



Adaptivity and Personalization in Persuasive Technologies

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Brief introduction, me.

Maurits Kaptein

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- Persuasion Profiling
 - Adapting messages based on Cialdini's influence tactics
 - Sequential personalization of treatments
 - Applications in health & online marketing
 - Interest in research methods / Bayesian decision theory
 - (Perhaps I will talk about his very, very, briefly...)
- Author: **"Persuasion Profiling; how the internet knows what makes you tick"**

The current work: Structuring personalization

- Shlomo Berkovsky: Personalization of games aimed at increasing physical motivation.
- Massimo Zancanaro: Personalizing / adapting an interactive display to encourage group conversations
- Maurits Kaptein: Personalizing persuasive strategies / influence tactics to increase email compliance for a health service.

After an informal discussion of our research topics, decided to contrast and compare the different adaptation and personalization efforts: how do our efforts relate? How are they different? Can we identify new opportunities?

~~Shlomo~~ Maurits (sorry) invited to speak...

Three case studies: Diverse domains

Motivating Games

Physical exercise game: jump to gain more time.

Adapting the reward height and the difficulty of the task based on performance

Behavioral outcomes measured

Persuasion Profiles

Change types of arguments (e.g., social proof, scarcity) in email messages

Adapting based on previous responses

Behavioral responses logged

Augmented Table

Motivating groups of people using the display to engage in conversation.

Adaptation based on attention and activity: rules to select content

Measurement of engagement / activity

Three step process



Three step process: Who is the user?

What facilitates personalization?

- What features are measured and how are they measured to obtain information regarding the targeted individual or group?
- Are these measures explicit (e.g., using surveys or self report), or implicit (e.g., derived from behavioral observations)?
- Is the impression static (not changing after having been established) or dynamic

Three step process: What do we change?

How is
personalization
achieved?

- What is the granularity of the presented information?
- Are the means or ends altered?
- What is the duration of the target behavior?
- Is the persuasive attempt directly visible to the user?
- Is the act of persuasion disclosed?

Three step process: Is it successful?

How is
personalization
evaluated?

- Objective, behavioral measurements? Or subjective “perception of being persuaded?”
- Which metrics are used? How are they obtained?
- What is the evaluation term?

Three case studies

	Exercise Game	Persuasion Profile	Augmented display
Who is the user?	Level times to implicitly learn skill level. Dynamic	Behavior logs to implicitly measure susceptibility to persuasion	Activity monitoring and attention monitoring to explicitly measure group behavior
What do we adapt?	Setting a personalized difficulty, changing the rewards. Short term and indirect.	Changing the argument in the email. Short term, direct, but not disclosed	Content for a specific group member. Indirect persuasion, undisclosed but understood.
How do we measure the effect?	Objective measurement of number of jumps	Measurement of clicks and logs of behavior	Objective measurement of speech activity

Surprises

- We all focused on **implicit** measurements, each of which was varied **dynamically**.
 - Large differences in the “types” of features: skill level vs. susceptibility to persuasion vs. (group) activity
 - Opportunity for **explicit measurements**?
- Mostly **undisclosed, short term, interventions**. Different granularity, and directness.
 - Opportunity for focus on long term interventions?
 - Understanding disclosure?
- All “**objective**” evaluations (measurements of behavioral outcomes)
 - Selection bias of the team
 - Opportunity for long term evaluation

Wrapping up today:

Paper	Who is the user?	What do we personalize?	How do we evaluate?
<i>Persuasive Recommendations in ubiquitous Environments</i>	Motivation, (personality, preferences, etc.)	Novelty, Serendipity	Perception of the recommendations
<i>Persuasiveness, Personalization & Productive Workplace Practices with IT Knowledge Artefacts</i>	Personality	Persuasive strategies	Correlations of ratings / behavior
<i>Towards the design of a persuasive technology for encouraging collaborative prototyping</i>	Interest, Communication style, Supervision?	Motivation, Ability, Triggers	N/A (yet)
<i>Personalization of Gait Rehabilitation Games on a Pressure Sensitive Interactive LED Floor</i>	Balance, anticipation, (description of the patient by the therapist)	Rate of the lilies / difficulty of game	Liking, perceived comfort, evaluation of therapist
<i>Missing the Forest for the Trees: Balancing Personalization Costs and Benefits in Persuasive Games</i>	Persuadability, gender, age, activity level, etc. etc.	Game “versions”	N/A (yet)
<i>Evaluating Personalization and Persuasion in E Commerce</i>	Browsing history, advertising preferences	PSD / persuasive principles	N/A (yet)
<i>Integrating Persuasive Technology to Telemedical Applications for Type 2 Diabetes</i>	Type 2 Diabetes / different food intake practices	Not clear	Perception as queried in interview

