

Collaborative Web Recommender Framework for Homestay Programs

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Abstract: Day after day homestay program dramatically is changing economic benefit and marketing but the issue of ground breaking technology endorsing rural homestay recommender system problem faced by the operation research. A web recommender system is a significant tool for subsidiary organization in assembly, storing, indulgence and allocating information and in the marketing process and this is done by providing prediction and verdict models (Littlestone and Warmuth). The web gradually grew into a vast source of gratified; most operators exposed that they could no longer efficiently recognize the contented of most attention to them. Numerous methods industrialized for educating our capacity to discover content. Syntactic exploration devices helped index and rapidly scan lots of pages for keywords but we speedily educated that the quantity of content with corresponding keywords was quiet too extraordinary. Recommender systems signify operator likings for the persistence of signifying substances to acquisition or inspect. They have developed essential submissions in automated trade and info admission as long as ideas that successfully trim large info spaces so that users are directed toward those items that best meet their needs and preferences. A variety of techniques have been proposed for execution recommendation including content-based, collaborative, knowledge-based and other techniques. This study adapts collaborative base recommendations for web recommendations. Further, we show that semantic ratings obtained from the collaborative based part of the system enhance the effectiveness of collaborative filtering.

Key words: Homestay, website, recommender system, techniques and promotion, effectiveness

INTRODUCTION

Tourism is the second biggest provider to the budget following to the industrial segment in Malaysia. Homestay is a branch of tourism. The emerging and endorsing of travel goods have shaped imposing outcomes. In record emerging states, travel is usually been depicted as donor to small homestay organization and inspiring the typical of existing homestay (Honey, 1999). The Homestay is also effect on community development. Moreover, the economic potential of holiday business in fewer advanced states has been recognized as a significant causal issue to worldwide travel development (Palmer, 2002; Honey, 1999; Mowforth and Munt, 1998). The homestay tourism is advancing through web promotion.

There are many kinds of web services in current decades. Website is the medium to display homestay promotion. The marketing of homestay through website has become popular and effective for tourism. There are several web tools to homestay promotion website. Google site is one of them. Google sites are known as a free service of Google that allows you to create a simple web site with minimal knowledge of web site creation and this is done by using only a web browser. Google sites

provide some powerful built in tools like calendars and announcement postings. Google site is one kind of website that gives Google chances to get combined with web recommender (Linden *et al.*, 2003). This goggle site provides recommendation to see the site over web to the users around the world (Terveen and Hill, 2001). Administrator can update the price list according to their seasons.

Website for homestay: Website is online web page to promote homestay to user and operator. Homestay Website is information platform is designed to promote homestay information around the globe. Homestay website is an online information bank to the world user. Every tourist and user worldwide can view current information and promoting about homestay. Website also dived into several pages and sub term. Main website for the website show the homestay info, available reservations, connected mails login function and other purposes to the operators.

Website: A website is named as web site or mostly site and it is consist of connected of web pages classically obliged from a solitary web domain (American Heritage

