ACCURATE PERSONALIZATION OF CATCH-UP TV SERVICES

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ABSTRACT

Web-based catch-up TV services allow users to watch programs at their favoured time and device and are revolutionizing the existing TV watching habits. With the increasing offer and demand for catch-up TV, it has become evident that there is a need for personalised recommendations that will help users to pick programs of interest from a large collection of available content.

We have studied the watching patterns and recommendation approaches for catch-up TV domain using a large-scale dataset gathered by an Australian catch-up TV services provider. We have identified meaningful behaviour stereotypes and developed an accurate hybrid recommender.

CATCH-UP TV

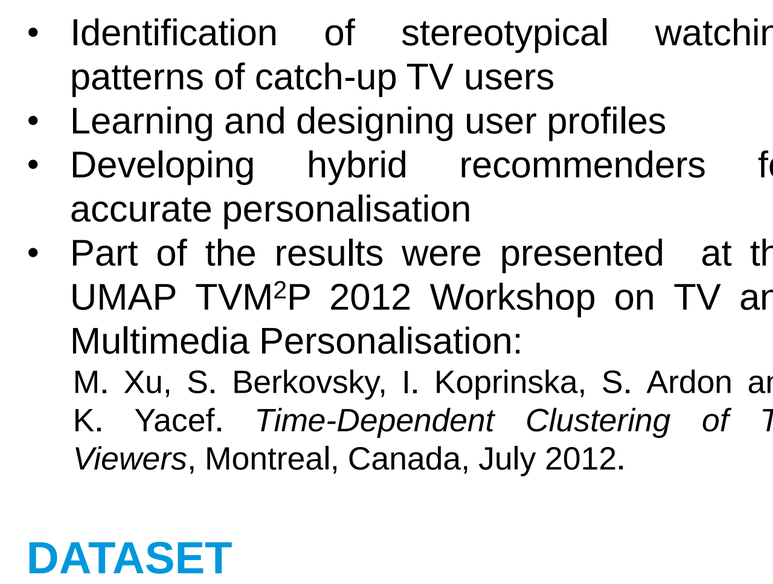
- A type of video-on-demand service
- Content is only available for a period of time
- Allows audience to watch TV programs that they have recently missed
- Run by TV network broadcasters via web portal online and accessible from a variety of devices

CONTRIBUTION

- Identification of stereotypical watching patterns of catch-up TV users
- Learning and designing user profiles
- Developing hybrid recommenders for accurate personalisation
- Part of the results were presented at the UMAP TVM^{2}P 2012 Workshop on TV and Multimedia Personalisation:
  M. Xu, S. Berkovsky, I. Koprinska, S. Ardon and K. Yacef. *Time-Dependent Clustering of TV Viewers*, Montreal, Canada, July 2012.

DATASET

- From a leading Australian TV broadcaster
- Captured usage logs for a period of 207 days from 7th February to 31st August 2012:
  - more than 26 million views
  - 2.86 million unique users
  - 11,699 unique programs



Number of views and users

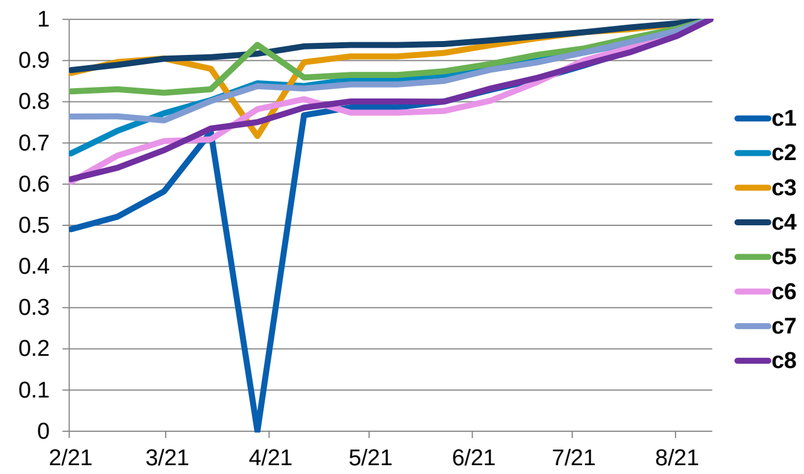
STEREOTYPICAL WATCHING PATTERNS

- 12 categories of programs in total, e.g. drama, sport, documentary, children's etc.
- We used the K-means clustering algorithm to identify 8 distinct clusters of users

cluster	1st category		2nd category		3rd category		4th category		size
	category	score	category	score	category	score	category	score	
c1	children	0.45	drama	0.21					11727
c2	comedy	0.41	drama	0.14	panel	0.14	documentary	0.12	29553
c3	children	0.87							19317
c4	pre-school	0.93							20346
c5	drama	0.66							33893
c6	documentary	0.32	lifestyle	0.24	comedy	0.11	drama	0.10	31680
c7	news	0.45	documentary	0.12	panel	0.12			9532
c8	pre-school	0.52	children	0.21					10749

Watching patterns associated with each cluster

- The stability of the clusters over time was analysed: clusters with only a few dominant categories were formed accurately at the beginning and were more stable over time

