Catch-Up TV Recommendations:
Show Old Favourites and Find New Ones

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TV Content Discovery

- Motivation: Web + social Web + IPTV + connected TV = overwhelming choice
  - Video on demand
  - Broadcast TV
  - Catch-up TV
  - YouTube, Facebook, Twitter, …
- How do users discover relevant content?
  - Search – content they know and are looking for
  - Discovery – content they do not know yet but may like
    - Personalisation and recommendations
- Industry project with Australian national broadcaster

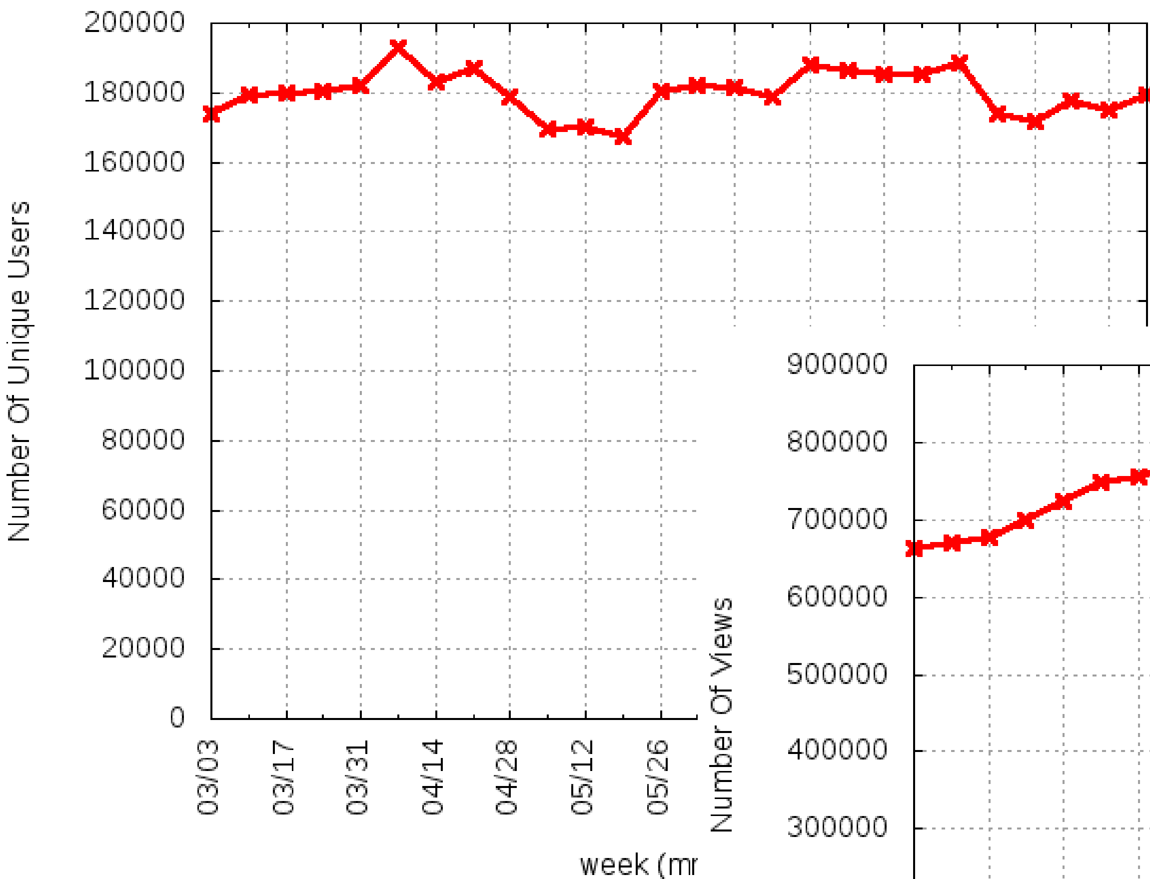
Catch-Up TV Content Discovery

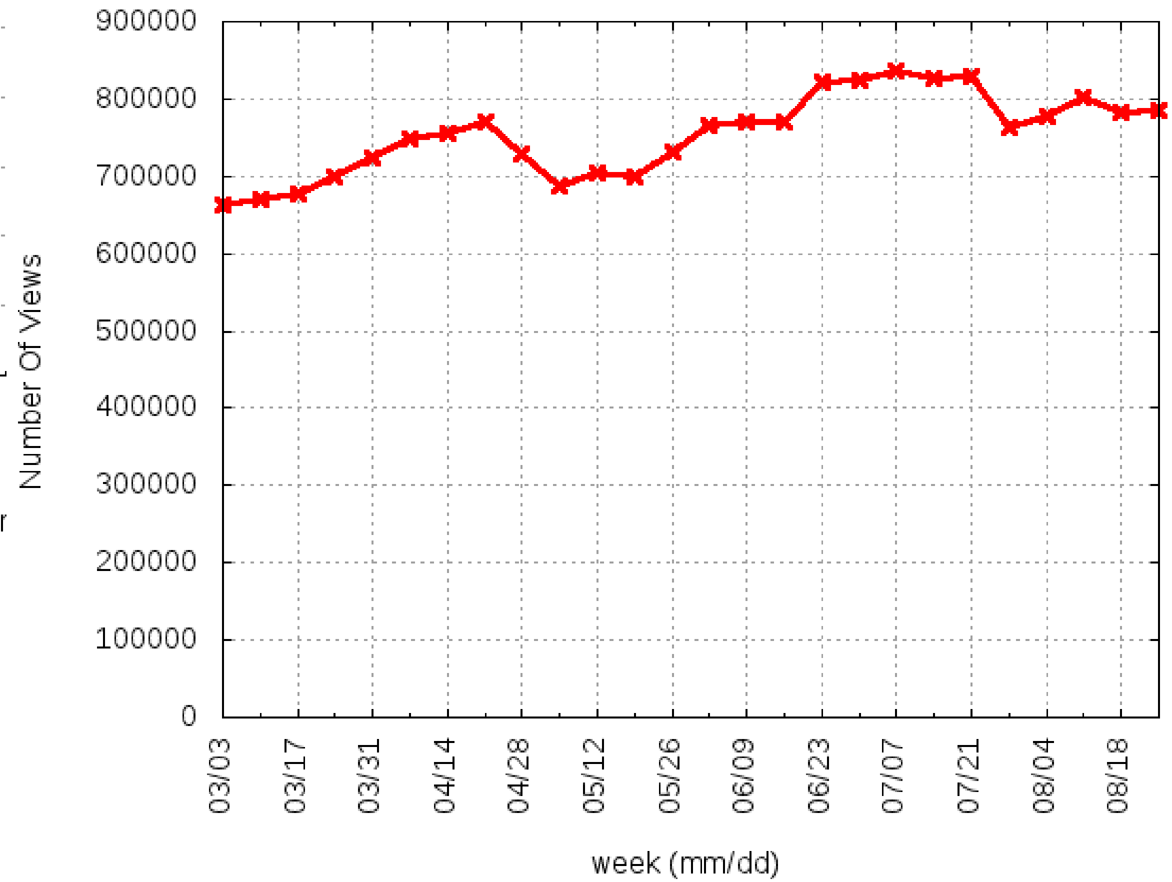
- Dynamicity over time
  - Items appear and retire regularly
  - New item cold start problem
- Unreliable user data
  - Small fraction through catch-up TV
  - Imprecise consumption logs
    - Composite: multiple users sharing a device
    - Cross-device: one user with multiple devices
- This work
  - Exploratory study into user viewing behaviour
  - Recommendations of catch-up TV programs

Dataset

- Past logs
  - 184 days of Australia wide viewing logs
  - 19.8M views [play clicks only]
    - 2.02M unique users
    - 9.1K unique programs viewed
    - Dates (no timestamps)
  - Limited program information
    - Title
    - Publication/retirement date
    - Category
      - Art, children (6-15), comedy, documentaries, drama, education, lifestyle, news, panel, preschool (<6), children reruns, shop, sport.
  - User information
    - Browser cookie id

