

16. 8. Feature-Rich Recommender Systems

Background

- Interaction data
 - The most basic **indication** of users' **preferences** and **interests**
 - Usually extremely **sparse** and can be **noisy at times**
- Integrate side information to resolve sparseness
 - Features of items
 - Profiles of users
- Click-through rate (CTR) for online advertisement recommendations
 - **Targeted advertisement** services are often framed as recommendation engines
 - CTR is an important signal that indicates the **effectiveness of prediction algorithms**
 - Targeted Ads systems, general item (movies, news, products), email campaign, search engine
 - Closely related to user' satisfaction, conversion rate, setting campaign goals

$$CTR = \frac{\# Clicks}{\# Impressions} \times 100\%$$

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An Online Advertising Dataset

- Online advertising
 - With the **considerable advancements** of Internet and mobile tech
 - Become an **important income resource** and generates vast majority of revenue in IT industry
- Important to display **relevant** advertisements
- Casual visitors can be converted into **paying customers**
- Target variables are usually expressed as clicked (1) or not (0)

```
(array([ 143.,  145.,  227.,  238.,  957., 1250., 1471., 1566., 1624.,
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 [1.0])
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