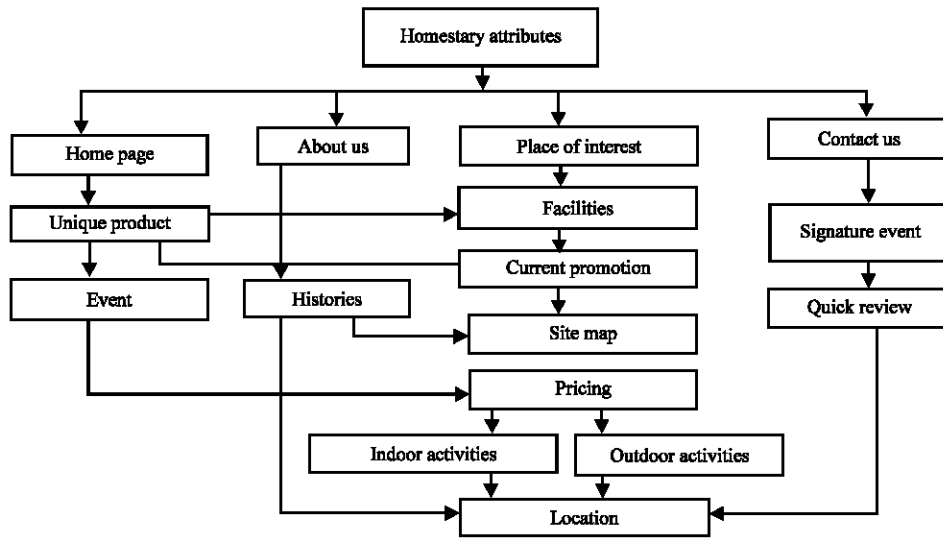


Fig. 1: Homestay attributes

Dictionary in (2011). Website also defines as WWW (World Wide Web). The website was created 1990 by the British physicist Tim Berners-Lee in 1993, he publish free for rest of the world to utilize it. Website is hosted by one web server and it is useable only connect to internet facility. The content of website then only views to the entire world. The contacts of a website can typically be retrieved as of a modest URL (Uniform Resource Locator) named the web address. The URLs of the folios establish them hooked on a grading, though hyper linking among them takes the user’s apparensite structureand directors the user’s steering of the site. Website is the median to promote all kinds of electronic marketing and it come up with number of attributes.

Attributes of website: Homestay website is website that consists of many attributes. Home and living place is the one of those major attributes (Huh, 2002). Many types of attributes that are included in this homestay procedure and its sites. Homestay attributes mostly define home page, about us, contact us, current promotion, facility, unique product, history and location map (Huh, 2002).

Site map of homestay website: A diagram that demonstrations the process of the production of data set is called tree diagram (Johnson, 1967). The principal characteristic of a website tree diagram is homepage. A home page is generally the first page a tourist navigating to a web site from asearch engine will see and may also attend as a landing page to fascinate the consideration of tourists (Chaffey, 2014; Jennifer, 2002). Secondly, interaction page is an import element for verification.

Contact page is a typical web pageon a web siteused to allow the tourist to contact the web site owner or people who are responsible for the upkeep of the site. A link page is a type of web page on certain web sites. History and link page contains a list of links the web page owner, a person or society, finds distinguished to reference. In spite of that, a number of attributes is also important in a website such as facility, promotion, event, cost and unique product. A standard website tree diagram is described in Fig. 1.

MATERIALS AND METHODS

Recommender model: Web recommended system is a structure that recommends specefic site to the users through recommendation (Terveen and Hill, 2001). The system is recommended subject to user and operator (Resnick and Varian, 1997; Schafer *et al.*, 1999; Terveen and Hill, 2001). Recommender systems are comprehensive and comprise refining the understanding of operators including background material, backup multi criteria ratings. It is more flexible and less invasive types of recommendations (Linden *et al.*, 2003). Such more inclusive mockups of recommender systems can deliver improved recommendation capabilities (Schafer *et al.*, 1999).

RESULTS AND DISCUSSION

The first impartial is to find the existence of the homestay programme as perceived by the owner or operator and its operationalization. To identify important

Table 1: Five main collections and collaborative based and recommendations

Variables	Researchers
Collaborative-based recommender system	Chien and George (1999)
Content-based recommender system	Balabanovic and Shoham (1997)
Demographic-based recommender system	Rich (1979)
Utility-based recommender system	Guttman and Maes (1998)
Knowledge-based recommender system	Schmitt and Bergmann (1999)

elements is deemed necessary from the perspective of the community for a homestay program website. The use of content based recommender develops a web recommended system in supporting the business initiative of the homestay program in the community network. The impact of technology adoption depends on the performance of homestay programs. We should also be aware of a slightly different goal that makes sense in many applications (Burke, 2010). It is not essential to predict every complete entry in a collaborative base recommender system. Rather, it is only necessary to discover some entries in each row that are probable to be high (Cohen *et al.*, 1999).

Burke distributes recommender systems into five main collections and they are collaborative-based recommendations (Chien and George, 1999), content based recommendations (Balabanovic and Shoham, 1997), demographic-based recommendations (Rich, 1979), utility-based recommendations (Guttman and Maes, 1998) and knowledge-based recommendations (Schmitt and Bergmann, 1999) (Table 1).

