Online consumer decision making

Agenda

- **Online consumer decision making**
  - Introduction
  - Context effects
  - Primacy/recency effects
  - Further effects
  - Personality and social psychology
  - Discussion and summary
  - Literature

Introduction

- The understanding of online users' purchasing behavior is of high importance for companies

- This purchasing behavior can be explained by different models of human decision making

- Research has clearly pointed out that preference stability in decision processes does not exist

    - *For instance, a customer who purchases a digital camera could first define a strict upper limit for the price of the camera, but because of additional technical information about the camera, the customer could change his or her mind and significantly increase the upper limit of the price.*

- The nonexistence of stable preferences led to the development of different alternative decision models, which are discussed in the following

Effort accuracy framework

- Model focuses on cost-benefit aspects

- A decision process is interpreted as a tradeoff between the decision making effort and the accuracy of the resulting decision

- Based on the idea that human decision behavior is adaptive and that consumers dispose of a number of different decision heuristics that they apply in different decision contexts

- The quality of consumer decision support in terms of perceived usefulness and ease of use has an important impact on a consumer's behavioral intentions
  - For example, in terms of reusing the recommender system in the future

Preference construction - *Theories from cognition and decision psychology*

Theory	Description
Context effects	Additional irrelevant (inferior) items in an item set significantly influence the selection behavior
Primacy/recency effects	Items at the beginning and the end of a list are analyzed significantly more often than items in the middle of a list
Framing effects	The way in which different decision alternatives are presented influences the final decision taken
Priming	If specific decision properties are made more available in memory, this influences a consumer's item evaluations
Defaults	Preset options bias the decision process

Preference construction - *Theories from personality and social psychology*

Theory	Description
Internal vs. external LOC	Externally influenced users need more guidance; internally controlled users want to actively and selectively search for additional information
Need for closure	Describes the individual pursuit of making a decision as soon as possible
Maximizer vs. satisficer	Maximizers try to find an optimal solution; satisficers search for solutions that fulfill their basic requirements
Conformity	A person's behavior, attitudes, and beliefs are influenced by other people
Trust	A person's behavioral intention is related to factors such as the willingness to buy
Emotions	Mental states triggered by an event of importance for a Person
Persuasion	Changing attitudes or behaviors

Context effects

- The way in which we present different item sets to a consumer can have an enormous impact on the outcome of the overall decision process

- A decision is always made depending on the context in which item alternatives are presented

- Additions of completely inferior item alternatives can trigger significant changes in choice behaviors

- Different context effects are presented in the following

Compromise effect

Product	A	B	D
price per month	30	20	50
download limit	10GB	6GB	12GB

- The addition of alternative *D* (the decoy alternative) increases the attractiveness of alternative *A* because, compared with product *D*, *A* has only a slightly lower download limit but a significantly lower price

- Thus *A* appears to be a compromise between the product alternatives *B* and *D*

- *D* is a so-called decoy product, which represents a solution alternative with the lowest attractiveness

Asymmetric dominance effect

Product	A	B	D
price per month	30	20	50
download limit	10GB	6GB	12GB

- Product *A* dominates *D* in both dimensions (price and download limit)

- Product *B* dominates alternative *D* in only one dimension (price)

- The additional inclusion of *D* into the choice set could trigger an increase of the selection probability of *A*

Attraction effect

Product	A	B	D
price per month	30	250	28
download limit	10GB	36GB	7GB

- Product *A* is a little bit more expensive but of significantly higher quality than *D*

- The introduction of product *D* would induce an increased selection probability for *A*

Summary of context effects

- *A* is the target item, *B* represents the competitor, and *D* is the decoy item

Effect	Description
Compromise effect	Product *A* is of slightly lower quality but has a significantly lower price
Asymmetric dominance effect	Product *A* dominates *D* in both dimensions (product *B* does not)
Attraction effect	Product *A* is a little more expensive but has a significantly higher quality

- These effects can be exploited for different purposes within the scope of recommendation sessions
  - Increased selection share of a target product
  - Increased confidence in a decision
  - Increased willingness to buy

Calculate dominance relationships

- Calculation of a dominance value for an item x in the item set $CSet$

$$d(x, CSet) = \sum_{y \in CSet - x} \sum_{a \in properties} \frac{x_a - y_a}{a_{max} - a_{min}}$$

