# A HYBRID E-LEARNING RECOMMENDATION APPROACH BASED ON LEARNER'S INFLUENCE PROPAGATION

K. Venkatesh<sup>1</sup>, K. Sravani<sup>2</sup>,

# <sup>1</sup>Assistant professor(HOD), MCA DEPT, Dantuluri Narayana Raju College, Bhimavaram, Andharapradesh Email:- kornalavenkatesh@gmail.com <sup>2</sup>PG Student of MCA, Dantuluri Narayana Raju College, Bhimavaram, Andharapradesh

Email:- koppinenisravani9@gmail.com

#### ABSTRACT

In e-learning recommender systems, interpersonal information between learners is very scarce, which makes it difficult to apply collaborative filtering (CF) techniques. In this study, we propose a hybrid filtering (HF) recommendation approach (SI  $\Box$  IFL) combining learner influence model (LIM), self-organization based (SOB) recommendation strategy and sequential pattern mining (SPM) together for recommending learning objects (LOs) to learners. The method works as follows: (i) LIM is applied to acquire the interpersonal information by computing the influence that a learner exerts on others. LIM consists of learner similarity, knowledge credibility, and learner aggregation. LIM is independent of ratings. Furthermore, to address the uncertainty and fuzzy natures of learners, intuitionistic fuzzy logic (IFL) is applied to optimize the LIM.

(ii) A SOB recommendation strategy is applied to recommend the optimal learner cliques for active learners by simulating the influence propagation among learners. Influence propagation means that a learner can move toward active learners, and such behaviors can stimulate the moving behaviors of his neighbors. This SOB recommendation approach achieves a stable structure based on distributed and bottom-up behaviors of individuals.

(iii) SPM is applied to decide the final learning objects (LOs) and navigational paths based on the recommended learner cliques. The experimental results demonstrate that SI  $\Box$  IFL can provide personalized and diversified recommendations, and it shows promising efficiency and adaptability in e-learning scenarios

#### **1 INTRODUCTION**

Currently, owing to the plentiful learning materials and the convenient access, e-learning platforms have been widely used by learners to accomplish their study, such as ELM-ART, AHA, etc. The popularity of MOOCs, such as Coursers and edX, further increase learners' interests on e learning. Correspondingly, how to recommend personalized and effective learning resources and learning path to e learners has become an important problem, because more and more learners expect to be recommended with personalized learning content, especially LOs. LOs refer to items with smallest

granularity, such as examples or multiple-choice question.

E-learning recommender system (RS) offers flexibility for learners to decrease the time for searching learning content, increase the learner's interest, and provide the recommendations relevant to the learner's goals or interests. Content-based filtering (CBF), collaborative filtering (CF) and hybrid filtering (HF) are common methods to filter the learning content. CBF recommender systems customize items for users according to what they have learned. Learners' knowledge level, learning ability, cognitive model and learning experience are common recommendation criteria. Furthermore, the similarities between items are critical to recommend what learners might like. However, although some research implemented CBF recommendations by combining multi-dimensional preferences of learners and multi-attributes of items, information overload is normally encountered due to the over specification for certain preferences and the high reliance on learner-item similarity.

### **Literature Survey**

#### **E-Learning Recommendation Systems:**

Explore various types of recommendation systems used in E-learning platforms, such as collaborative filtering, content-based filtering, and hybrid approaches.

Understand the advantages and limitations of each approach in the context of E-learning.

#### Hybrid Recommendation Approaches:

Investigate recent developments in hybrid recommendation systems that combine multiple recommendation techniques to improve accuracy and coverage.

Look into how these approaches have been applied in domains similar to E-learning.

#### **3 IMPLEMENTATION STUDY** Existing System:

Zaiane applied CF techniques to some e-learning platforms which have experienced and wellestablished learning communities. The rating information can be obtained from the interactive evaluation records. Zapata attempted to add voting functionality to obtain the score of learners and items. Aleksandra presented an approach for the implementation of collaborative tagging techniques into online tutoring system. However, not all the learning platforms like to provide interaction entrances or communities, and it is not realistic for learners to rate or tag the large amount of resources during their continuous learning process.

#### **Disadvantages:**

• In the existing work, the system never finds hybrid recommendation for heterogeneous Education system.

• The system approaches for the implementation of collaborative tagging techniques into online tutoring system and which not all the learning platforms like to provide interaction entrances or communities, and it is not realistic for learners to rate or tag the large amount of resources during their continuous learning process.

