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***Research paper***

# A fuzzy preference tree-based recommender system for medical database

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## Abstract

Nowadays every online site is using personalized recommender systems to suggest a right product for the customer. But existing system has tree structures and have unrequired items in the user preferences. So, it requires high memory and time. To overcome this issue, proposed a new method with increased performance. Firstly, introduced a technique for modeling fuzzy tree-established consumer preferences, in which fuzzy set techniques are used to express user choices. A recommendation approach to recommend tree-dependent items is then advanced. The critical path on this study is a comprehensive tree matching method, which can compare two tree-established facts and identify their corresponding components by taking into consideration of all the records on tree structures, weights, and the node attributes. The proposed fuzzy preference tree based recommender system is tested using a medical dataset.

***Keywords***: *Comprehensive Tree Matching Method; Fuzzy Preference; Fuzzy Techniques; Fuzzy Tree-Established; Recommender System.*

## 1. Introduction

Nowadays Medical is also online in which the Doctors are placing all the required symptoms of the diseases, and the users or patients are entering their symptoms and getting to know about their conditions and the medicines to cure their disease. This process is done based on Recommender systems. Recommender systems are mostly known for their use on e-commerce websites. Recommender systems mainly rely on user preferences, and they collect the data from the users and make a list of user preference items. Unlike other systems, our system only depends on user preferences. The user ranks the subject, and according to their ranking a list is prepared and it helps for the next user who ever searches for the diseases.

Over the past few years, technology becomes more advanced; it generates excellent volumes of valuable data from various real-time applications in the society and the modern organizations. For instance, torrents of banking, marketing, financial, telecommunication, life science, biological, medical, industrial and social data. Different mining and analytics are done past by the researchers who are web application processing, stock exchange analytics, marketing analytics and biological analytics. In web application processing requests from the customer are served by giving his required page within elapsed time and also predict the customer navigation to give his requested page which grouping similar people based on their interests or grouping similar constraints based on their properties (clustering). Stock exchange analytics are predicting a trading pattern to bought/ sold stocks which comes under classification. Marketing analytics are used to identify the future directions for taking decisions. Medical data also analyzed for future decisions. But all these techniques are up-to some limited volumes of data. Big-data brings us into a new epoch of data, which commonly referred to be as a big data. It poses a challenge to the researchers with more velocity, more variety, and large volumes. Where the widely used software's are not able to imprisonment, accomplish and process within the elapsed time. Furthermore, there is a need to discover new procedures for to handle large volumes of data to optimization, data mining and knowledge discovery. This ambitions and motivations are drives the researchers to Big-data analytics and data mining. Over the earlier few centuries, different procedures have been proposed to use the Advanced Decision Tree Algorithms model-which decrease the space of search with distributed or parallel computing-for different big data mining and analytics tasks. Example tasks include clustering, outlier detection, and structure mining. These calculations find fortifying data in the types of routinely happening information sets of produce things or occasions. Following the presentation of incessant example mining, there are various studies that direct to mine successive examples from exact information (for instance customary database of market exchanges). With these conventional databases, clients certainly know whether a thing is available in a trade. Then again, information on some actual applications is filled with vulnerability. It is in part because of fundamental estimation mistakes, testing and length of time blunders, system latencies, and purposeful obscuring of information to protect secrecy. Thus, clients usually are dubious about the vicinity or nonappearance of things. As a reliable sample, a meteorologist might suspect (yet can't promise) that extreme climate wonders will create amid an electrical storm. The vulnerability of such suspicions we can communicate as far as existential likelihood. The paper contains following things namely section 1 talks about presentation; section 2 examine related work; section 3 talked about proposed action, section 4 bargains results and assessments and section 5 finishes as a conclusion and section 6 are about references.

## 2. Literature survey

Hua-Ming Wang did a study on personalized recommendation structures with the help of a k-neighbor algorithm. In this, the writer used consumer-primarily based collaborative filtering set of rules for the recommended which is a goal consumer for the assessment of nearest neighbor. It's far the high-quality advice algorithm and in that the feature property does now not require evaluation [1].

Vivek Sharma did a survey on advice machine primarily based on a k-Nearest neighbor algorithm. In this, the writer achieved the sentimental analysis. It uses the herbal language processing and textual content analytics to discover the excellent reviews on the blogs and that they used scaling gadget to determine the sentiment of a person [2].

Kaustubh Kulkarni studied on recommender systems with hybrid collaborative filtering. It is mostly an aggregate of content material based filtering and collaborative filtering. From content primarily based filtering person rate gadgets and that we can build a version for consumer options. In collaborative filtering, it uses the opinions of other users to propose the attribute of statistics [3].