Overall Characterisation





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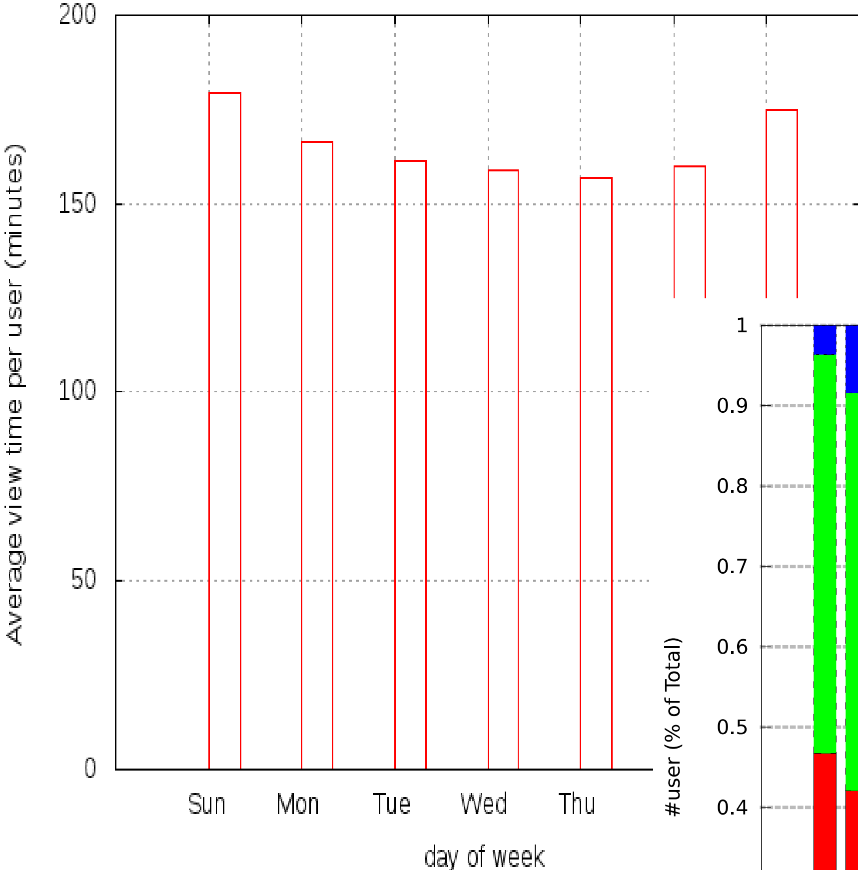
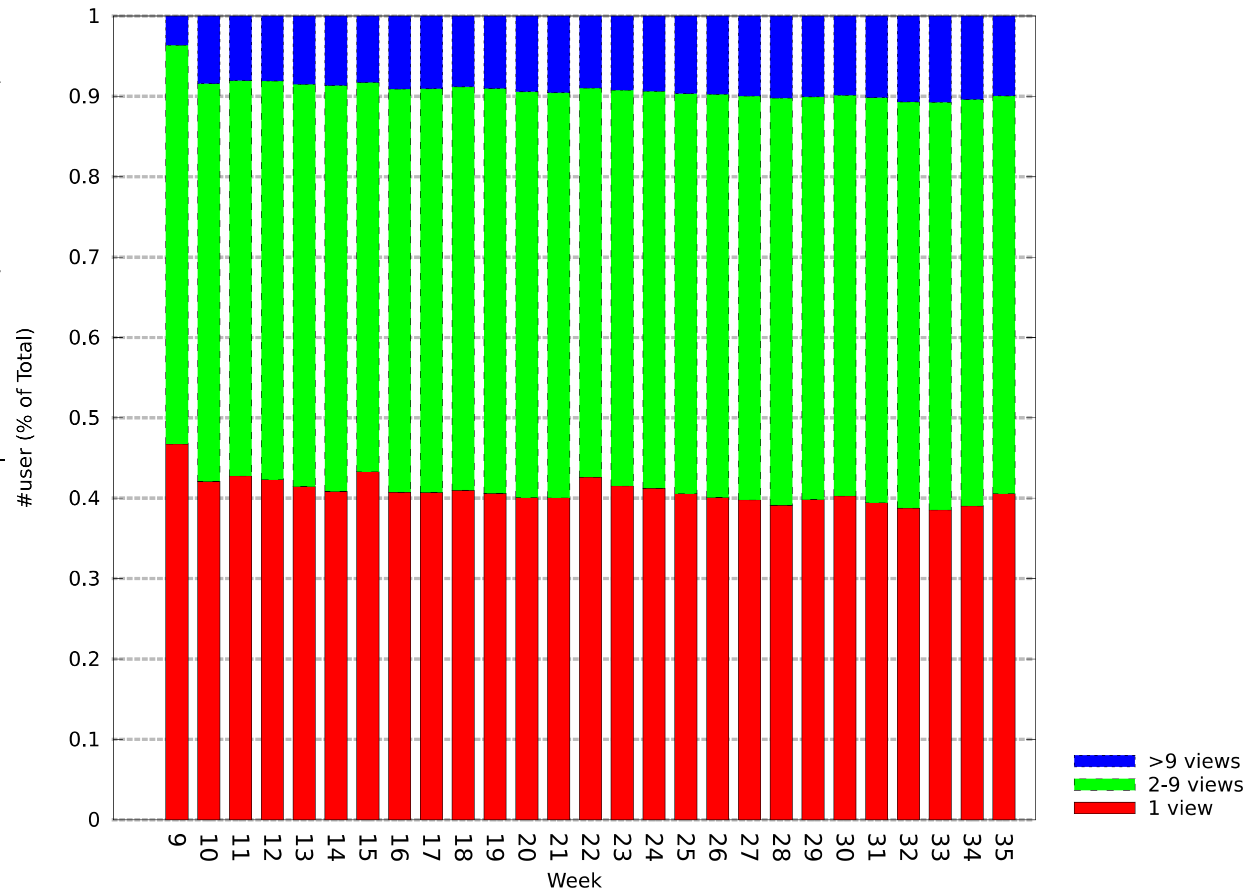
User Characterisation