Collaborative-based recommender: Collaborative-based recommendation is a popular recommendation system and its forecast is based on the behavior of other operators in the system and evaluations. A collaborative-based recommendation system is founded upon finding similarities among operators (Chen and Sycara, 1997). In demand to do that, there must be produced profile for every operator (Burke *et al.*, 2005). The recommendation himself is then built upon associating and similar different operator profiles (Burke *et al.*, 2005). Operators in systems comparable this typically rates items ratings that will be accredited to their user profile. A weakness with this method is that new unrated stuffs are not automatically arrived in the recommendation process if it requirements to be found and rated by a user first. Another weakness is that users with unusual tastes might suffer from a comparatively empty dataset with the idea of matching (Bhumik *et al.*, 2006). The benefit with this approach is that it improves over time. Collaborative-based recommendation systems might also discover cross-genre niches in additional algorithm (Williams *et al.*, 2006).

Content-based recommender: Content-based recommender is a recommendation structure that works on the basis of matching items with similar characteristics (Balabanovic and Shoham, 1997). In this approach, a operator outline is also applied, accredited with items that are highly appreciated by the operator (Mooney and Roy, 2000). For the matching of items to be likely, info must be textually extracted from the substances (Pazzani, 1999). Hence, this type of recommendation is the finest suitable for textual based documents and not for binary documents (like music, images and videos). A benefit with content-based recommendation is that it progresses over time; the excellence of the recommendation improves with the amount of metadata and info finder is a system that employs content-based recommendation (Melville *et al.*, 2002).

Demographic-based recommender: Demographic recommender is a method that aims to classify the operators on the basis of personal characteristics and makes communicating dialogue. The user’s replies were matched in contradiction of a library of manually collected user typecasts. Some additional current recommender systems have also taken up in this method. They service demographic groups from advertising research to suggest a variety of products and facilities (Krulwich, 1997). A short study is used to gather the data for operator classification. In additional methods, machine learning is used to attain at a classifier grounded on demographic data (Pazzani, 1999). The representation of demographic information in a user model can vary greatly. Rich’s system used hand-crafted attributes with numeric self-assurance values recommendations that are based on demographic modules. A primary instance of this compassionate of system was Grundy (Rich, 1979) that recommended books created on individual information collected through. Pazzani’s model uses Winnow/window to extract features from user’s home pages that are predictive of liking certain restaurants. Demographic techniques form “people-to-people” connections like collaborative ones but use dissimilar data. The benefit of a demographic method is that it may not necessitate a past of operator evaluations of the category needed by collaborative and content-based methods.

Utility-based recommender: Utility-based recommender is a method that makes suggestions on the basis of a subtraction of the utility of each object for the operators. Of course, the essential problematic is in what way to create a utility function for each user. Tete-a-Tete and the

e-Commerce site PersonalLogic2 each have dissimilar methods for arriving at a user-specific utility function and for smearing it to the substances under attention (Guttman and Maes, 1998). The user profile, consequently is the utility function, and that the system has been imitative for the user, and the system employs limitation satisfaction techniques to locate the best match. The benefit of utility-based recommendation is that it can work as factors for non-product characteristics such as vendor dependability and produce accessibility, into the utility computation and it also makes it conceivable, for instance to trade off value in contradiction of delivery agenda for an operator who has an instant essential.

Knowledge-based recommender: Knowledge-based recommender systems attempts to suggest objects on the basis of inferences about a user’s requirements and predilections. Knowledge-based methods are notable in that technique that they have practical knowledge, they have knowledge about how a particular item that meets a particular user’s need and can consequently reason about the connection between a need and a possible recommendation. The user outline can have any knowledge construction that provisions this inference. In the simplest case as in Google, it may simply be the query that the user has formulated. In other words, it may be a more detailed illustration of the user’s needs (Towle and Quinn, 2000). The entree/entry system and numerous other recent systems, for example employ techniques from case-based reasoning for knowledge-based recommendation (Schmitt and Bergmann, 1999). Schafer, Konstan and Riedl call knowledge-based recommendation as the “Editor’s choice” method. The knowledge rummage-sale by a knowledge-based recommender can also take many forms. Google uses information about the links between web pages to infer acceptance and imposing worth.