Wrapping up today:

Paper	Who is the user?	How do we personalize?	How do we evaluate?
<i>Personalization of Mobile Health Applications for Remote Health Monitoring</i>	Not presented	Not presented	Not presented
<i>Personalized Persuasion for Social Interactions in Nursing Homes</i>	Stakeholders / types of users	Different contents of magazine	Perception of interaction (?)
<i>Personalized Persuasive Messaging System for Reducing Patient's Dissatisfaction With Prolonged Waiting Times</i>	Fingerprints / bio-data / persuasion profiling / ...	Waiting time / persuasive message	Perceived waiting time / dissatisfaction
<i>Understanding Effective Coaching on Healthy Lifestyle by Combining Theory and Data driven Approaches</i>	Mood, environment (user features)	Coaching features / content	Interviews.
<i>Designing for Different Stages in Behavior Change</i>	Stages of behavior change	Goal setting / glancing	Acceptance / retention
<i>An Empirical Analysis of the Perception of Mobile Website Interfaces and the Influence of Culture</i>	High vs Low context culture	information structure / colors	Perceptions, evaluations
<i>Persuasion and Culture: Individualism–Collectivism and Susceptibility to Influence Strategies</i>	Individualist / Collectivist	Different persuasion strategies	Susceptibility



Overarching conclusion

Adapted / personalized persuasion in each trial more effective than static, non-personalized approaches.

(Admittedly, this is a hard / artificial distinction. However, it is encouraging to find very different implementations of personalization and adaptation, in very different domains, to be successful).

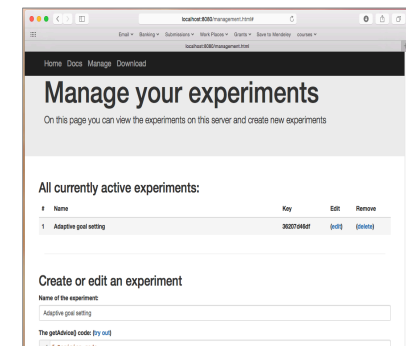
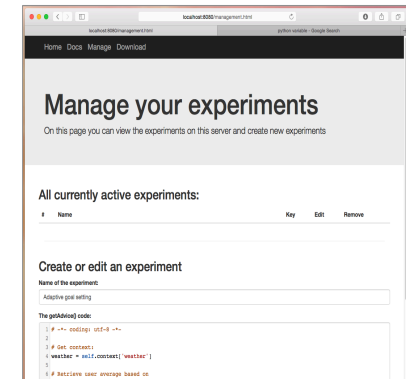
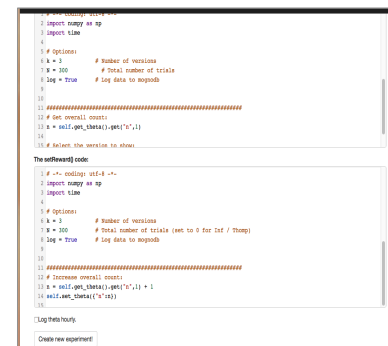
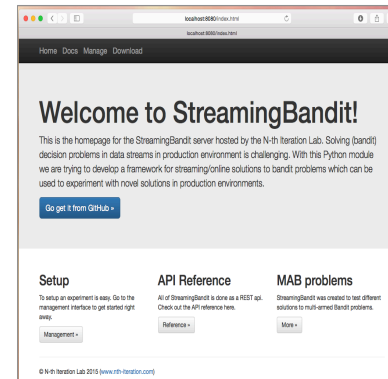
We have seen many examples today! (And will see more during the main conference)

Where are we going? (according to me, but hey...)

