CS-4053 Recommender System

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Lecture 11: Context-aware Recommendations

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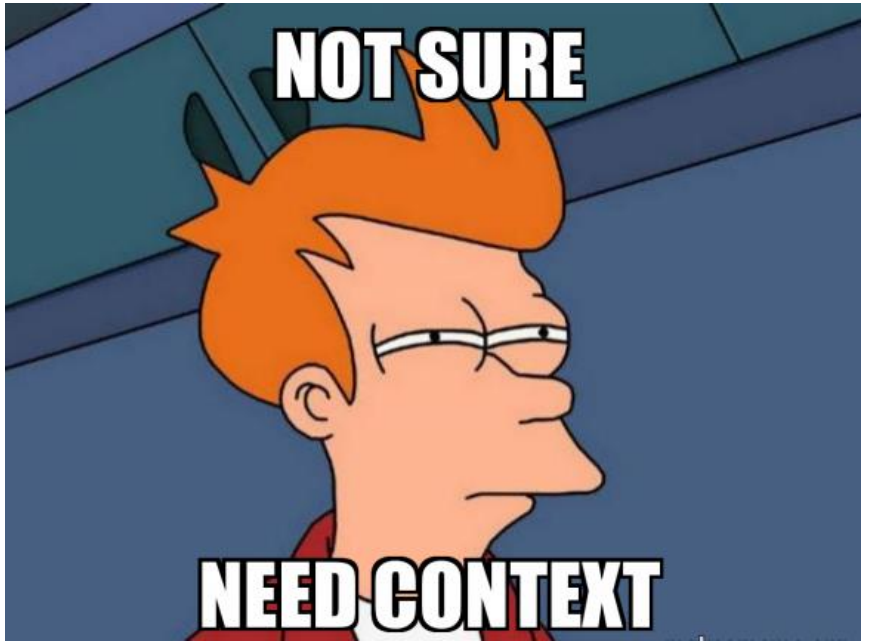
Context-aware Recommendations

- **Context** is an important factor in personalized recommendations



Context-aware Recommendations

- **Context** is an important factor in personalized recommendations

- The two different views of context are:
  - **Representational**: The attributes that do not change over time
    e.g. first language, date of birth, siblings
  - **Interactional**: An active relation between attributes and user activity
    e.g. budget, music taste

Contextual Knowledge

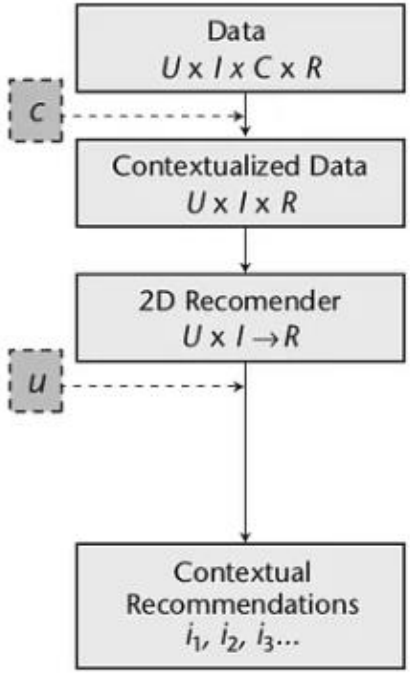
- The knowledge about user context may be:
  - **Fully Observable**: The contextual factors are known explicitly.
  - **Partially Observable**: Only some information is known explicitly.
  - **Unobservable**: No explicit information. Needs to be modeled using latent variables.

Context-aware Recommendations: Paradigms

- Three different types of architectures for using context are:
  - *Contextual Pre-filtering*
  - *Contextual Post-filtering*
  - *Contextual Modelling*

Contextual Pre-filtering

- Context is used to select some set of data and then predict like a traditional recommender system.



Contextual Pre-filtering

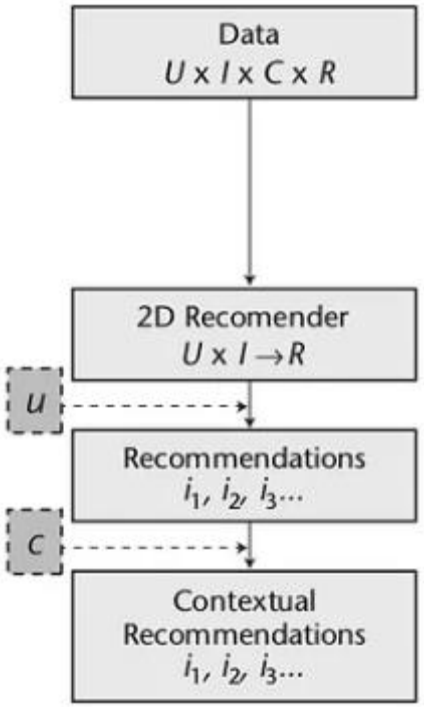
- Context is used to select some set of data and then predict like a traditional recommender system.

  Example: *If someone wants to watch a movie on Saturday, then only use data (movies) that were rated on Saturdays*

- **Advantage:** Minimizes computational cost
- **Disadvantage:** We lose serendipity

Contextual Post-filtering

- Ratings are predicted and then the results are filtered using the context.



Contextual Post-filtering

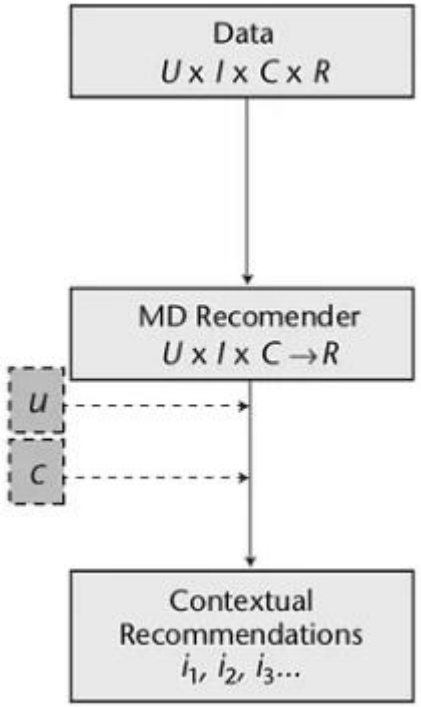
- Ratings are predicted and then the results are filtered using the context.

  Example: *If someone wants to watch a comedy movie, then generate recommendations over all movies, then filter out/push back all other genre (assign weights)*

- **Advantage:** Recommendations can be ranked with respect to the context
- **Disadvantage:** Does not allow for performance evaluation of recommendation model

Contextual Modelling

- The context is used right in the model. It is more complex and could be implemented by multiple machine learning models



Contextual Modelling

- The context is used right in the model. It is more complex and could be implemented by multiple machine learning model

- Contextual variables are added as dimensions to our data *e.g. movie studio, time period, country*

- **Advantage:** More accurate context-driven recommendation
- **Disadvantage:** Difficult to implement in practice