In addition to above information regarding hybrid methods, the paper done by WU Yuan-hong and TAN Xiao-qiu gave a brief insight into the usage of hybrid collaborative filtering in real time recommender systems [8].

Badrul Sarwar did have a look at on object-based collaborative filtering algorithms. Collaborative filtering is to provide the item recommendations or predictions primarily based on the evaluations of the customers. In that, the author has taken film database, and they skilled and tested the statistics [4].

Hui Li surveyed gaining knowledge of to suggest a product with the content material of net page and in that they used the element-of-speech tagging for to describe the critiques to the products using the adjectives of the human beings. In that, they used the NL Processor semantic parser to parse every opinion [5].

Daniar Asanov and Megha Jain stated various techniques and algorithms to implement a recommender system in his paper [9], [10].

Bela Gipp, Jöran Beel, and Christian Hentschel introduced Scienstein, the first hybrid research paper recommender system and a compelling alternative to currently used academic search engines [12].

Sutheera Puntheeranurak, Pongpan Pitakpaisarnsin used Naïve Bayes Classifier Weighting Technique for time-aware recommender system [6].

Mukta kohar discussed various existing recommender systems in her paper and also stated multiple drawbacks with respective the existing models such as collaborative filtering, content-based filtering and Hybrid approach [13].

Greg Linden, Brent Smith, and Jeremy York illustrated item-to-item collaborative filtering technique based recommender system for amazon.com [11].

Nitin Agarwal, Ehtesham Haque, Huan Liu, and Lance Parsons stated a new type of subspace clustering approach [7].

Stuart E. Middleton, David De Roure, and Nigel R. Shadbolt conveyed latest approaches to use ontology in a recommender system. They stated a method to collaborate feedback and unobtrusively monitored behavior to make a recommendation to users [14].

## 3. Proposed work

Our project works on Medical datasets. In this, the doctor acts as the admin of the website and the patient as the user. The Admin enters all the diseases and their symptoms and the medication that helps in curing their ailments. The user now signs up into the web page and enters his/her symptoms. According to their symptoms, the webpage shows related diseases. For example, if a user had entered the symptoms like Eye watering, Eye itching, and eye redness, then the system searches for the signs that match the disease and shows the illness as Conjunctivitis. Later the medication that is tablets related to the disease will be given. In our project, this genuinely depends on ranking. That means many users enter their conditions and get their medicines then the user ranks the medication. So that this helps another user to choose because every user decides medicine that is suitable for their disease based on a ranking that is the more number of rank the drug consists the more users are preferring.

## 4. Implementation methodology

Nowadays recommendation became more specific and meaningful in every application. For example, if we look through Amazon or eBay or any other online app when a user searches for an item then the engine will be able to make suggestions based upon previous preferences and make the user work leisurely, and this is the case in online applications. We are implementing on the medical dataset. Here we have N number of data records. There will be an Admin and User. Admin acts as doctor whereas User serves as a patient. Nowadays everything has become online, suppose if any person requires emergency medicine they can find it on our website. In our application, the admin enters records of data that consists of symptoms, body part, medication and consultant doctor to whom the patient can consult. The whole thing makes the user task immensely more comfortable.

In this paper, we used MySQL and NetBeans software to implement this project. In this project as told above user acts as patient and admin acts as a doctor. The admin enters n number of records in the application that contains required fields such as symptoms, body part, medication and the name of a doctor to whom the patient can consult. The user first registers and then logins into the application, where he must enter at which body part is he getting troubled, symptoms that he is facing and any other queries. After entering these details, the user must click on submit, then the medication and the name of possible disease will be displayed and also give the details of the doctor who can he consult. When next user enters his symptoms then if those are matching with any other disease that the previous user has entered it shows ranking based medication that means the last user ranks the medicine. The medicines will be displayed based on classification, the ranking which has high number will be displayed first this helps the user better to know which medication is frequently used. Not only the user admin is also benefited he can know how much the ranking is given and which drugs are most preferred. That is how we are using Recommender system and classification in our project.

## 5. Conclusion

In this paper, we are using a medical dataset which consists of records of data. In this project, we have a doctor who is an Admin; he enters all the diseases with symptoms and the required medications. The patient here acts as a user. First, he logs in to the web page and begins his signs that he is facing. Then according to the symptoms, the matched disease will be displayed. For example, suppose if the patient enters Eye watering, Eye redness, Eye itching and swelling then the condition will be shown as conjunctivitis, and the required medicines will be displayed. Here we used Recommender systems. The ranking also plays a vital role in our recommender systems. When one user searches for the disease, he then ranks the medicine so that the next user whoever seeks for the same illness can choose the best medicine with the top ranking. This helps the user to know which one is best. Not only the user but the admin can also have an idea about the rankings. We have used NetBeans and MySQL software to develop this web application.

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