

Description

Computer-implemented method for generating a sorted list of rich media product reviews of a social commerce platform

FIELD OF THE INVENTION

The present invention concerns a method for generating a sorted list of rich media objects like user-generated product reviews to be presented to a user of an electronic social commerce platform and a data processing apparatus, a computer program and computer readable medium according to the independent claims.

BACKGROUND OF THE INVENTION

Moderne e-commerce systems rely on intelligent product reviews based on individual preferences of the users. Properly designed and well-executed personalized services enable e-commerce service providers to capture the unique needs and preferences of individual customers, help them build customer loyalty and strengthen their competitiveness in the marketplace. The expectation of customers and users is to receive customized and personalized recommendations of meaningful and convincing product reviews. Generic recommender principles are known in many e-commerce platforms. Also well-known are text-based reviewing and rating functions where users can describe advantages and disadvantages of a product.

Successful recommender systems also rely on a high degree of relevancy of recommendations to a user to make purchase decisions. If a recommendation is not relevant and not helpful, a user may be annoyed and disappointed. To increase relevancy, several different influencing factors can be considered with an increasing degree of complexity for calculation and data processing. Examples are browsing history, purchasing history and/or individually set preferences for interests. At the same time users expect a user-friendly and fast frontend which supports input and output processes and communication within a community. Rich media content like

videos are increasingly used to review products and services. Videos of user-generated reviews of products offered on a social commerce platform provide a convenient possibility for users to be broadly and comfortably informed about features and advantages of products and services and make informed decisions.

One of the technical challenges for operators of an e-commerce or social commerce platform is a sufficient performance, in particular speed and processing time for frontend content. When considering a higher number of influencing factors as well as rich media content, a recommender engine requires significant processing resources and therefore time. Known systems generate recommendations to users, however, relevancy often lacks due to insufficient or ineffective prioritization of suitable media database items and long processing times. US10223727B2 discloses an e-commerce recommendation system that identifies a set of recommended products with similar visual features.

Due to the rapid increase of available media content volumes, the processing resources to effectively select and sort relevant content is increasing at the same time. It would therefore be desirable to improve existing systems for more effective identification, prioritization, and effective generation of product recommendations in order to achieve high relevancy of recommendations and user satisfaction.

DESCRIPTION OF THE INVENTION

It is therefore an object of the present invention to provide an improved method for generating a sorted list of media object recommendations, in particular links to user-generated rich media product reviews, providing a higher relevancy and improved processing performance compared to solutions known from the state of art. The object is solved by a method for sorting a list of media objects links to be recommended to a user of an electronic / social commerce platform according to the independent claims. The dependent claims describe useful embodiments of the invention.

According to the invention, a method for sorting a list of media object links to be recommended to a user of an electronic social commerce platform is proposed. The media objects comprise user-generated rich media product reviews. A rich media object can be any type of media that uses media formats beyond text like video or

video comparable formats, 3D media, 4D media, 3D/4D images, holographic, virtual reality, augmented reality, combinations thereof, or other electronically distributable media beyond plain text and simple images that are capable to describe features and advantages of a product or service and/or can provide an opinion of a user concerning a product. This can comprise, for example, Internet links, websites, any application such as mobile applications on smartphones, or any other suitable rich media type.

A user-generated product review refers to rich media content that is generated by any user of a social selling platform in his role as peer group member of platform users. Reviews and testimonials of other peer users and their opinion about products are often considered more trustworthy and credible than official advertising from manufacturers or service providers. Product reviews can also serve as learning material for users how to use a product. Media object links refer to the aspect that not the media file as such must necessarily be accessed but a link such as a storage address, web address, a clickable or selectable hyperlink on a website or application, or similar is used to reference or point to the original media file. Rich media objects, for instance, product review videos or testimonials, can be directly linked to a specific product dataset which can be stored in a product database of the social commerce platform.