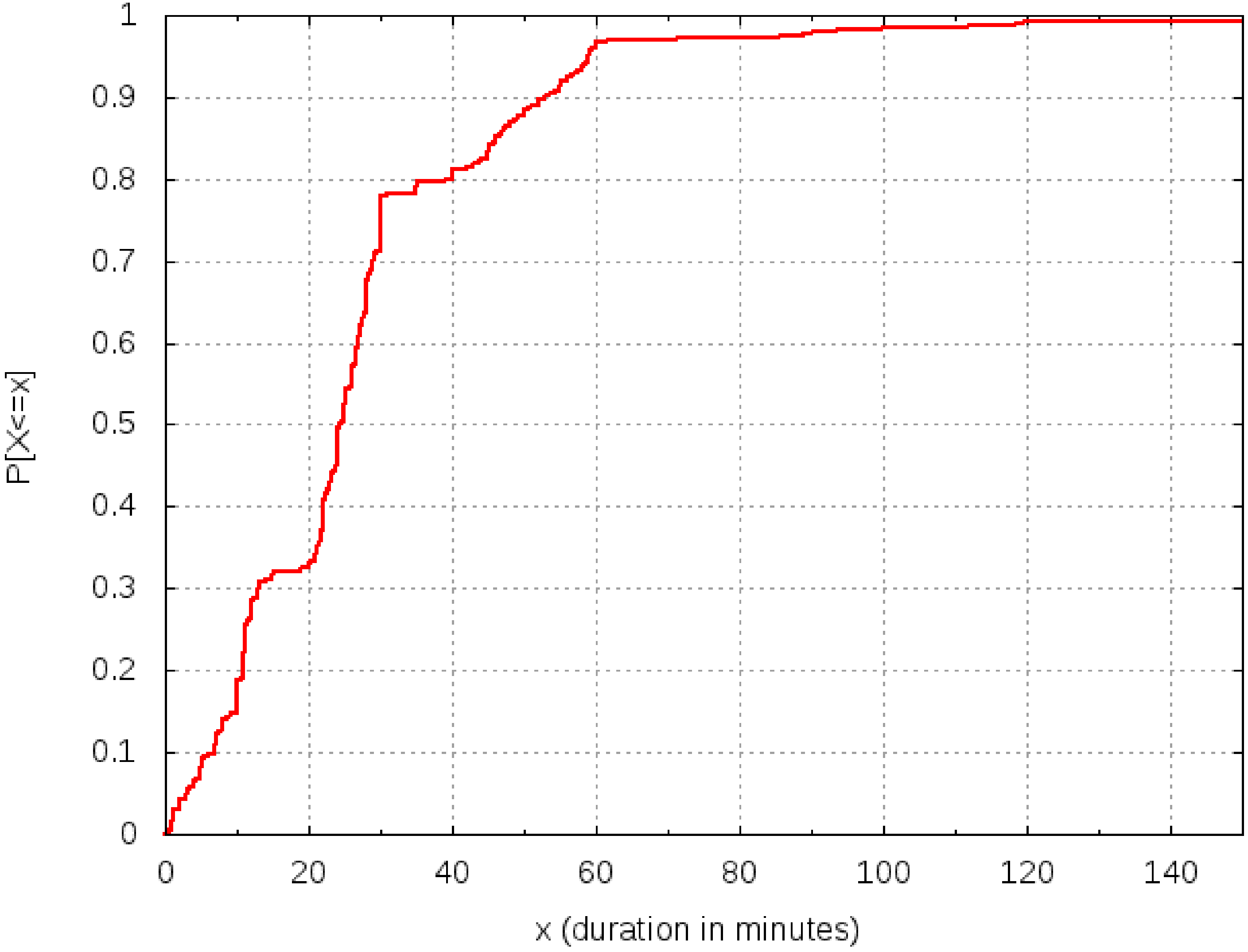


User Clustering

- With respect to frequency of categories
  - Distance based clustering
  - Optimised for cohesion and separation
- Identified clusters
  - Some have a small number of dominant categories
    - c8, c5, c1
  - Others are less pronounced

num	1st category		2nd category		3rd category		4th category		size	week
	category	score	category	score	category	score	category	score		
c1	drama	0.734							27,740	1
c2	docu	0.489	lifestyle	0.128	comedy	0.105			8,175	4
c3	lifestyle	0.500	docu	0.113	drama	0.107	comedy	0.106	8,462	2
c4	children	0.514	drama	0.158	preschool	0.137			9,332	3
c5	preschool	0.868							16,755	1
c6	panel	0.253	drama	0.169	comedy	0.155	lifestyle	0.108	14,698	9
c7	comedy	0.540	drama	0.139					11,485	1
c8	children	0.920							13,514	1