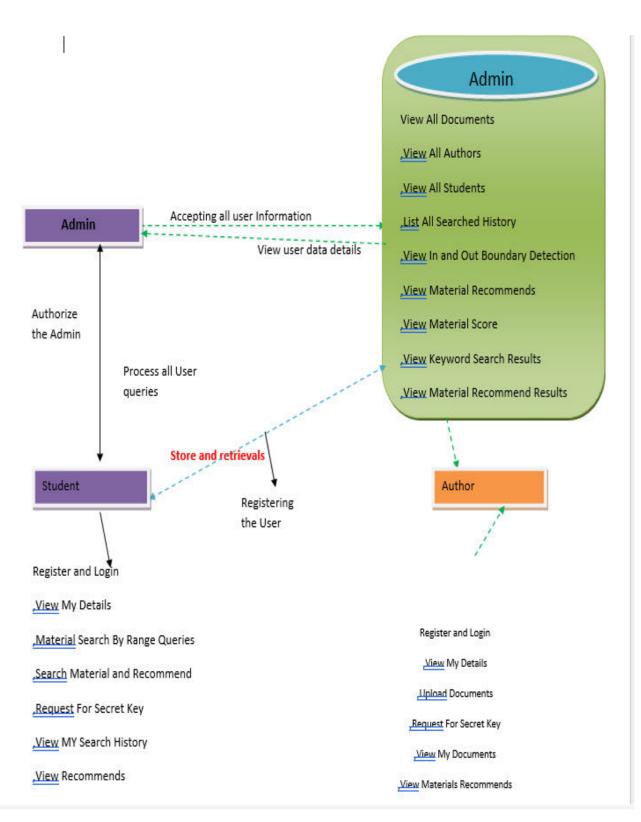
#### Proposed System & alogirtham

The system approaches for the implementation of collaborative tagging techniques into online tutoring system and which not all the learning platforms like to provide interaction entrances or communities, and it is not realistic for learners to rate or tag the large amount of resources during their continuous learning process.

Build a learner model-LIM. LIM includes learner similarity, knowledge credibility and learner aggregation. LIM can be deduced form learning styles and learning profiles directly, so LIM is effective in addressing the extreme data sparsity normally encountered when applying CF techniques.

#### 4.1 Advantages:

- 1. The system is more effective due to adaptive and intelligent educational systems.
- 2. The system is more effective due to provide personalized and diversified recommendations, and it shows promising efficiency and adaptability in e-learning scenarios



**Fig1: System Architecture** 

#### **IMPLEMENTATION**

#### **Modules:**

#### Admin:

In this module, admin has to login and also performs the following operations such as View All Documents, View All Authors, View All Students, List All Searched History, View In and Out Boundary Detection, View Material Recommends, View Material Score ,View Keyword Search Results, View Material Recommend Results.

#### Author:

In this module the author has to register and login and also performs the following operations such as View My Details, Upload Documents, Request For Secret Key, View My Documents, View Materials Recommends.

#### **Student:**

In this module, the student has to register to admin and log in and performs the following operations such as View My Details, Material Search By Range Queries, Search Material and Recommend, Request For Secret Key, View MY Search History, View Recommends.

### **5 RESULTS AND DISCUSSION** Screenshots:

#### **Fig 5.1: Student Registration Form:**

Mail - KOPPINENI H	🧱 Toloka: earn r	money					-	C All Bo
	Home	Admin	Student	Author	Register			
	Welcome Student Us Admin Login Student Login Register here	here in here 1 here	jister			Student Regi Studert Name : Password : E-Mail : Mobile NO(10 Digits) : Location : DOB(dd/mm/yyyr) : Address : Gender : Pin Code :	istration Form dinesh info.hmise@gmail.com 9347225321 vskp 11-may-1899 VskR Male 530001 Submit	

jespublication.com

In the above screenshot a new student was registered.

Fig 5.2: S	Studen	t Log	gin Fo	rm:									
👻 📈 User Login pa	age	× +									-	ð X	
← → C C	) localhost:8080/	A%20Hybrid%	620Elearning%2	20Recommen	dation%20App	roach%20Based%	20on%20Learners%	620Influence%20	Pro 🕞 🕁	▲ 0	<u>۵</u>	A :	
🛃 Mail - KOPPINENI H.	🧾 Toloka: earn	money										All Bookmarks	
							V		V				•
	Home	Admin	Student	Author	Register								
	Welcom Student	e to Log	jin			Student I	.ogin Form						
	Home				1								
	Admin Login				1	Student Name :	dinesh					>_<	
	Student Logi			_		Password :							
	Author Logir Register her						Submit						
		с				Home							
													l
													•
📕 🔎 Type he	re to search		<u>ă</u> i		0	6 G			^ ĝ 🛃 🔳	🕀 🕼 ENG	10:45 24-06-2024	0	

In the above screenshot the student was login after registration.