The method comprises a step of retrieving a list of user-specific tags from a user database. Usually, e-commerce platforms comprise a user database storing essential information about registered users. When registering, users can select and input interests, preferences, and other individual information to customize and personalize the use of the platform. The tags to be retrieved were previously selected or entered by the user and can, for instance, be predefined interest categories like spare time activities, profession, sports, fashion and alike that can be selected using checkboxes. Accordingly, these tags are adapted to describe the user's preferences and interests.

In a further step the method concerns a generating of a user specific list of media object links by retrieving a maximum predefined number of media object links from a media database. Such media content like video files are stored in a media database of the platform or in other accessible external databases. As one of the challenges is the increasing large amount of available media content and files, only a limited

number of potentially relevant links to media objects are retrieved. In other words, instead of processing or considering the entire set of available media files or media objects, only a limited set of media objects and/or the corresponding links are processed.

According to an embodiment of the invention, the predefined number of media object links to be retrieved from the media database is between 50 and 150 media objects, preferably 100 media object links. It could be shown that this range of media object links provides a significantly improved performance and faster processing. According to an example, less the predefined number of media object links are retrieved. This can, for instance, be the case if users have selected no or not sufficient tags or not enough media objects are tagged with the relevant tags. Another additional requirement for retrieving relevant media object links is that the media objects were not previously selected by the user. This can, in other words, be video objects that have not been watched or selected yet by a user and are therefore new and/or unknown to this user.

The predefined number of media object links comprise links to the most recently published and/or created media objects in the media database. In other words, only the newest media objects are considered whereas older content is prioritized lower. In addition to the publication or creation date, other criteria such as modification date, viewing date, number of retrieval requests, and various timestamps can be considered. According to another example, media objects can be specifically tagged to be selected for retrieving, for instance, for product promotions or similar. The retrieved media object links can be stored into a separate list.

For each listed and retrieved media object an overall rating of all users of the user database is retrieved. For instance, a product video can be rated by other users and based on that an overall average rating can be obtained and calculated. Purpose is to consider an opinion of the entire platform community related to this product, particularly to this media object promoting a product.

It is furthermore an idea of the invention to weight and prioritize the different tags a user has selected. For that purpose, a screen time tag quantifier based on a portion of screen time with media objects tagged with this tag in relation to a total screen time or reference screen time of the user is calculated. If a user, for instance, watches predominantly videos concerning a specific interest, the corresponding user

tag is prioritized and weighted to a higher degree. According to an example, the total screen time is between 1 and 7 days. In an embodiment of the invention, the total screen time is one day. Based on typical browsing behavior and online time spent a total screen time in the proposed time ranges can reduce processing resources while maintaining a sufficient quality of the quantifier. A quantifier can be, for instance, a multiplier weighting the corresponding tag.

Applying the same principle, a purchases tag quantifier based on a ratio of user purchased products tagged with this tag in relation to a total number of products is calculated. Also, this quantifier can be, for instance, a multiplier weighting the corresponding tag. In an example, instead of considering a total number of products, a total turnover of certain products per user is used as a basis.

In another step, a media object community attractiveness quantifier is calculated by cumulating ratings of the media object by other users, wherein the other users are linked to the user in the user database. Other users can be so-called "friends" on the social commerce platform which a user knows or is linked or related to them. Such relationships can comprise different levels of relationships. According to an embodiment of the invention, only ratings of other users with a direct relationship with the user are considered. Advantage in this case can be seen in a high probability that similarities in interests and preferences are more likely compared to indirectly connected users over several levels or nodes.

In a subsequent step a recommendation ranking score of each listed media object is calculated by weighting the overall rating of the respective media object with a sum of the related combined tag qualifier and the related community attractiveness quantifier. An advantage is that a generic relevancy for a large group of users, for example all "likes" of a product video is individualized and adapted to the special interests and preferences of a specific user and allows a more precise assessment of the potential attractiveness of a media object to a specific user. The combined tag qualifier is the sum of the related screen time tag quantifier and the related purchases tag qualifier. This way both tag quantifier's can be considered in combination and can therefore improve the accuracy of the ranking score.