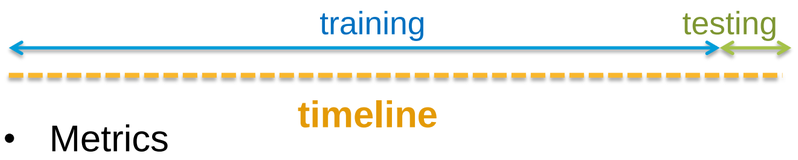


Stability of clusters

EVALUATION

Offline Analysis

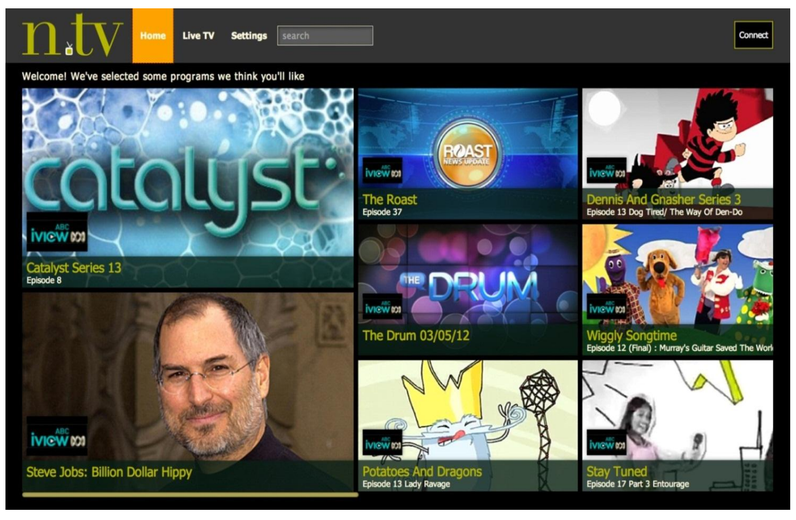
- Training and Testing Data



- Metrics
  Precision: quality of recommendations
  Coverage: sufficiency of recommendations

Planned Online User Trial

- 12-month with a social TV prototype
- Around 2000 student users are involved
- Access to live and catch-up TV services
- Data are gathered during the trial
- Help in evaluating the accuracy of the user models and recommendation approaches



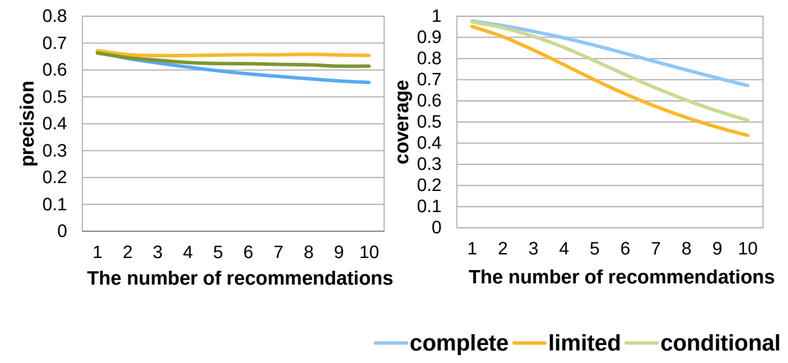
Snapshot of the social TV prototype

HYBRID RECOMMENDER

User Profile

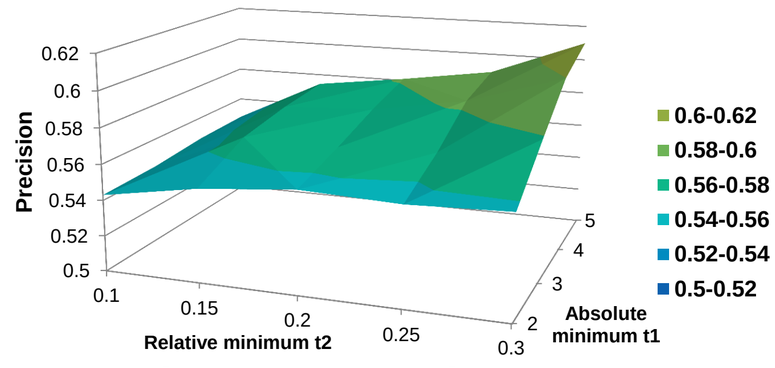
Three candidate user profiles were evaluated using the same recommendation approach:

- User profile using complete usage logs
- User profile using only recent usage logs
- User profile with conditions



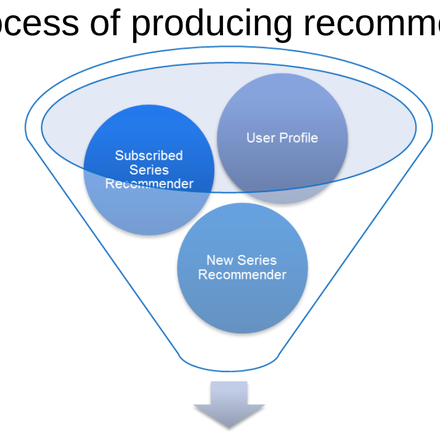
Subscribed Series Recommender

- Produces a list of subscriptions
- Recommends from subscription list
- User *u* is subscribed to series *s* when:
  - *u* watched more than *t1* episodes of *s* or
  - *u* watched over *t2* (percentage) of all episodes in *s*
  - Chose the with high precision that also has good coverage



New Series Recommender

- Bring serendipity to users
- Recommend unsubscribed series
- Candidate recommendation approaches:
  - Generic user-based recommender
  - Generic item-based recommender
  - Cluster-based recommender
  - Slope-one recommender
  - SVD recommender
- The process of producing recommendations



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