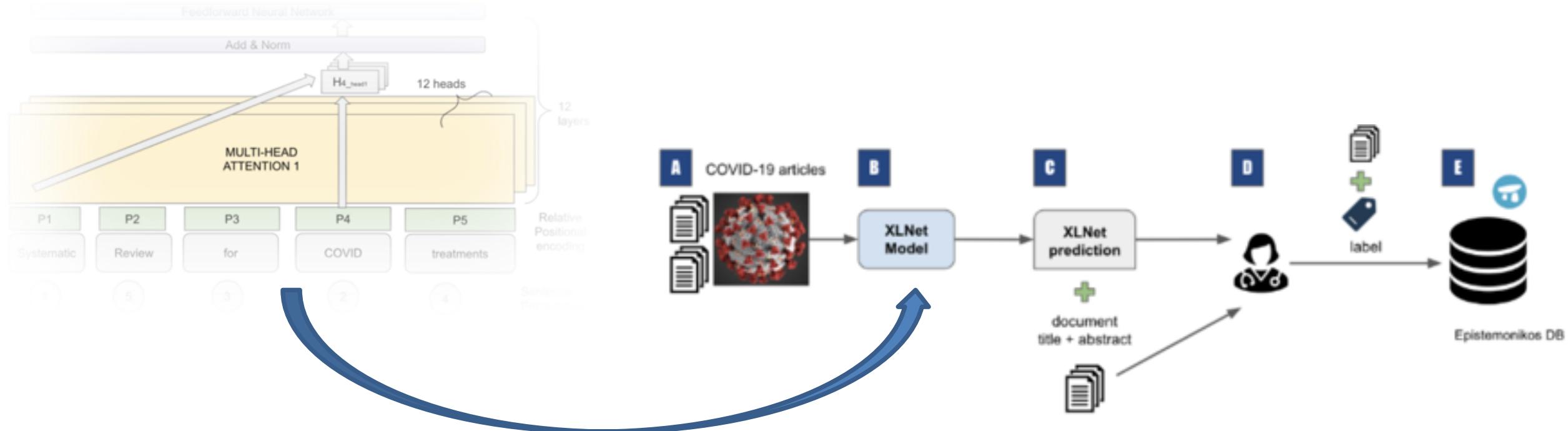
Abstract: successfully establishing captive breeding programs is priority across diverse industries to address food security demand for ethical laboratory research animals and prevent extinction differences in reproductive success due to birth origin may threaten the long term sustainability of captive breeding our meta analysis examining effect sizes from species of invertebrates fish birds and mammals shows that overall captive born animals have

# Recent study: Biomedical Document Classification



1. Train XLNet document classifier
  - \* It uses the neural self-**attention** mechanism (transformer)

# Recent study: Biomedical Document Classification



2. Ask physicians to confirm the document class and evaluate the explanation based on word importance

# Recent study: Biomedical Document Classification

Inclusion criteria: Articles that report a randomised trial. Trial registries and protocols are also included.

Screening Statistics

Fluctuations and the rate-limiting step of peptide-induced membrane leakage.

Year 2010  
Journal Biophysical journal  
Authors Mazzuca C et al  
DOI 10.1002/bj.2010.07.010  
Links Epistemonikos  
Votes See article vote status

**(A)** \*Predicted Label Confidence Randomized Trial (41.4% out of 100%)

**(B)** Show tutorial

Fluctuations and the rate-limiting step of peptide-induced membrane leakage.

Peptide-induced vesicle leakage is a common experimental test for the membrane-perturbing activity of antimicrobial peptides. The leakage kinetics is usually very slow, requiring minutes to hours for complete release of vesicle contents, and exhibits a biphasic behavior. We report here that, in the case of the peptaibol trichogin GA IV, all processes involved in peptide-membrane interaction, such as peptide-membrane association, peptide aggregation, and peptide translocation, take place on a timescale much shorter than the leakage kinetics. On the basis of these findings, we propose a stochastic model in which the leakage kinetics is determined by the discrete nature of a vesicle suspension: peptides are continuously exchanging among vesicles, producing significant fluctuations over time in the number of peptide molecules bound to each vesicle, and in the formation of pores. According to this model, the fast initial leakage is caused by vesicles that contain at least one pore after the peptides are randomly distributed among the liposomes, whereas the slower release is associated with the time needed to occasionally reach in an intact vesicle the critical number of

Is this document a randomised trial (outstew)? Yes

Select your expected label and click the button 'Next'?