According to an embodiment of the invention, the combined tag qualifier is calculated by adding a weighted screen time tag quantifier and a weighted

purchased tag quantifier. For instance, if users purchase a product, a likelihood of relevancy of that tag may be significantly higher than screen time as users often randomly browse different product videos in a random sequence. In that case a multiplier can be applied to the tags to mathematically reflect the weighting.

The calculated recommendation ranking score is used as a basis for a subsequent step for sorting the list of media object links. As a result, the most relevant media object link is in a first or at least upper position of the list of recommendations. Results with lower ranking score values are also listed further down the list. This sorted list of media object links is then output and/or stored in a database. The list can be then forwarded to a frontend system to be presented to users.

According to an embodiment of the invention the weighting of the overall rating of the respective media object with the combined tag qualifier and the community attractiveness quantifier is based on a multiplication function and/or exponential function. In other words, linear or non-linear dynamics can be applied. An advantage can be that a clear distinction between relevant and less relevant media object links can be achieved.

In case that less than the predefined number of user-specific media objects meet the criteria of corresponding user tags and non-selection by the user for generating the list of media objects links, the method further comprises, according to an embodiment of the invention, the steps of generating a supplementary list of additional media object links containing links to media objects that were previously selected by the user. Furthermore, also according to this embodiment, the method comprises a step of sorting of the supplementary list by the previously calculated recommendation ranking score, wherein the sorting is carried out separately from sorting the first list of media object links. Advantage can be seen in a better calculating performance and lower complexity as this sorting process is processed separately. In a subsequent step, the media object links of the supplementary list are added or appended to the end of the list of media object links. In other words, the additional results are attached and supplemented to the end of the initial list of media object links leading to a final merged list of media object links.

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages of the invention will now be illustrated in more detail with reference to embodiments and the figures.

Fig. 1 shows basic technical aspects of a social commerce platform.

Fig. 2 shows essential technical building blocks of a social commerce platform according to the invention.

Fig. 3 shows a method for generating a sorted list of rich media object links to be recommended to a user of a social commerce platform according to the invention.

Fig. 4 shows a process with steps for calculating a recommendation ranking score according to the invention.

The reference symbols used in the drawings, and their meanings, are listed in summary form in the list of reference symbols. In principle, identical parts are provided with the same reference symbols in the figures.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Fig. 1 discloses basic aspects of a social commerce platform 10 implementation. In recent years electronic commerce platforms are evolving and continuously embracing social networking principles and features. Technical implementations of social commerce platforms 10 need to consider features supporting certain key aspects to make them successful. Typically, intelligent data analysis can be done based on historic and current user behavior and purchases. The use of artificial intelligence, in particular artificial neural networks and machine learning techniques allow classifications along with intelligent tagging. Based on this analysis recommendations of products and services can be done more accurately increasing a relevancy of the presented results. Highly relevant product recommendations increase the likelihood of purchase transactions.

As social media platforms are incorporated or dynamically linked to social commerce platforms 10 rating and reviewing functions for users can play a significant role. Search features and functions along with complex data analysis capabilities require substantial processing resources and smart algorithms to achieve a sufficient performance. Users expect both accuracy and relevancy but

also fast response times and great overall performance. User benefits such as commercial benefits, bonuses, and rewards need to be clearly and appropriately communicated as they act as motivators to retain customers on a platform over a longer term.

Another important aspect of a successful social commerce platform 10 is the ability to leverage the potential social relationships by integrating online community features. For example, the social commerce platform can be configured to offer an incentive for forwarding and sharing of rich media object links with other users of the platform. The incentive can be implemented by providing financial benefits like product pricing discounts to users when sharing relevant media object links or product review videos online with other users and friends within their community.

