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Abstract

Personalised recommendations have become an important feature of many online services. The emergence of IPTV services raises the possibility of delivering personalised recommendations for TV and radio programmes directly to consumers. Many of the emerging standards for IPTV use the TV-Anytime metadata standards for their content guides. This document describes how the latest versions of the TV-Anytime specifications provide improved support for recommender systems and personalised recommendations.

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1 Introduction

Personalised recommendations have become an important feature of many online services. The emergence of IPTV services raises the possibility of delivering personalised recommendations for TV and radio programmes directly to consumers. Many of the emerging standards for IPTV use the TV-Anytime metadata standards for their content guides. This document describes how the latest versions of the TV-Anytime specifications [1, 2] provide improved support for recommender systems and personalised recommendations.

Earlier versions of TV-Anytime provided many data structures and features that are useful for recommender systems. For example, TV-Anytime has always provided support for the signalling of user preferences which can be used for the personalisation of services. However, work in the MyMedia collaborative research project [3] identified several deficiencies in the support for recommender systems:

- Many modern recommender systems use collaborative filtering techniques which require the collection of user feedback. Whilst TV-Anytime supported the collection of implicit feedback (e.g. viewing actions) there was no support for the collection of explicit feedback (e.g. programme ratings).

- TV-Anytime has also always provided the ability to request and deliver non-personalised promotions. However, there was no explicit support for personalised recommendations.

The latest versions of the specifications address these deficiencies, providing support for explicit feedback and introducing the ability to request and deliver personalised recommendations.

This document describes each element of TV-Anytime which is relevant to recommender systems and illustrates how they can be used to deliver personalised recommendations.

2 Implicit feedback

Implicit feedback collected from users can be signalled using the TV-Anytime Usage History Description Scheme described in Section 6.5.1 of the metadata schema specification [1]. The associated ActionType Classification Scheme defined in Annex A.2 includes PlayRecording and PlayStream actions which are of most interest for collaborative filtering based recommender systems.

3 Explicit feedback

In the latest version of the TV-Anytime metadata schema specification the Usage History Description Scheme has been extended to support explicit user feedback, in the form of individual programme ratings.

The UserActionType defined in Section 6.5.1.4 has been extended to include an optional rating field as shown in Figure 1. This rating field can describe a rating value and the characteristics of the rating scheme (lower limit, upper limit, etc).

The optional rating field is used in conjunction with a new "RatingAction" action type which has been added to the ActionType Classification Scheme defined in Annex A.2.
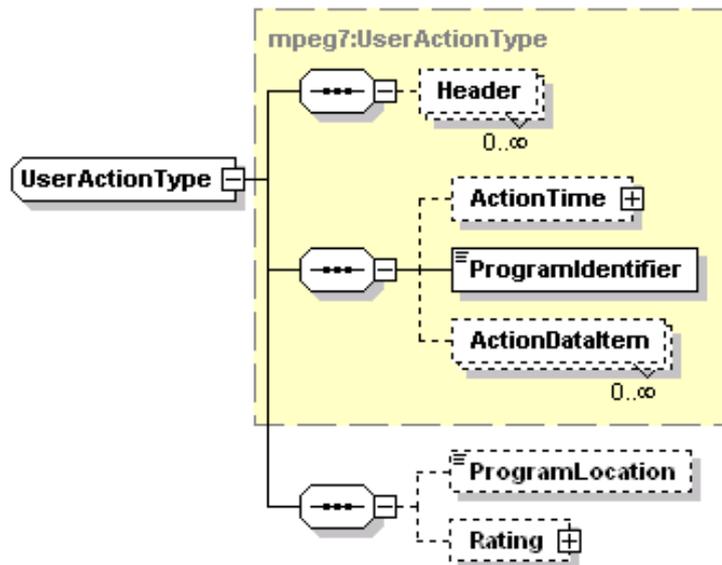
Figure 1: The TV-Anytime UserAction Element

To signal a list of rating actions for a specific user the ActionType in the UserActionList is set as a RatingAction and the UserAction sub-elements each specify a ProgrammeIdentifier and include a Rating field.