Privacy issues: The usage of individually modified commendations has its obvious compensations as deliberated above but one necessity is conscious of a likely misuse of the personal data the recommendation appliance supplies on one’s behalf. The knowledge the recommendation engine obtains when learning to know your partialities and tastes strength be dispersed to particular advertisement benefactors who use this knowledge to produce personalized posters impartial for you. These features of personalization comprise moral respects and the operator’s necessity is conscious of that. Even though almost nonentity really reads the personalization disclaimers of service providers prior to establishing an account, one is powerfully fortified to do accordingly.

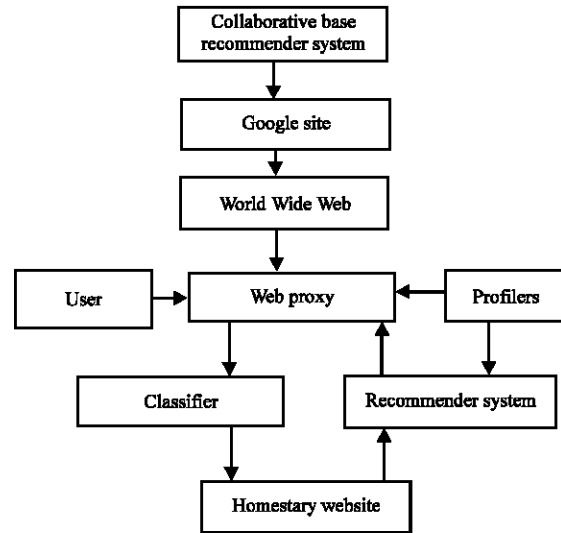


Fig. 2: Web recommender framework

Criteria for recommendation: The exact words that are condensed to their stem by removing prefixes and suffixes to discovery desired information is recognized as criteria for any recommendation system (Porter, 2001). Tourists examined finished their selections and the criteria’s-religious places, monuments, shopping places, guides, traditional scenery, arts, galleries, cultural villages, theme parks, tour packages, historic people, indoor facilities, architecture and historic building (Huh, 2002). Separately info sifting methods that use significance response of the outline contain of additional than one vector. For example, WebMate (Chen and Sycara, 1997) is an individual mediator that helps operators browse the web uses gathering to uphold numerous outline courses that each signifies a dissimilar subject. In the second method documents are recommended if their notch is above a relevance verge (Yan and Garcia-Molina, 1994). Tourism changes the range from slight to major position in income rappers that is the individuality of the homestay tourism (Busby and Rendle, 2000). Amazon.com, for instance uses the grouplens system to variety recommendations about books and videos. It labels more than a few mining techniques for personalization to find reliable data for traveler creation assortment (Resnick *et al.*, 1994).

Frameworks: This research goes through a research process which is consisted of several phases i.e., problem identification; data collection; research design; google site constructs; validation (Fig. 2).

Model formations: Collaborative filtering is a memory-based method which preceding rates to calculate

likenesses among them in order to forecast a hidden rate for an item. This procedure, first calculates the similarity between each two operators by likening their rates to the co-rated items. Then to make a forecast for an active user to an item, the algorithm takes the weighted average of rates from group of similar user to active user. This group of alike users is called nearest neighborhoods or NN, for the active user. Number of these neighborhoods is indicated as K in kNN (Ahmadi-Abkenari and Selamat, 2012).

Proposed recommendation model: Implicit rating focuses various variables. The absolute preference of user, i = item I, AP = implicit ratings of users on items from transaction data, AP (u, i) is computed from the following equation:

$$AP(u,i) = \ln \left(\frac{\text{The number of transactions of user } u \text{ including item } i}{\text{The number of transactions of user } u} + 1 \right)$$

Absolute preference depends on criteria. The demand of user from person to person varies. Some users want to look for jungle following and some have dissimilar choices. Mostly, they look for natural view. The criteria list below: cultural village, architecture and historic building, parks, arts and galleries, tour packages, shopping place, indoor and outdoor facility, traditional scenery.