In Fig. 2 key shows, in a simplified way, technical building blocks of a social commerce platform 10 according to the invention. A user database 12 is adapted to store information of users of a social commerce platform 10. User information can be, for example, purchase transactions, user preferences and interests, selected content such as watched or accessed videos, audio or websites, relationships to other users and more. A media objects database 14 can be adapted to store and retrieve media content such as videos, audio recordings, documents, websites and similar media capable of providing information about a product or service.

According to an example, media objects can be referenced by links comprising logic link addresses pointing to file locations, file names, storage addresses or alike. In another example, media objects can be promotional product videos. Media objects can comprise additional meta information regarding ratings, attractiveness, number of accesses, and/or user information. Particularly, media objects can comprise tags for improved filtering related to interests, content, and other criteria. A stream service unit 16 provides functions for retrieving, playback and streaming, forwarding or generally handling of media object files. In the context of the current invention a sorting service unit 18 is provided. This sorting service unit 18 is adapted to perform all steps related to the sorting of a list of recommendations links to media objects.

The sorting service unit 18 generates a sorted list of media object links 22, also referred to as recommendations, to a user frontend 20 for displaying content and allowing interaction between the social commerce platform 10 and a user.

In Fig. 3 shows a method 100 for generating a sorted list of media object links 22. In a first step 110 a list of user specific tags is retrieved by a stream service unit 16. These tags are retrieved from a user database 12. In a following step 120, a list of videos previously watched or accessed by a user is retrieved. This list can be seen as preliminary or temporary list that serves as a basis for next steps like sorting. In many cases a history of accessed media files is stored along with a user in the user database 12. Information about browsing behavior, media files consumed and further specifics like duration of playback, number of requests of a media file can provide valuable information about a user's preferences and interests.

In step 130 this temporary list is sorted by the time of watching, in other words, the most recently watched videos are listed first. In an example, the most recently watched video is listed first to allow users to remember recent videos and related products and recall the context of it. In step 140, a user specific list of video links is generated by retrieving a maximum predefined number of media object links from a media objects database 14, wherein the user-specific media objects are tagged with at least one of user-specific tags and were not previously selected or accessed by the user. The predefined number of media object links comprise links to the most recently published and/or created media objects in the media database 14. This preliminary user-specific list of video links is not yet sorted and can temporarily be stored or cached.

In step 150, the condition is checked whether a quantity of media object links or video links is lower than a predefined quantity, in this case 100 link entries. As one of the objectives of this invention can be seen in an improvement of processing performance of the sorting algorithm, a principle of the solution can be seen in the approach to work with only a subset of the total number of media objects. This subset should be, on one hand, be big enough to provide enough options to a user. On the other hand, the number should be low enough to allow quick processing and very limited computing resources. It should be noted that the sorting and retrieving is done for a larger number of users simultaneously which can require substantial computing resources.

In case the check in step 150 results in a number of links lower than the predefined 100 links, in step 160, additional media object links of most recently watched videos are loaded until the predefined number of links, here 100, is reached. These

additional media object links are stored in a separate supplementary link list (step 170). This supplementary link list is not yet sorted at this stage of the method.

In case the condition check in step 150 shows that the initially generated user specific list of video links (see step 140) already contains the maximum predefined number of media object links (option "No"), in step 180 overall ratings of all users for each listed video is retrieved. Such ratings can be stored in the user database 12 and/or in the media objects database 14 using links between the media objects and the respective users. Step 190 relates to a calculation of a screen time tag quantifier. This quantifier can be seen as a user-specific overall quantifier independently from a specific media object describing an importance and relevance of a certain tag for a specific user based on the screen time he spends on videos tagged with this tag and/or, according to an example, based on the number of videos watched which are tagged with this tag.