Bread Synthesis  
Excluded  
Non-randomized Studies  
Systematic Review

How much do you agree with the following two statements:

To choose the document category, it was useful:  
Predicted Label Confidence  
Neutral  
Fully Disagree Fully Agree

The highlighted words in abstract:  
Neutral  
Fully Disagree Fully Agree

**(C)**

**(D)**

**(E)**

**(F)**

Subjects had to classify de documents

# Recent study: Biomedical Document Classification

The screenshot shows a web-based application for document classification. At the top, the URL is [app.loovevidence.com/screening/60ca02ece689d3e0f47900c3](https://app.loovevidence.com/screening/60ca02ece689d3e0f47900c3). The page title is "Screening". The main content area displays a study abstract and its metadata:

**Abstract:** Fluctuations and the rate-limiting step of peptide-induced membrane leakage.

**Year:** 2010  
**Journal:** Biophysical journal.  
**Authors:** Mazzuca C et al  
**DOI:** 10.1038/bpj.2010.07.010  
**Links:** Epistemonikos  
**Votes:** See article vote status

**(A)** Predicted Label: Randomized Trial (41.4% out of 100%)

**(B)** Show tutorial

**(C)** Abstract text: Fluctuations and the rate-limiting step of peptide-induced membrane leakage. Peptide-induced vesicle leakage is a common experimental test for the membrane-perturbing activity of antimicrobial peptides. The leakage kinetics is usually very slow, requiring minutes to hours for complete release of vesicle contents, and exhibits a biphasic behavior. We report here that, in the case of the peptaibol trichogin GA IV, all processes involved in peptide-membrane interaction, such as peptide-membrane association, peptide aggregation, and peptide translocation, take place on a timescale much shorter than the leakage kinetics. On the basis of these findings, we propose a stochastic model in which the leakage kinetics is determined by the discrete nature of a vesicle suspension: peptides are continuously exchanging among vesicles, producing significant fluctuations over time in the number of peptide molecules bound to each vesicle, and in the formation of pores. According to this model, the fast initial leakage is caused by vesicles that contain at least one pore after the peptides are randomly distributed among the liposomes, whereas the slower release is associated with the time needed to occasionally reach in an intact vesicle the critical number of

**(D)** Is this document a randomised trial (outstude)?  
Yes  
No  
Select your expected label and click the button 'Next'. ?  
Bread Synthesis  
Excluded  
Non-randomized Studies  
Systematic Review

**(E)** How much do you agree with the following two statements?  
To choose the document category, it was useful:  
Predicted Label Confidence  
Neutral  
Fully Disagree Fully Agree  
The highlighted words in abstract  
Neutral  
Fully Disagree Fully Agree

**(F)** Epistemonikos User Study  
Phase 1 of 2: Fixed Visualizations Total progress: 7/200  
Brightness  
Link to challenge 7/40

... and tell us how useful were the highlighted words

# Designs: marks and channels (effectiveness principle)

## (A) Control group (plain text)

### CONCLUSION:

The CYP1B1 rs200046 variant T/T favors lower incidence of hot flashes/sweating under abiraterone + OFS treatment, suggesting endocrine-mediated effects. Based on findings from others, this SNP may potentially enhance treatment adherence and treatment efficacy. We plan to evaluate the clinical impact of this polymorphism during time, pending sufficient median follow up.

## (C) Word luminance

The study is designed as a Phase II, multi-center trial of tandem autologous transplants versus the strategy of autologous followed by Human Leukocyte Antigen (HLA)-matched sibling non-myeloablative allogeneic transplant. Study subjects will be biologically assigned to the appropriate arm depending on the availability of an HLA-matched sibling. There is a nested randomized phase III trial of observation versus maintenance therapy following the second autologous transplant for patients on the tandem autologous transplant arm.

## (B) Background color saturation

A randomized phase II trial of personalized peptide vaccine plus low dose estramustine phosphate (EMP) versus standard dose EMP in patients with castration resistant prostate cancer.