In the past few decades, tourism experienced tremendous growth as visitors were seeking for places for relaxation and releasing their stress (Lin and Yeh, 2013). Various studies had highlighted the importance of environmental component towards the sustainability of tourism industry (Chandralal, 2010; Miller and Kaiser, 2001) and the development of destination competitiveness strategy (Kim, 2012). The definition of environmental education as a process directed to increase biological and cultural knowledge, consciousness of environment problems and creating motivation to act responsibly in support of an ecologically sustainable environment department of the Environment and Heritage in 2000. The unique visualization and geographic analysis benefits are offered by maps for tourism and those are based on choice or section (Bhaire and Elliott-White, 1999). In Malaysia, the homestay formations that have emerged recently do not have such a traditional reliance on geographical proximity to major tourism attractions or large tourism establishments for clientele sources. Tourism moves the continuum from minor to major

importance in revenue terms and also in terms of the uniqueness of the homestay tourism (Busby and Rendle, 2000). Tourists were satisfied with “religious places, monuments, shopping places, guides, traditional scenery, arts, galleries, cultural villages, theme parks, tour packages, historic people, indoor facilities, architecture and historic building” (Huh, 2002).

Why collaborative base recommender system choose

Prediction accuracy: Prediction accuracy is a testing recommender algorithms that are based on predicting user preference. The collaborative recommender system is method that measuring the recommendation quality and absolute error so it can predict authentic result, though it’s called absolute deviation (Breese *et al.*, 1998; Herlocker *et al.*, 2002; Herlocker *et al.*, 1999, 2004).

Accuracy over time: Accuracy over time work through sequential version metric. The measure of sequential versions metric for averaging the rating or simply computing the average error in a system is identified by over time and the accuracy reach the robustness (Lathia, 2010). MAE version called RMSE and smellier version MAE provides specific error over time (Burke, 2010). As a result accuracy and time can maintain in collaborative based recommender system.

Ranking accuracy: Evaluating of ranking accuracy is the one kind of utility metric (Breese *et al.*, 1998). The ranking accuracy measures the predictable utility of a ranked recommendation list, built on the supposition that operators are more probable to appearance at substances upper in the list; this hypothesis is sensible for numerous actual systems such as e-Commerce sites.

Decision support: Decision support helps user to make decision from different similar choice. Different user takes different trade and goods. such as a operator looking for a film recommendation likely only cares that they get a good movie on the other hand a lawyer looking for legal precedent needs to find all relevant cases (high recall). It is easy to classify these two dissimilar needs as “Find Good Items” and “Find All Good Items” (Herlocker *et al.*, 2004).

To the body of knowledge: The research contributes new information, frequently to the fields of endorsing homestay through google site and recommender system using collaborative base recommender system. Web recommender system delivers user an exact submission. Operator also can choose numerous selections for the recommendation.

Practitioners: Good-looking, high-quality gratified and gateway for home stay Malaysia can be seen. Using web recommender system can provide the user a specific location and cost. It also provides the best choice using map. One needs to find the right budget and cost selection. Web recommended system is used for choosing the right site (Littlestone and Warmuth, 1994).

Policy maker: This research helps the tourism Malaysia to uphold homestay around the world. It helps the government for emerging the rural culture and budget. Homestay site does not only solve the existing problems faced by the home stay Malaysia but also it is can be a widespread one to others alike applications. Thus, it may help overwhelmed the connected difficulties faced by the other organizations in comparable environment. The examples include sites and others such as in enlightening site, big trades, corporate office, large investment and firm stay.

CONCLUSION

Recommender systems have made significant progress over the last decade when numerous content-based, collaborative and hybrid methods were proposed and several “industrial strength” systems have been developed. However, despite all of these developments, the current cohort of recommender systems plotted in this study still needs further developments to make recommendation approaches more actual applications.

