# PERSONALIZED RECOMMENDATION FRAMEWORK IN TECHNOLOGY ENHANCED LEARNING

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***Abstract:*** ***There is growing consensus that the success of our students and our nation requires the modernization of our education system to be student-centered and personalized. Personalized learning does not require that all learning is digital, but it cannot be achieved at scale without technology. Technology-enabled personalized learning means that technology is used to identify student needs, dynamically customize a playlist of student learning experiences, support teachers, and learn what works best with which students to inform the development of ever smarter educational systems. Technology-enabled personalized learning is complex and requires many different components of the education system to work together to meet the needs of each student. This paper proposes a new technique called personalized recommendation in technology enhanced learning.***

## 1Introduction

Technology enhanced learning is a broad field ranging from formal to informal learning, from classroom to workplace and mobile learning, and covers almost all topics in our everyday lives. The main aim of recommender systems in TEL can be summarized as supporting learners during their learning process in order to accomplish their learning goals [1], [2]. A recent survey of TEL recommender systems can be found in [3] and an overview of research trends and applications of recommender systems for TEL in [4]. Additionally, a survey of context-aware TEL recommender systems can be found in [5]. Recommender systems in TEL recommend a wide variety of items such as learning objects, learning resources on the Web, software, foreign language lessons, test items, lecture notes, or complete courses [2]. The recommender systems identified in this survey make very diverse recommendations, including learning resources, fellow peers, and more TEL specific items such as learning sequences, advice to teachers or grade predictions. These findings are not surprising and confirm those reported in related work [9].

Presently a day, for any sort of data, individuals rely on upon web. They utilize web indexes like Google to pursuit data over web. The inquiries must be precise that will give the data identified with client's Health Care. Be that as it may, there is tremendous measure of data on the web as it's hard to get the significant data effortlessly. If there should arise an occurrence of inquiries on right prescription, individuals for the most part have their own particular inclinations. Wellbeing experts require the adaptability of unstructured content to express their conclusions and treatment systems. In this manner, the vicinity of unstructured content is inescapable, be that as it may, for information mining, data frameworks are obliged to change over the unstructured content to an organized representation for examination. Additionally the human advancement where individuals live will have sway on the quantity of decisions of prescription. So the proposed strategy will be utilized to prescribe best medication and nourishment to the clients or patients. These proposals are in view of the positioning of things and nourishments. The trial results give better exactness contrasted with existing strategies.

The Internet, which brought the most creative change on data society, has likewise brought numerous noteworthy changes of medicinal services administrations. By means of the Internet, getting to data about human services administrations turned out to be moderately simpler for administration purchasers who need satisfactory therapeutic medications. Additionally, purchasers can correspond with specialists to get medicinal advices or to make arrangement by email or moment detachments, which are more advantageous correspondence channels than by telephone. Due to these advantages, a great deal more social insurance administration suppliers began distributed sites for their administration on the Internet aggressively; as an outcome, customers can acquire wide decision of administrations and better administration quality. On the other hand, there are likewise negative impacts created by exponential development of the social insurance sites. Due to an excess of data accessible, buyers cannot easily pick legitimate social insurance administration among them. Some of them may not have the capacity to judge what medicinal services administrations are useful in light of the fact that assessing those administrations as a rule obliges restorative aptitude. Besides, there may be over-promoting sites that hotshot misrepresented data about administrations. For this situation, social insurance administrations on the Internet may confound administration customers and make them faultier. To help clients to pick a fitting administration among the accessible administrations on the Internet, numerous expediting sites for human services administrations, for example, social insurance web entrances and web indexes have been created [5][6][7][8]. The clients can utilize the handling sites as beginning stages and find fitting medicinal services administrations utilizing them. This change permits the clients to get to data about the administrations much simpler than some time recently, and the social insurance suppliers to spare more lives. The facilitating sites, then again, demonstrated their constraint that more complex system is needed in the area of human services. The greater part of the clients who does not have any learning about medicinal services or any thought what isn't right with their bodies can't figure out legitimate human services administrations. What they need is not sorted out data about administrations, but rather an expert rule to the most suitable administrations for a particular client.