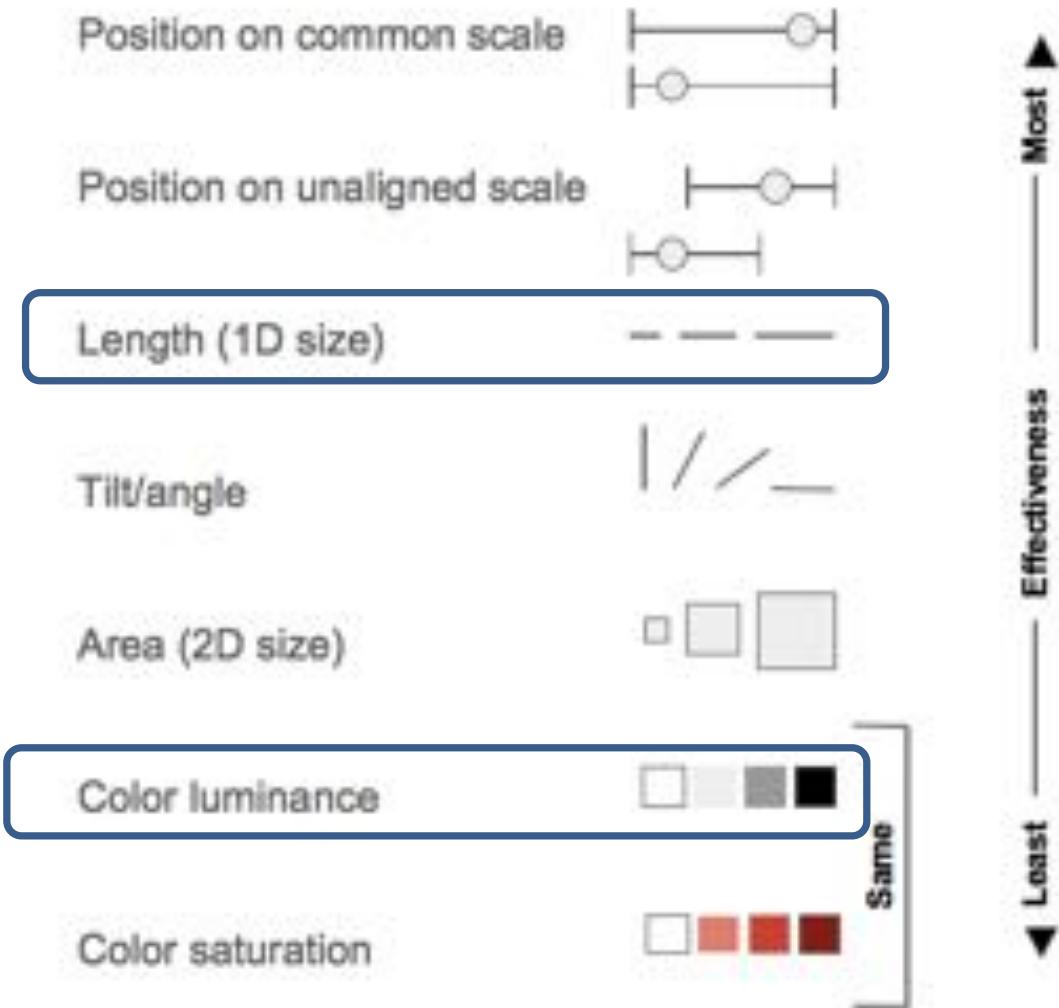
Personalized peptide vaccination (PPV) combined with chemotherapy [REDACTED] be a novel approach for many cancer patients. In this randomized study, we evaluated the anti-tumor effect and safety of PPV plus low-dose estramustine phosphate (EMP) as

## (D) Bar length

### CONCLUSIONS:

Both methods LIA and SFNS provided excellent pain relief and lower morphine consumption following TKA. LIA is a surgeon-controlled analgesic technique, which can be used to enhance patients' satisfaction and reduce the pain in the very early postoperative period by surgeon independently.