REFERENCES

- Ahmadi-Abkenari, F. and A. Selamat, 2012. An architecture for a focused trend parallel web crawler with the application of clickstream analysis. *Inf. Sci.*, 184: 266-281.
- Arunachalam, K. and P. Thambidurai, 2010. Collaborative web recommendation systems-a survey approach. *Global J. Comput. Sci. Technol.*, 9: 30-35.
- Bahaire, T. and M. Elliott-White, 1999. The application of Geographical Information Systems (GIS) in sustainable tourism planning: A review. *J. Sustainable Tourism*, 7: 159-174.
- Balabanovic, M. and Y. Shoham, 1997. Fab: Content-based, collaborative recommendation. *Commun. ACM*, 40: 66-72.
- Bhaumik, R., C. Williams, B. Mobasher and R. Burke, 2006. Securing collaborative filtering against malicious attacks through anomaly detection. *Proceedings of the 4th Workshop on Intelligent Techniques for Web Personalization*, July 16-20, 2006, Boston.
- Breese, J.S., D. Heckerman and C. Kadie, 1998. Empirical analysis of predictive algorithms for collaborative filtering. *Proceedings of the 14th Conference on Uncertainty in Artificial Intelligence*, Jul 24-26, 1998, Madison, WI., pp: 43-52.
- Burke, R., 2010. Evaluating the dynamic properties of recommendation algorithms. *Proceedings of the 4th ACM Conference on Recommender Systems*, September 26-30, 2010, Barcelona, Spain, pp: 225-228.
- Burke, R., B. Mobasher, R. Bhaumik and C. Williams, 2005. Collaborative recommendation vulnerability to focused bias injection attacks. *Proceedings of the 5th IEEE International Conference on Data Mining*, November 27-30, 2005, Houston, Texas.
- Busby, G. and S. Rendle, 2000. The transition from tourism on farms to farm tourism. *Tourism Manage.*, 21: 635-642.
- Chandralal, K.P.L., 2010. Impacts of tourism and community attitude towards tourism: A case study in Sri Lanka. *South Asian J. Tourism Heritage*, 3: 41-49.
- Chen, L. and K. Sycara, 1997. WebMate: A personal agent for browsing and searching. *The Robotics Institute Carnegie Mellon University Cerf, Vinton, How the Internet Came to Be, as told to Bernard Aboba.*
- Chien, Y.H. and E.I. George, 1999. A Bayesian model for collaborative filtering. *Proceedings of the Conference the 7th International Workshop on Artificial Intelligence and Statistics*, January 4-6, 1999, Florida.
- Cohen, W.W., R.E. Shapire and Y. Singer, 1999. Learning to order things. *J. Artificial Intell. Res.*, 10: 243-270.
- Guttman, R.H. and P. Maes, 1998. Agent-mediated integrative negotiation for retail electronic commerce. *Proceedings of the 1st International Workshop on Agent-Mediated Electronic Trading (AMET 1998)*, May 10, 1998, Springer, Berlin, Germany, pp: 70-90.
- Herlocker, J., J.A. Konstan and J. Riedl, 2002. An empirical analysis of design choices in neighborhood-based collaborative filtering algorithms. *Inf. Retrieval*, 5: 287-310.
- Herlocker, J.L., J.A. Konstan, A. Borchers and J. Riedl, 1999. An algorithmic framework for performing collaborative filtering. *Proceedings of the 22nd Annual International ACM SIGIR Conference on Research and Development in Information Retrieval*, August 15-19, 1999, Berkeley, California, pp: 230-237.
- Herlocker, J.L., J.A. Konstan, L.G. Terveen and J. Reidl, 2004. Evaluating collaborative filtering recommender systems. *ACM Trans. Infom. Syst.*, 22: 5-53.
- Honey, M., 1999. *Ecotourism and Sustainable Development: Who Owns Paradise?* Island Press, Washington D.C.