Content Characterisation



Content Characterisation

- Vast majority of programs are linked
  - Series, shows, news, sport, …
  - We refer to these as *series* and *episodes*
- Recommend series rather than individual episodes
- score(user u, series s) =
  number episodes of s that u watched /
  number episodes of s available since u joined
- subscription(user u, series s) = 1 iff
  score(u,s) > α && number of watched episodes > β
- Two recommendation use cases
  - **Subscribed**: recommend series a user regularly watches
  - **New**: recommend series a user does not watch but may like

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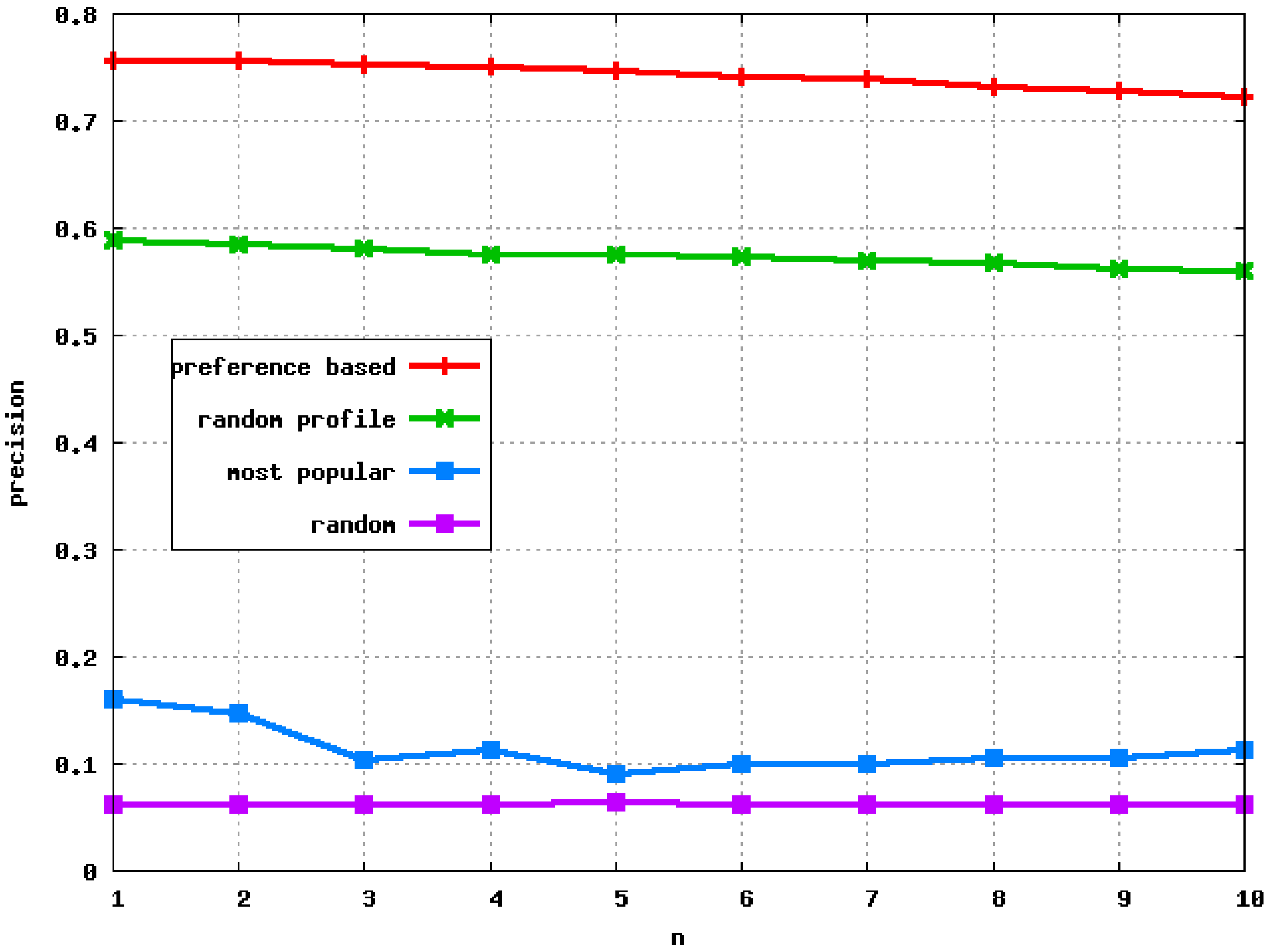
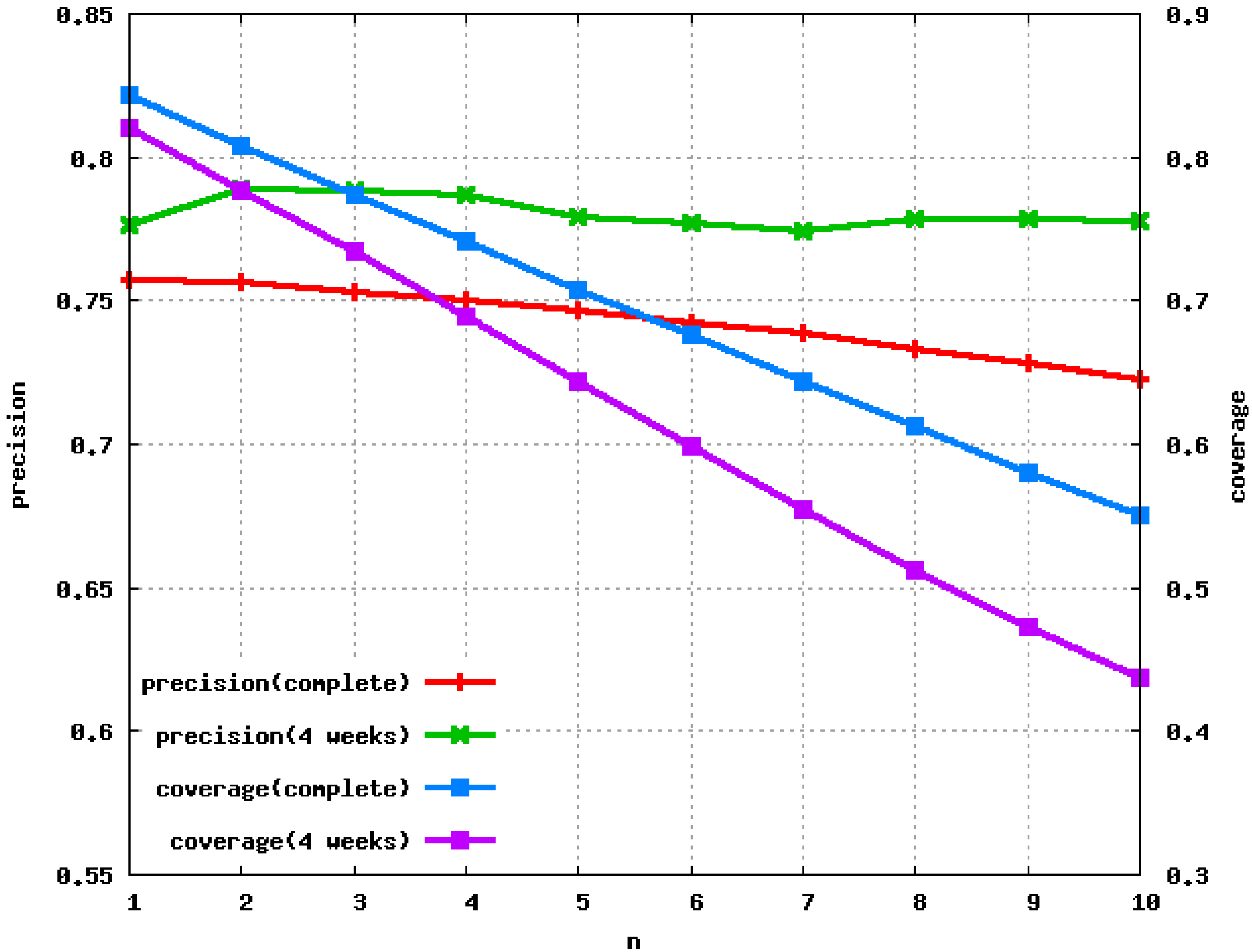
Subscribed Series Recommendations

- Rule-based recommender: if subscription(u,s)=1 && exists episode of s not watched by u then recommend s
  - According to score(u,s)
  - Randomly selected amongst s s.t. subscription(u,s)=1
- Non personalised recommendations
  - Most popular across the entire community
  - Randomly selected
- Methodology
  - Training / test split: first 136 days / 3 immediately following days
  - Ground truth: s watched by u during the test period
  - Metric: precision