In step 200 a purchases tag quantifier is calculated based on a history of purchases tagged with this tag of the respective user. Therefore, this quantifier analyses purchases instead of media consumption and allows a weighting of tags for a specific user in combination with other quantifiers like screen time 190. By adding the related screen time tag quantifier 190 and the purchases tag quantifier 200 a combined tag quantifier 210 is calculated. As an example, the purchases tag quantifier 200 and the screen time tag quantifier 190 can alternatively be multiplied or combined using an exponential or linear function. In another example, the purchases tag quantifier 200 and the screen time tag quantifier 190 are each weighted with a multiplier. This way certain aspects can be considered to a higher degree depending on the desired result. For instance, a screen time tag quantifier 190 provides more significance for potential future purchases as it reflects desires and interests of users compared to past purchases (purchase tag quantifier 200) where a user's needs are mostly fulfilled.

A media object community attractiveness quantifier is calculated in step 220 by cumulating ratings of the media objects by other users. A media object community attractiveness 220 can be expressed, for instance, using a "like" tag known from social media platforms. The other users are linked to the user in the user database 12. This can be for instance a database reference in the user database 12, for instance, which a user can create or initiate by adding another user as a friend.

Research has shown that often communities of friends sharing same or similar interests as they are in a same age or stage of life and share similar opinions. Now, in step 230, a recommendation ranking score 230 of each listed media object is calculated by weighting the overall rating of the respective media object with a sum of the related combined tag qualifier 210 and the related community attractiveness quantifier 220. For example, a recommendation ranking score 230 can be calculated by the number of likes (overall rating) * (combined tag quantifier 210 + community attractiveness quantifier 220). This weighting can also be implemented using an exponential or linear function instead of multiplication.

In step 240, the previously generated user specific list of video links is now sorted based on the previously calculated recommendation ranking score 230. For example, list entries with the highest recommendation ranking score 230 are listed first. Advantage is that the most relevant list entries and media object links are presented first to a user. Referring to step 170, the additionally loaded media object links are now also sorted in step 250 based on the calculated recommendation ranking score 230. The supplementary link list generated in step 170 is separately processed and sorted from the main list of media object links resulting in a supplementary sorted media objects link list 22.

In step 260 this sorted supplementary link list is appended to the main list of video links created in step 240. The result is a final list of sorted media object links which is prepared for output and/or is stored as shown in step 270. Optionally, as shown in step 280, the most recently watched video is added on top of the list. It is noted that in Fig. 3 dotted lines and dotted boxes refer to optional or conditional method steps. For instance, if the condition in step 150 is fulfilled and the predefined number of links are already reached, steps 160, 170, and 250 may not be executed.

In Fig. 4 the special aspect of calculating the recommendation ranking score 230 according to the invention is shown in another example. After a start step the combined tag quantifier 220 is calculated (see also Fig. 3). In step 290 the condition is checked whether a friend's community has previously rated or liked this video or media object. If this is the case a community attractiveness tag quantifier 220 is calculated and considered as one influencing factor in step 230 when the corresponding recommendation ranking score 230 is calculated. In case that in step 290 no connected user or friend has rated or liked the media object or video, the

recommendation ranking score is calculated in step 230 without consideration of the community attractiveness quantifier 220. Said steps are repeated (step 300) for every list entry until the end of the list is reached and the last entry was processed.

While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive; the invention is not limited to the disclosed embodiments. Other variations to the disclosed embodiments can be understood and effected by those skilled in the art and practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims.

In the claims, the word “comprising” does not exclude other elements or steps, and the indefinite article “a” or “an” does not exclude a plurality. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage. Any reference signs in the claims should not be construed as limiting the scope.