In this manner, suggestion frameworks for better medicinal services are proposed. Proposal framework for the human services is a site that suggests medicinal services benefits or gives helpful data to the clients considering. Medicinal services Provider Recommendation System [3] is an illustration of very much proposed social insurance suggestion framework. Client can look the medicinal services suppliers utilizing area, suppliers' claim to fame, and notoriety. Then again, what this framework couldn't understand yet is that fledgling client's patients still will most likely

be unable to discover fitting treatment for them when they don't have the foggiest idea about their precise wellbeing status. Since the vast majority of individual's absence of therapeutic information, the framework may not be viable, in actuality. To prescribe fitting social insurance administrations to fledgling or nonprofessional clients all the more successfully, proposal framework must be mindful of clients' vital settings, for example, area, as well as clients' wellbeing status.

The data on the web has gotten to be testing issue for clients. The client should be clear about their needs to get right data. The measure of web-base data accessible on the web has turned into the most difficult occupation today's situation. Individuals are keen on significant and intrigued data from the web. There is immense measure of data on the web so it's hard to get important data identified with clients Health Care and for this client needs more canny system (agents) to assemble the valuable data. If there should arise an occurrence of pursuits on right nourishment and activity, individuals for the most part have their own particular inclinations. Likewise individuals are limited to some restorative conditions so a few nourishments and activities are dodged so they are pulled in towards other sustenance and activities. Likewise the development where individuals dwell will have sway on the quantity of decisions and mixed bags of nourishment. So there is requirement for simple to utilize edge work for nourishment and activity proposal. This system is to examine client's inclination and will and will construct a sustained and wellbeing related client's profile and will utilize the profile to sort the related information with the goal that clients can make flavorful nourishment and activity request.

## 2. Related Work

Information retrieval is a system that retrieves information from web resources on behalf of user requests. User type something on search engine and the requested query is resolved according to some relevance and ranking algorithms on server end to reply the requested information of that user. The fact that user has to enter his query explicitly has itself became serious problem with information retrieval systems. This is because today tremendous information is available on web out of which user may be unaware about most of it. User will request only for that information that he or she had heard before this. Other existing information in which user may find interest never comes to the user screen because IR returns only relevant information. But unfortunately IR can't understand user's interests intelligently and hence lots of useful information remains behind the scene. Another crucial point is that though this accepts IR in its current form; user has to enter exact and specific query that represents his or her interest. Otherwise IR may come with large set of generalized results and expected result may be displayed somewhere at the later pages of results which is more cumbersome. Instead of this what if users do not have to enter any query at all and someone intelligently recommend customized information for user. Well web personalization is the area where all such care is taken about users and their likes-dislikes.

Web Personalization is a technique that customizes a website in accordance of user's interests and likes-dislikes. Web personalization does not need any explicit data instead it collects web data in web context which can be structural, content or user profile data. Web Personalization guides the users to achieve better web experience. Web experience can be simply browsing of a web site or it can be as important as purchasing some products or downloading some items from that web site. And this experience can be enhanced by rearranging the web site content or structure, highlighting web links, insertion of some runtime links or creation of new windows or pages. Uses of proper web mining techniques that are intelligent and computationally efficient are required. Accurate utilization of such techniques will lead to web personalization in true sense. In addition lots of problems associated with web personalization also need to be addressed simultaneously. They are cold-start problem, scalability, adapting to user context, managing dynamics in user interests, robustness, information security.

Recommender system is a simulation of Web Personalization. Recommender system is a special kind of personalized information retrieval system that retrieves or say recommends products/items in accordance of user's interests and likes-dislikes but without explicit requests from users. They are also seen. Recommender engine is an important part for any such commercial website today. The implicit data obtained from intelligent mining techniques is the input for recommender engine and the algorithm implemented inside do the rating predictions and ranking of information to be recommended. One way to classify recommender systems as content based type, collaborative type and hybrid type [1][2][3]. Another way is heuristic based type and model based type recommender systems.

Lots of different factors are important in deciding the quality of a recommender system. These factors are seen as more or less important depending on the application where you are going to use the recommender system. As stated earlier recommender system is simulation of web personalization so improvements in problems of web personalization will improve the quality of recommender system also. Some of factors are accuracy, diversity, scalability, reliability, serendipity etc.

Precision is the property of recommender framework that chooses whether created proposals are precisely recognized to client's hobbies and preferences loathes or not. If user is receiving what he or she is expecting then the accuracy of your recommender system is high.

Diversity is the property of recommender system that forces to recommend various different items as possible. Many it so happens that user get bored if received recommendations are all of same type and in this situation if he or she found items that stands out differently among other items he or she may go for that outstanding member. Basic reason behind this is the human mind set which is easily attracted to odd figure in search of something new than regular routine.