- Huh, J., 2002. Tourist satisfaction with cultural/heritage sites: The virginia historic triangle. M.Sc. Thesis, Virginia Polytechnic Institute and State University.
- Jennifer, R.C., 2002. Bipolar disorder: Responding to challenges to indent. Ph.D Thesis, University of Texas at Austin, Austin, Texas.
- Johnson, S.C., 1967. Hierarchical clustering schemes. *Psychometrika*, 32: 241-254.
- Kim, M., 2012. Phonetic accommodation after auditory exposure to native and nonnative speech. Ph.D. Thesis, Northwestern University, Illinois.
- Krulwich, B., 1997. Lifestyle finder: Intelligent user profiling using large-scale demographic data. *AI Magazine*, 18: 37-45.
- Lathia, N., 2010. Evaluating collaborative filtering over time. Ph.D. Thesis, University College London, London, UK.
- Lin, C.L. and J.T. Yeh, 2013. Modeling religious involvement: A qualitative integration based on female role visualization consumption. *Q. Quantity*, 47: 561-566.
- Linden, G., B. Smith and J. York, 2003. Amazon.com recommendations: Item-to-item collaborative filtering. *IEEE Internet Comput.*, 7: 76-80.
- Littlestone, N. and M.K. Warmuth, 1994. The weighted majority algorithm. *Inf. Comput.*, 108: 212-261.
- Melville, P., R.J. Mooney and R. Nagarajan, 2002. Content-boosted collaborative filtering for improved recommendations. Proceedings of the 8th National Conference on Artificial Intelligence, 28 July-August 1, 2002, Alberta, Canada.
- Miler, C.T. and C.R. Kaiser, 2001. Implications of Mental Models of Self and others for the Targets of Stigmatization. In: *Interpersonal Rejection*, Leary, M.R. (Ed.). Oxford University Press, New York, USA., pp: 189-212.
- Mooney, R.J. and L. Roy, 2000. Content-based book recommending using learning for text categorization. Proceedings of the Fifth ACM Conference on Digital Libraries, June 2-7, 2000, ACM, San Antonio, Texas, USA, ISBN: 1-58113-231-X, pp: 195-204.
- Mowforth, M. and I. Munt, 1998. *Tourism and Sustainability: New Tourism in the Third World*. Routledge, London, England, ISBN:0-203-13729-2, Pages: 362.
- Palmer, S.E., 2002. Perceptual grouping: It's later than you think. *Curr. Directions Psychol. Sci.*, 11: 101-106.
- Pazzani, M.J., 1999. A framework for collaborative, content-based and demographic filtering. *Artificial Intell. Rev.*, 13: 393-408.
- Porter, M., 2001. Strategy and the Internet. *Harvard Bus. Rev.*, 79: 63-78.
- Resnick, P. and H.R. Varian, 1997. Recommender systems. *Commun. ACM.*, 40: 56-58.
- Resnick, P., N. Lakovou, M. Sushak, P. Bergstrom and J. Riedl, 1994. Group lens: An open architecture for collaborative filtering of Netnews. Proceedings of the 1994 ACM Conference on Computer Supported Cooperative Work, Oct. 22-26, Chapel Hill, North Carolina, United States, ACM Press, pp: 175-186.
- Rich E., 1979. User modeling via stereotypes. *Cognitive Sci. J.*, 3: 329-354.
- Schafer, J.B., J. Konstan and J. Riedi, 1999. Recommender systems in e-commerce. Proceedings of the 1st ACM Conference on Electronic Commerce, Nov. 3-5, ACM Press, Denver, Colorado, United States, pp: 158-166.
- Schmitt, S. and R. Bergmann, 1999. Applying case-based reasoning technology for product selection and customization in electronic commerce environments. Proceedings of the 12th Bled Electronic Commerce Conference, June 7-9, 1999, Bled, Slovenia.
- Terveen, L. G. and W. Hill, 2001. Beyond Recommender Systems: Helping People Help Each Other. In: *Human-Computer Interaction in the New Millennium*, Carroll, J.M. (Ed.). 1st Edn., Addison Wesley Professional, USA., ISBN-13: 978-0201704471, pp: 752.
- Towle, B. and C. Quinn, 2000. Knowledge based recommender systems using explicit user models. Proceedings of the AAAI Workshop on Knowledge Based Electronic Markets, July 31, 2000, AAAI, Austin, Texas, pp: 74-77.
- Williams, C., B. Mobasher, R. Burke, J. Sandvig and R. Bhaumik, 2006. Detection of obfuscated attacks in collaborative recommender system. Proceedings of the 17th European Conference on Artificial Intelligence, August 28-29, 2006, Riva del Garda, Italy pp: 19-23.
- Yan, T.W. and H. Garcia-Molina, 1994. Distributed selective dissemination of information. Proceedings of the 3rd International Conference on Parallel and Distributed Information Systems, September 28-30, 1994, Austin, TX., pp: 89-98.