Subscribed Series Recommendations



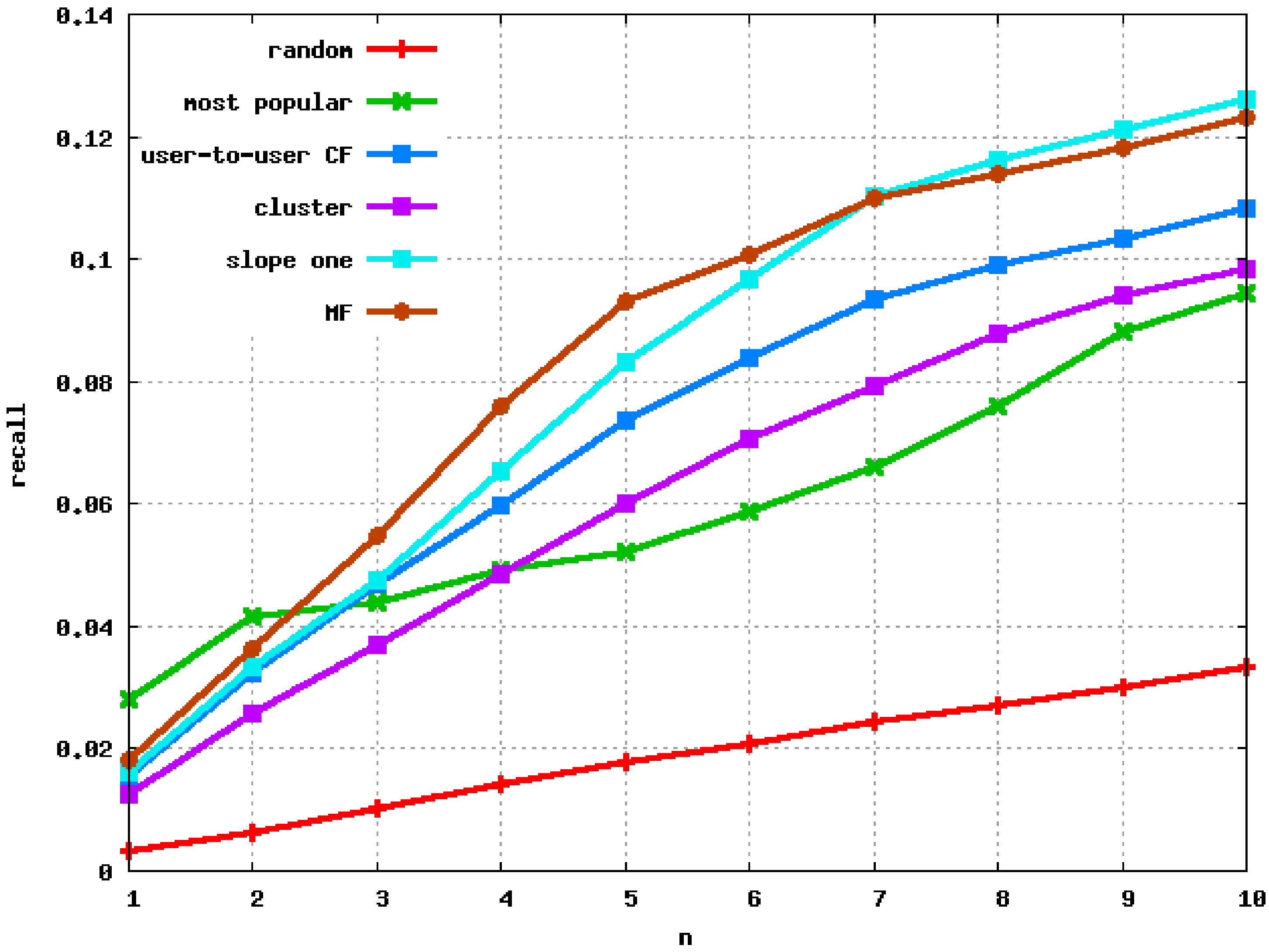
Subscribed Series Recommendations



New Series Recommendations

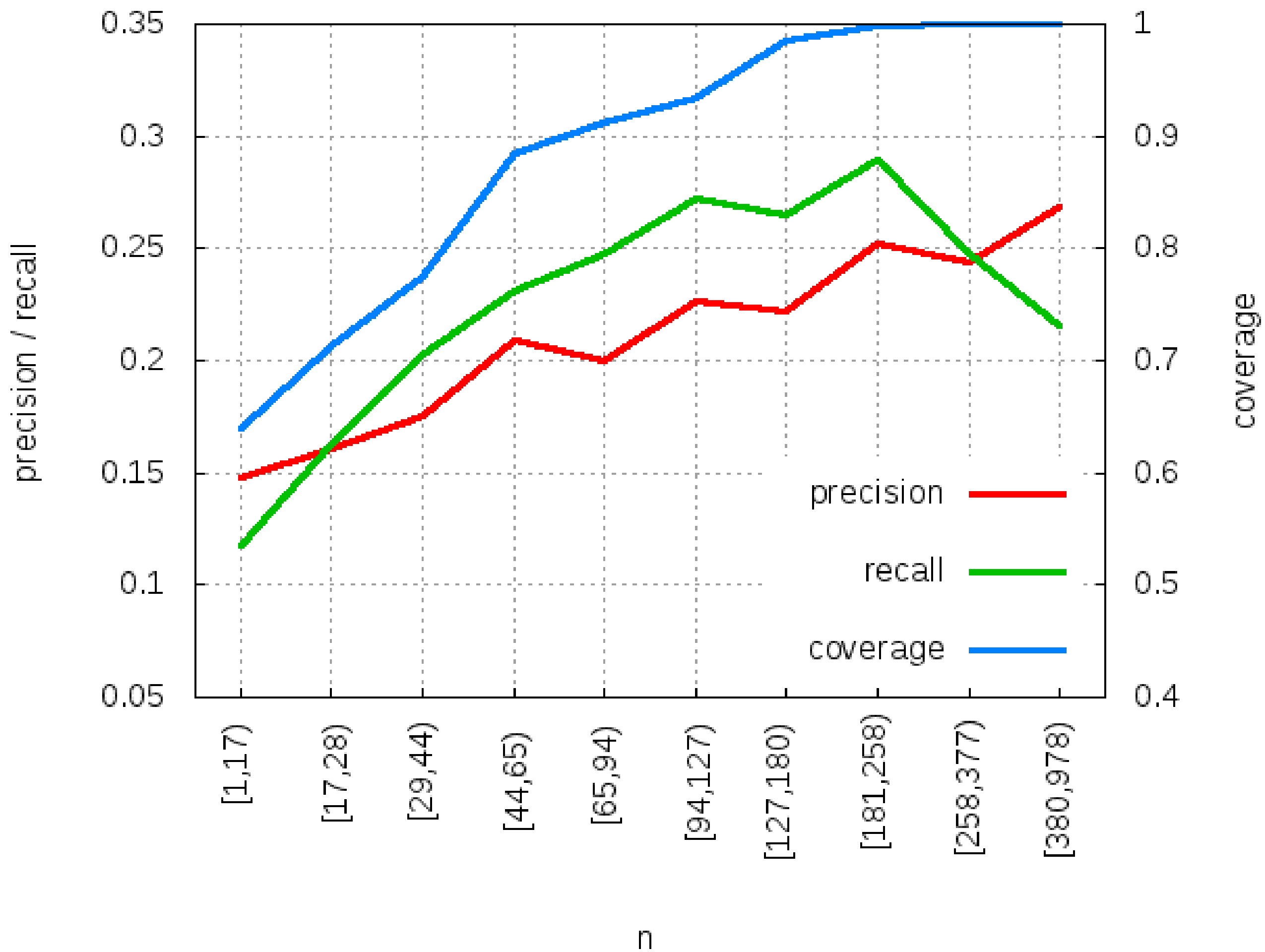
- Existing model- and memory-based algorithms
  - User-to-user collaborative filtering
  - Cluster-based recommendations
  - Slope-one recommender
  - Matrix factorisation
- Non personalised recommendations
  - Most popular across the entire community
  - Randomly selected
- Methodology
  - Training / test split: first 136 days / remaining days
  - Ground truth: u subscribed to s during the test period
  - Metric: recall

New Series Recommendations



Hybrid Recommendations

- Mix the *outputs* of the two recommenders
  - 5 from subscribed and 5 from new recommender



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Summary

- Catch-up TV recommender using real-life 6 months logs
- Two use cases evaluated
  - Subscribed: recommendations for already watched content
    - 75% accuracy with simple rule based recommender
    - Short term profile more accurate but loses coverage
  - New: serendipitous recommendations for unfamiliar content
    - 12% accuracy with state-of-the-art MF
  - New use case is inherently harder
- Future work
  - Identify composite and cross-device profiles
  - Recommendations for groups of viewers
  - Pilot trial and live user study

Thank You!