As in [2] proposed some impromptu systems to rank things for incorporation in suggestion list. As indicated by creator most extreme comparability in target inquiry and cases to be recovered is the general methodology in numerous areas yet it doesn't work in a few spaces.

As in [26] proposed three new calculations for enhancing singular differing qualities. As indicated by creator differing qualities issue is dependably been restriction for substance based suggestion methods and the proposed calculations have framed a benchmark on this worry. Out of these Bounded Greedy Selection calculation has enormously lessened the recovery cost and created negligible loss of likeness among target inquiry and proposals.

As in [7] proposed theme expansion, another heuristic way to deal with streamline the harmony in the middle of precision and differences in order to keep exactness in a specific level while expanding assorted qualities, particularly for suggestion records acquired as an after-effect of something based community oriented separating calculation. Point expansion looks like to Osmotic Pressure similarity where particular porousness is the key criteria for streamlining. Scientific categorizations are made for different areas, masterminded hierarchically. Every item has a place with one or more scientific categorizations and they likewise have content

depictions identifying with this space scientific categorizations. The creators additionally propose intra-list closeness, another metric which is appropriate to catch the differing qualities utilizing proposed calculation. As per creators compelling utilization of substance portrayals alongside significance weights of items has successful effect while positioning things and that is the place the proposed strategy contrasts from other existing ones. Their exploratory results demonstrated that clients favoured the modified broadened list even some loss of precision happened, than the exact unaltered rundown.

As in [4] indicated how essential outline decisions the result, and in this manner supervisors can pick recommender plans that are more predictable with their business objectives and customers' inclinations. They found that recommenders can expand deals, and recommenders that rebate prominence properly might build deals more.

As in [28] proposed a methodology that tries to discover most ideal subset of things to be suggested over every single conceivable subset. Here resultant rundown's likeness to target inquiry and differing qualities inside of rundown these two are taken as a parallel improvement issue. Another assessment measurement, thing oddity, is proposed. Thing curiosity implies how much a thing is not quite the same as existing things list. Thing oddity relies on other existing things in client profile. Thing curiosity brings certain level of trouble for suggestions and thus can be utilized to produce helpful experiments. By altering the oddity esteem the resistance in precision misfortune is adjusted. Creator calls attention to that likelihood of prescribing novel things is low at whatever point similitude is the essential choice standard.

**3 Proposed work**

Many components of the education system vary considerably when moving from a traditional system to a personalized learning system, as illustrated in Figure below. This comparison list outlines key components of a personalized learning system, while recognizing that each characteristic should be seen on a continuum as its implementation evolves from traditional to personalized.

| TRADITIONAL SYSTEM | REDESIGNED PERSONALIZED LEARNING SYSTEM |
|---|---|
| Mass Production | Mass Customization |
| Time Constant/Achievement Variable; Seat Time | Time Variable/Achievement Constant; Mastery/Competency Based |
| Industrial Age, Assembly-Line, Common-Pace Instructional Model | Knowledge Age, Individualized, Variable-Pace Learning Model |
| End of Year/Course Assessment of Knowledge | Ongoing, Embedded, and Dynamic Assessments of Knowledge/Skills, Learning Styles and Interests |
| Institution/Teacher Centered Student-Centered | Fixed Place; School-Based Anywhere and Everywhere; Mobile |
| Fixed Time; September-June; 6 hours/day, 180 days/year | Flexible Schedule, Anytime, 24/7/365; Extra as Needed |
| One-Size Fits All Instruction/Resources | Differentiated Instruction |
| Teach the Content; Sage on the Stage | Teach the Student; Guide at the Side; Collaborative Learning Communities |
| Geographically Limited Instructional Sources (Teacher/Textbook) | Virtually Unlimited, Multiple Instructional Sources (Online Resources and Experts) |
| Limited & Locked Student Report Card | Portable Electronic Student Portfolio Record |
| Printed, Static Text Dominant | Digital, Interactive Resources Dominant |
| Physical/Face-to-Face Learning | Online Platform Enables Blended Learning |
| Informal Learning Disconnected | Informal Learning Integrated |

**Fig1: Traditional vs personalized system**

Technology-enabled personalized learning includes teacher and machine use of the following tools:

• Multiple, ongoing assessments and other data to dynamically identify each student's needs and strengths relative to learning goals, including around the universal design for learning (UDL) spectrum;

• Dynamic matching of students with a customized playlist of content and interventions (digital and analog) from multiple sources based on relevant connections to prior learning, interest, experience, etc.; and