- This value is calculated by a pairwise comparison of the item property values of x with each y in $CSet$

- Example:

Product	A	B	D
price per month	30	20	50
download limit	10GB	6GB	12GB
$d(x, CSet)$	**0.92**	**-0.08**	**-0.83**

Primacy/recency effects as a cognitive phenomenon

- Describe situations in which information units at the beginning (primary) and at the end (recency) of a list of items are more likely remembered than information units in the middle of the list

- Primacy/recency effects in recommendation dialogs must be taken into account because different question sequences can potentially change the selection behavior of consumers

Primacy/recency effects
as a decision phenomenon

- Describe situations in which items presented at the beginning and at the end of a list are evaluated significantly more often compared with items in the middle of a list

- The same phenomenon exists as well in the context of web search scenarios:
  - Web links at the beginning and the end of a list are activated significantly more often than those in the middle of the list

- Typically, users are not interested in evaluating large lists of items to identify those that best fit their wishes and needs

- Consequently, a recommender application must calculate rankings that reduce the cognitive overheads of a user as much as possible

Framing

- Denotes the effect that the way a decision alternative is presented influences the decision behavior of the user
  - For example, the way pricing information is presented to a user significantly influences the way in which other attributes of a certain decision alternative are evaluated (*price framing*)

- *Attribute framing* denotes the phenomenon that different but equivalent descriptions of a decision task lead to different final decisions
  - For example, consumers prefer to buy meat that is 80 percent lean compared with meat that is 20 percent fat

- Consumers who are highly familiar with a specific type of product are less amenable to framing effects, as they have clear preferences that should be fulfilled by the recommended product

Priming

- Denotes the idea of making some properties of a decision alternative more accessible in memory, with the consequence that this setting will directly influence the evaluations of a consumer

- *Background priming* (Mandel and Johnson 1999) exploits the fact that different page backgrounds can directly influence the decision-making process
  - *An example is provided by Mandel and Johnson (1999), in which one version of an online furniture selling environment had a background with coins and the second version had a cloudy background (cirrocumulus), which triggered feelings such as comfort or silence. Users who interacted with the first version chose significantly less expensive products compared with those who interacted with the cloudy-background version.*

- The reduction of questions in a recommendation dialog is another aspect of priming

Defaults

- Play an important role in decision-making processes because people often tend to favor the status quo compared with other potentially equally attractive decision alternatives

- Tendency to maintain decisions and being reluctant to change the current state is also called *status quo bias*

- Potential changes to the current state are always related to some kind of losses or expected gains – and people are typically loss-averse

- If default options are used in the presentation of decision alternatives, users are reluctant to change this setting (the current state)

- Consumers tend to associate a certain risk with changing a default
  → Biases in decision processes
  → Reduce the overall interaction effort and actively support consumers in the product selection process

Personality and social psychology

- Besides the cognitive and decision psychological phenomena, different personality properties pose specific requirements on the design of recommender user interfaces
  - Locus of control (LOC)
  - Need for closure (NFC)
  - Maximizer and satisficer (MaxSat)
  - Conformity
  - Trust
  - Emotions
  - Persuasion

Locus of control (LOC)

- The amount a human being is able to control occurring events

- Users should be able to decide on their own with which type of interface they prefer to interact

- *External LOC*
  - Predefined and static dialogs better support users without a special interest in controlling the recommendation process

- *Internal LOC*
  - More flexible dialogs better support users with a strong interest in controlling the recommendation process

- More flexible recommender user interfaces not only let the user select the parameters they want to specify but also actively propose interesting parameters and feature settings

Need for closure (NFC)

- Denotes the individual's need to arrive at a decision as soon as possible and to get feedback on how much effort is still needed to successfully complete a decision task
  - Inclusion of progress bars
  - Immediate display of temporary recommendation results such that the user has the flexibility to select an item for detailed inspection whenever he or she wants
  - Automated repair actions

- Also refers to a tendency of people to prefer predictability and to narrow down the efforts of an information search as much as possible
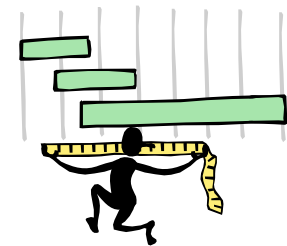
Maximizer and satisficer (MaxSat)

- *Maximizers* interacting with a recommender application typically need a longer time span for completing a session
  - Prefer to know many technical details about the product
  - Tend to identify an optimal solution that requires an exhaustive search over the available decision alternatives

- *Satisficers* are searching for "good enough" solutions until one solution is found that is within an acceptability threshold

- Example: Selection of TV channels:
  - Satisficers focus on the identification of a channel that offers the first acceptable program
  - Maximizers spend most of the time on selection activities such that, compared to satisficers, significantly less viewing time is available for them

- Show more application-oriented (satisficers) or more technical explanations (maximizers)?