4   Personalised recommendations

Non-personalised promotions can be signalled using the Review element of the Media Review Description Scheme defined in Section 6.3.8 of TV-Anytime metadata schema specification.

The latest version of the metadata schema introduces a new Target field to the Review element as shown in Figure 2 which carries a user identifier.
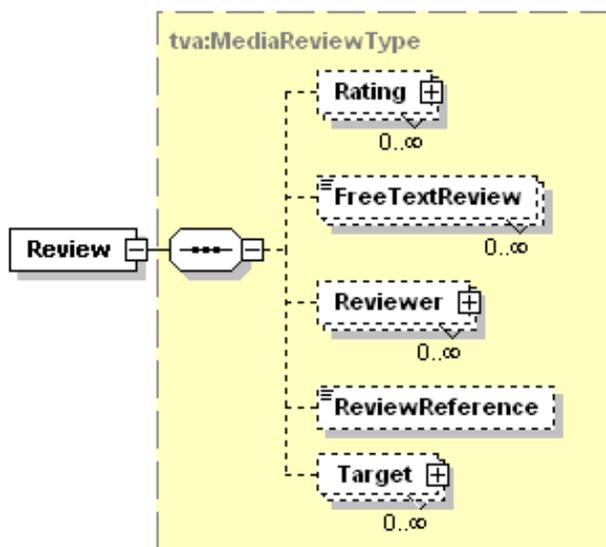

Figure 2: The TV-Anytime Review Element

The presence of the optional Target field indicates that the Review element is a personalised recommendation rather than a non-personalised promotion and identifies the intended recipient.

This allows the Programme Review Table to deliver both non-personalised promotions and personalised recommendations for one or more consumers and allows receivers to distinguish and present these as appropriate.

5   Requesting personalised recommendations

The TV-Anytime bi-directional delivery specification [2] defines a SOAP based protocol for requesting programme and schedule information. In this protocol all query fields must be identified using a fieldID, which is a syntactic shortcut that provides an alias for the full XPath expression that identifies the field.

The latest version of the specification provides a new 'Target' fieldID in the FieldID definition list in Annex B.2 which references the Target field in the Review element shown in Figure 2. Personalised recommendations, rather than non-personalised promotions can therefore be requested by including the Target field as a request constraint.

For example, the following query requests five personalised recommendations from within the "Fiction/Drama" genre for a specified user. The response would be ordered so that the highest rated programmes appear at the top of the list.

```
<get_Data maxPrograms='5'>
  <QueryConstraints>
    <PredicateBag type='AND'>
      <BinaryPredicate fieldID='Genre'
        fieldValue='urn:tva:metadata:cs:ContentCS:2010:3.4' />
      <BinaryPredicate fieldID='Target' fieldValue='1072951' />
    </PredicateBag>
  </QueryConstraints>
  <RequestedTables>
    <Table type='ProgramReviewTable'>
      <SortCriteria fieldID='tvaf:RatingValue' order='descending'/>
    </Table>
  </RequestedTables>
</get_Data>
```

The rating values in this context would be the personalised rating predictions provided by the recommender system.

6   Conclusions

The latest versions of the TV-Anytime specifications provide improved support for recommender systems and personalised recommendations and define data formats that can be used in both business-to-user and business-to-business applications.

In the business-to-user context, many emerging IPTV standards use TV-Anytime to support their content guides and therefore the new features will help these standards support personalised recommendations.

In the business-to-business context, the new features provide a standardised way to exchange content metadata, user feedback and personalised recommendations. This encourages the possibility that businesses will be able to compete to provide recommender services to the media industry, thus encouraging innovation in recommender system development.

7   Acknowledgements

8 References

[1] ETSI TS 102 822-3-1 V1.6.1 (2010-07): Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 - Metadata schemas.
http://tech.ebu.ch/docs/metadata/ts_1028220301v010601p.pdf

[2] ETSI TS 102 822-3-1 V1.6.1 (2010-07): Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 - Metadata schemas.
http://tech.ebu.ch/docs/metadata/ts_1028220301v010601p.pdf

[3] http://www.mymediaproject.org/