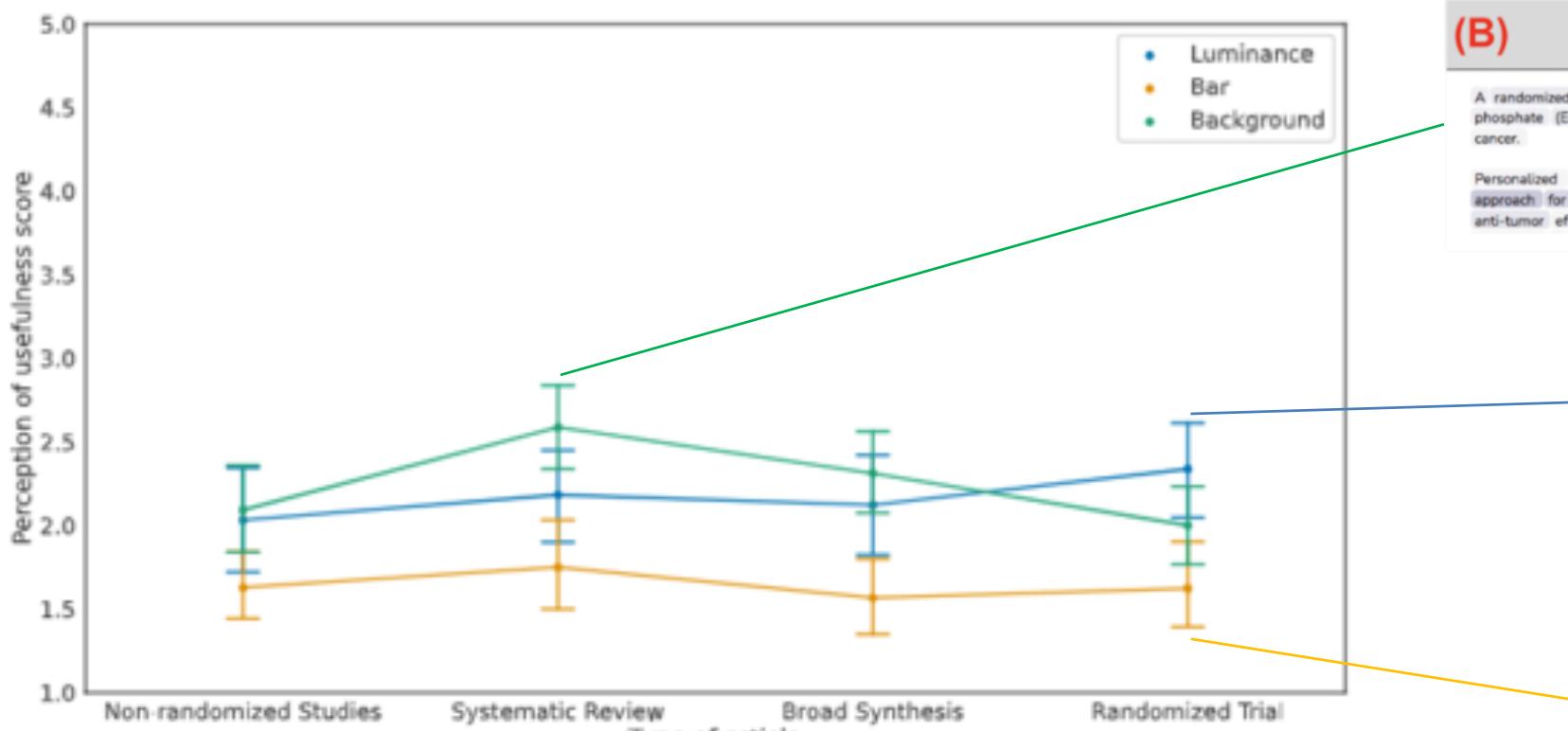
# Designs: marks and channels (effectiveness principle)



Do people prefer  
more effective channels  
for neural attention-based  
explanations?

# Recent study: Document Classification

- \* In this task, a more visually effective channel is not the most useful
- \* Perception of usefulness depends on document type



## (B) Background color saturation

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# Conclusion

- XAI and Visual XAI are active topics of critical research in AI
- Despite XAI being coined around 2017, the RecSys-IUI community has been researching explainability and transparency since early 2000s, and there are important lessons to contribute to XAI
- There's still a need to connect different disciplines and areas to address challenges in XAI and Visual XAI

dparra@ing.puc.cl

**THANKS!**