Conformity

- Is a process in which a person's behaviors, attitudes, and beliefs are influenced by other people

- Recommenders have the potential to affect users' opinions of items

- Cosley et al. (2003) investigated whether the display of item predictions affects a user's rating behavior
  - The outcome of this experiment was that users confronted with a prediction significantly changed (adapted) their rating behavior
  - The changed rating behavior can be explained by the fact that the display of ratings simply influences people's beliefs

→ The recommender user interface can have a strong impact on a user's rating behavior

Trust

- Is an important factor that influences a consumer's decision whether to buy a product

- In online sales environments trust is very hard to establish but easy to lose

- A customer's willingness to buy or return to a web site are important trust-induced benefits

- Major elements of a recommender user interface that support trust building are
  - explanations,
  - product comparisons,
  - and automated repair functionalities

- Perceived level of trust is also influence by the overall quality of recommendations

Emotions
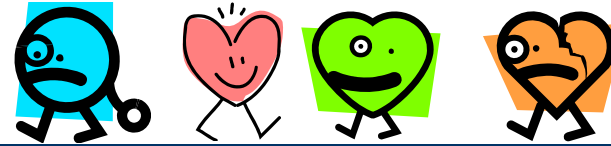
- Are ignored by most of the existing recommender applications

- An *emotion* can be defined as "a state usually caused by an event of importance to the subject". It typically includes
  - a conscious mental state with a recognizable quality of feeling and directed towards some object,
  - a bodily perturbation of some kind,
  - recognizable expressions of the face, tone of voice, and gesture
  - and a readiness for certain kinds of action" (Oatley and Jenkins 1996)

- MovieProfiler (www.movieprofiler.com)
  - The search engine of MovieProfiler supports item search on the basis of an emotional profile specified by the user
  - A user indicates on a five-point psychometric scale which specific emotions should be activated by a film
  - Users are able to evaluate movies regarding the emotions *fear*, *anger*, *sorrow*, *joy*, *disgust*, *acceptance*, *anticipation*, and *surprise*

MovieProfiler (www.movieprofiler.com)

The Green Mile (1999)

▶ **Emotion Profile**   ▶ Target Segment Profile

- ▶ Horror:
- ▶ Anger:
- ▶ Sorrow:
- ▶ Joy:
- ▶ Disgust:
- ▶ Acceptance:
- ▶ Anticipation:
- ▶ Surprise:

Number of reviews: 1

ADD TEXTUAL REVIEW!

OR

ADD EMOTION REVIEW!

- ▶ Released: 1999
- ▶ Runtime: 188 mins
- ▶ IMDb rating: 8.10/10
- ▶ Movies.go.com Average Reader Rating: 4.62/5
- ▶ Add to Watch list

The Green Mile
Tom Hanks, David M...
Best Price $0.72
or Buy New

Buy from

Privacy Information

Persuasion

- Recommender technologies can be interpreted as persuasive technologies in the sense of Fogg:

  - *"Persuasive technology is broadly defined as technology that is designed to change attitudes or behaviors of the users through persuasion and social influence, but not through coercion"* (Fogg 2003)

- This interpretation is admissible primarily if recommendation technologies are applied with the goal of supporting (not manipulating) the customer in finding the product that fits his or her wishes and needs

- Obviously, persuasive applications raise ethical considerations, as all of the effects mentioned here could be applied to stimulate the customer to purchase items that are unnecessary or not suitable

Discussion and summary

- Research has clearly pointed out that preference stability in decision processes does not exist

- Various forms of an online users' purchasing behavior were described

- The understanding of online users' purchasing behavior is of high importance for companies

- This purchasing behavior can be explained by different models of human decision making

- The nonexistence of stable preferences led to the development of different alternative decision models

- By taking the different models of human decision making into account, recommender systems are able to influence humans' decision process

Literature

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