Reference signs

10	social commerce platform
12	user database
14	media objects database
16	stream service unit
18	sorting service unit
20	user frontend
22	sorted list of media object links
100	method for generating a sorted list of media object links
110	retrieving list of user-specific tags
120	retrieving list of videos watched by user
130	sorting list by most recently watched videos
140	generating a user specific list of video links
150	checking number of list entries
160	loading additional links of most recently watched videos
170	storing additional media object links to separate link list
180	retrieving overall rating of all users of each listed media object
190	calculating screen time tag quantifier
200	calculating purchases tag quantifier
210	calculating combined tag quantifier
220	calculating community attractiveness quantifier (social graph)
230	calculating recommendation ranking score
240	sorting main list of video links using recommendation ranking score
250	sorting supplementary link list
260	appending supplementary link list to main list
270	outputting and/or storing of sorted link list
280	adding most recent watched video as top entry
290	checking condition of community rating
300	conditionally repeating steps 201, 290, 220, 230

Claims

1. Computer-implemented method (100) for generating a sorted list of media object links to be recommended to a user of an social commerce platform (10), wherein the media objects comprise user-generated rich media product reviews; the method (100) comprising the steps of
 - retrieving a list of user-specific tags (110) from a user database (12), wherein the tags were previously selected by the user and are adapted to describe the user's preferences and interests;
 - generating a user-specific list of media object links (140) by retrieving a maximum predefined number of media object links from a media objects database (14),
 - wherein the user-specific media objects are tagged with at least one of user-specific tags and were not previously selected or accessed by the user;
 - wherein the predefined number of media object links comprise links to the most recently published and/or created media objects in the media database (14).
 - retrieving an overall rating (180) of each listed media object of all users of the user database (12);
 - calculating a screen time tag quantifier (190) based on a ratio of screen time of media objects tagged with this tag in relation to a total screen time of the user;
 - calculating a purchases tag quantifier (200) based on a ratio of user purchased products tagged with this tag in relation to a total number of products;
 - calculating a media object community attractiveness quantifier (220) by cumulating ratings of the media objects by other users, wherein the other users are linked to the user in the user database (12);
 - calculating a recommendation ranking score (230) of each listed media object by weighting the overall rating of the respective media object with a sum of the related combined tag quantifier (190) and the related community attractiveness quantifier (220),
 - wherein the combined tag quantifier (210) is the sum of the related screen time tag quantifier (190) and the related purchases tag quantifier (200);

- sorting the list of media object links (240, 250) based on the calculated recommendation ranking score (230);
 - outputting and/or storing (250) the sorted list of media objects links.
2. The method (100) according to claim 1, wherein the weighting of the overall rating (180) of the respective media object with the combined tag qualifier (210) and the community attractiveness quantifier (220) is based on a multiplication function and/or exponential function.
 3. The method (100) according to any of the previous claims, wherein, for calculating the recommendation ranking score (230), the combined tag qualifier (210) is calculated by adding a weighted screen time tag quantifier (190) and a weighted purchase tag quantifier (200).
 4. The method (100) according to any of the previous claims, wherein the total screen time is one day.
 5. The method (100) according to any of the previous claims, wherein the predefined number of media object links to be retrieved from the media database (14) is between 50 and 150 media objects, preferably 100 media object links.
 6. The method (100) according to any of the previous claims, wherein, when calculating the media object community attractiveness quantifier (220), only ratings of other users having a direct relationship with the user are considered.
 7. The method (100) according to any of the previous claims, wherein, in case that less than the predefined number of user-specific media objects meet the criteria according to claim 1 for generating the list of media objects links, the method further comprises the steps of
 - generating a supplementary list of additional media object links (160) containing links to media objects that were previously selected by the user;
 - sorting of the supplementary list (250) by the recommendation ranking score (230), wherein the sorting is carried out separately from sorting the list of media object links; and

- appending (260) the media object links of the supplementary list to the end of the list of media object links.

8. A data processing apparatus comprising means for carrying out the method of any one of claims 1 to 7.
9. A computer program comprising instructions which, when the program is executed by a computer, cause the computer to carry out the method of any one of claims 1 - 7.
10. A computer-readable medium comprising instructions which, when executed by a computer, cause the computer to carry out the method of any one of claims 1 to 7.