• Ongoing evaluation of what works best (#2) with which types of students (#1) to inform the development of ever smarter educational systems. Participants identified the primary challenges they seek to address through personalized learning:

• Improve achievement for all students;

• Implement competency/mastery-based education (vs. seat-time);

• Implement a more student-centered learning model where the student voice is empowered to help determine his own learning path; and

• Increase student engagement.

| Definition | Resources |
|---|---|
| Recommendation Engine | Software algorithms designed to connect learners to learning objects (digital or otherwise) based on learner's profile and any preset Learning Plan |
| Learning Objective | Description of specific, observable, expected student behaviors; specific descriptions of what students should know and be able to do; a specific definition of observable actions or products that demonstrate the student's mastery |
| Learning Resource | Granular content asset - a single content item, practice item or assessment item which is aligned at the lowest level of a learning objective [see definition for learning objective] focused on a specific knowledge, skill, concept, behavior, disposition, etc. |
| Learning Object | Combination of one or more learning resources [see definition for learning resource] specifically designed to focus on a select set of one or more learning objective(s) and capable of standing on its own for instructional purposes |
| Learning Object Repository | Database of learning objects designed to store the learning objects themselves and the metadata used to describe the learning objects |
| Learning Plan | Personalized description of a learning pathway for each individual learner |
| Adaptive Learning | An educational method where computers adapt the presentation of educational material according to students' learning needs, as indicated by their responses to questions and tasks. |
| Data Analytics | Process of inspecting, cleaning, transforming, and modeling data with the goal of |

| | |
|---|---|
| | discovering useful information, suggesting conclusions, and supporting decision making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains. Data mining is a particular data analysis technique that focuses on modeling and knowledge discovery for predictive rather than purely descriptive purposes. |

**Modules**

1. **User registration**: In this module user is going to register his areas of interests .His interests include Science , engineering ,humanties .His personal information is included his name ,age ,sex, address, mail id, etc.
2. **Database module:** In this module we include all the available subjects
3. **Recommendation engine:** In this module recommendation engine is going to recommend the particular subjects according to the user interests

Precision is defined as the division of retrieved documents to relevant documents..

$$precision = \frac{relevant(documents) \cap retrieved(documents)}{retrieved(documents)} ...eqn(1)$$

Recall is defined as the fraction of the documents that are successfully retrieved.

$$recall = \frac{relevant(documents) \cap retrieved(documents)}{relevant(documents)} ...eqn(2)$$

TABLE I. USER RATINGS

| | USER1 | USER2 | USER3 | USER4 |
|---|---|---|---|---|
| JAVA | 4 | 2 | | 2 |
| xml | 2 | | 5 | 3 |
| C | | 4 | 1 | |
| cloud | | 5 | 4 | |
| bigdata | | 5 | | 6 |

4. **Feed back phase:** In this phase user is going to give the rating according to the his satisfaction

**Table1: Feed back phase**

| Rating | Description |
|---|---|
| 5 | Excellent |
| 4 | Best |
| 3 | Good |
| 2 | Average |
| 1 | Bad |

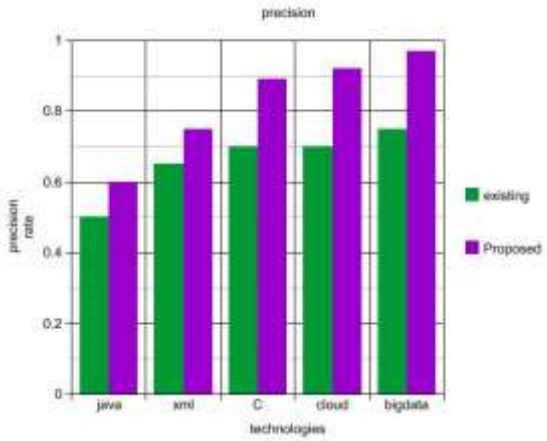


**Fig2: Precision**

As shown in figure 2 the precision comparison is shown with existing and proposed

## 4 Conclusion

Technology advancements certainly underscore the potential for realizing personalized learning, but they are not a silver bullet for meeting the needs of each student. Despite the scale, scope and complexity of the task, the 2014 Summit participants agree that personalized learning through technology is attainable. By addressing the challenges through the possible solutions identified, the education field can accelerate the progress toward personalized learning for all students. This paper proposes a new technique which can increase the efficiency of technology enhanced learning.

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