- Formal models of persuasion? (A new session!)
 - Context: State of the world, **features of the user**
 - Actions: **The possible messages** / content / channels we can use
 - Rewards: a function of the **observed behavior** (evaluation)
- Aim: Maximize (cumulative?) reward.
- Use reinforcement learning / **Multi Armed Bandits**
 - Psychology: Create the initial actions / determine model priors
 - Machine learning / Reinforcement learning for final decision rules

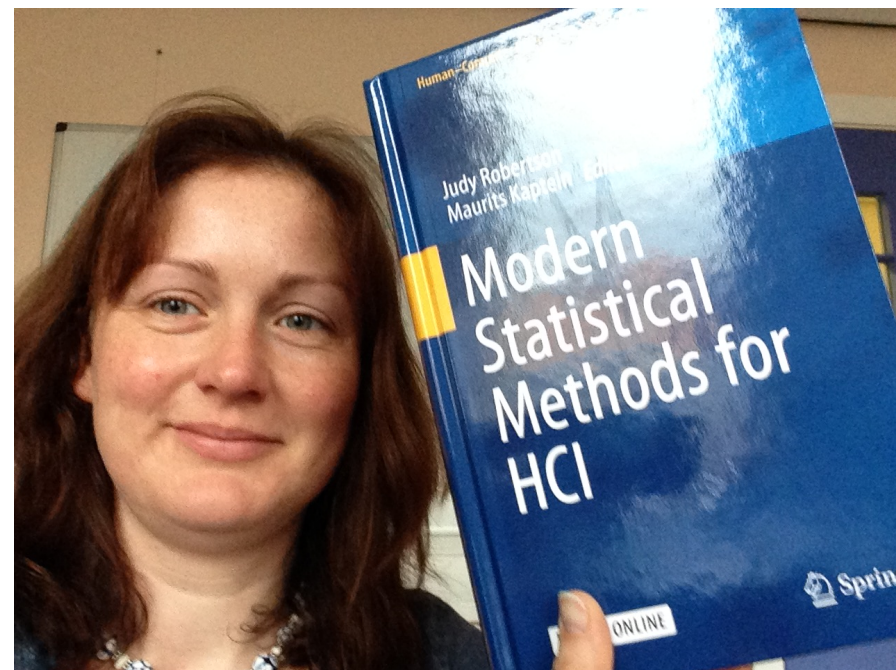
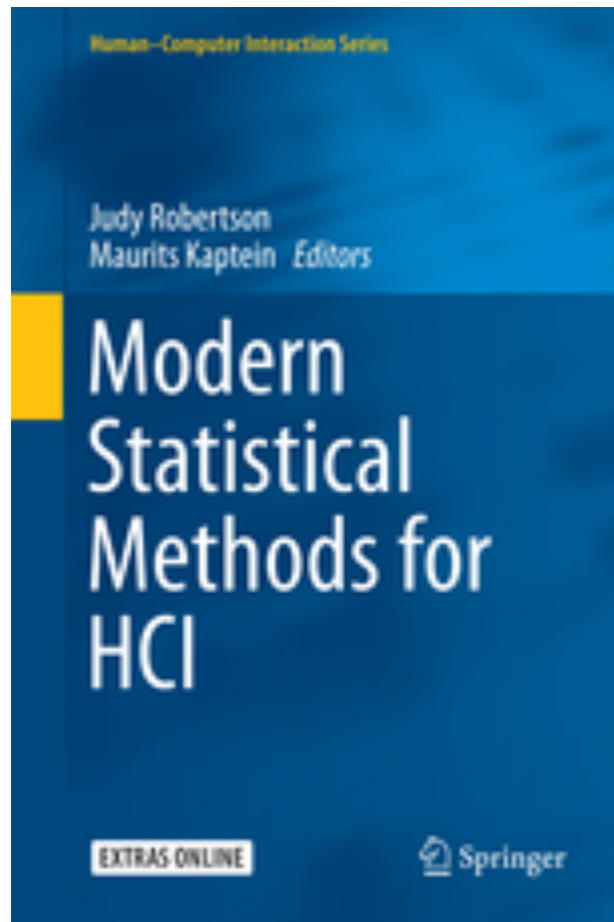
And a bit of advertising....

- REST server / API for adaptive / personalized persuasion.
- Can be used as back-end to do the “personalization logic” (Or - stochastic - decision rules)
- Currently used for:
 - Personalizing interest rates
 - Adapting / optimizing decoy position
 - Personalizing health goals
 - Personalizing rebates
 - Recommending news articles



<https://github.com/Mkaptein/streamingbandit>

Ow, and fresh, today, just now...





Thanks!

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