🕶 💐 User Main Page 🛛 🗙 🕂						-	٥	X
← → C O localhost:8080/A%20Hyb	rid%20Elearning%20Recom	mendation%20App	proach%20Based%20on%20Learners%20Influence%20Pi	ropagat 🛠 🛛 🖊	0	<u>ت</u>	A	:
🕺 Mail - KOPPINENI H 🗾 Toloka: earn money							All Bookm	iarks
Topugua								^
Home Admi	n Student Auth	or Register						h
Welcome to d View My Details Search on Query's Search on Content Request For Secret View MY Search Histo Logout	Кеу		WELCOME TO AUTHOR MAIN Enter Your Password to Get Secret Key (direct) Submit Your Secret Key is->8218455				3	2.2
	_	This template downli	oaded form free website templates	_				
♥ Type here to search	H 😭 🔒	B C	s <u>s</u> s	^ @ ∎ <b>@</b> ¢	) ENG 2	11:13 4-06-2024	$\Box$	

### Fig 5.3: Author Requesting for a Secret Key

In the above screenshot the author was requesting a secret key by entering their password.

# **Fig 5.4: Document Details:**

👻 🔀 User Main Page	x +										-	٥	Х
← → C 0	localhost:8080/A%20Hybrid9	620Elearning%20	Recommenc	dation%20Ap	proach%20Basi	ed%20on%2	OLearners%20Influence%20Propag	at 🖈	▲ 0		រ		:
og Mail - KOPPINENI H	🌉 Toloka: earn money									ļ	C A	ll Bookrr	narks
	Welcome to din	esh	1	<u>.</u>		Docum	IENT DETAILS						*
	View My Details Search on Query's		-	1									
	Search on Content			36									
	Request For Secret Key		-	Materia	Title		Python						
	View MY Search History			Materia	Description		Python is a computer language to do r concepts	achine learnir	ıg				
			-	Materia	Author		Zovaz						
	Logout			Launche	ed By		Ramesh						
				Launche	ed Date and 1	Time	01/08/2019						
				File Nar	ne		Python.txt					>	.<
				Ranks			8						
				View Do	ocument		Learn						
				BACK			arch Data ratio : python s : <b>12.5 %</b> earched data <b>:87.5 %</b>						
Type here	to search			0	6		^	ê 🗉 🤀	(1)) ENG	11: 24-06		$\Box$	PRE

### Fig 5.5: Student Search History

👻 🕺 User Main Pag	e	× +						- 0 X
$\leftrightarrow$ $\rightarrow$ G (0)	localhost:8080	)/A%20Hybrid%	620Elearning%2	0Recomme	ndation%20Approach%20	Based%20on%20Learne	rs%20Influence%20Propagat 🛠	🔺 0 🖷 🖸  🕹 🗄
💁 Mail - KOPPINENI H	. 🗾 Toloka: ean	n money						🗅 All Bookmarks
	Home	Admin	Student	Author	Register			4
	Welcom	ne to <mark>din</mark>	esh		View Your Sea	rched History		
	View My De	etails			Studentname dinesh	Keyword java	Date & Time 13/06/2024 13:25:06	P
	Search on				dinesh	Java dinesh	13/06/2024 13:25:37	
	Search on Content Request For Secret Key				dinesh	raj	13/06/2024 13:25:49	
	View MY S	Search Histo	ry		dinesh	java	13/06/2024 13:26:48	3,6
	Logout				dinesh	11-may-2023	13/06/2024 13:27:12	
					dinesh	java	13/06/2024 13:27:36	
					dinesh	java	19/06/2024 15:48:58	
					dinesh	python	19/06/2024 15:49:39	
					dinesh	java	19/06/2024 15:49:57	
					dinesh	java	19/06/2024 15:50:12	
					dinesh.	iava	19/06/2024 15-50-25	D.
الله المحمد ا	e to search		i 🗋	-	<b>.</b> C V (	3	 ^ @ ■	9 € ⊄) ENG 11:15 24-06-2024 ♀ 🥵

In the above screenshot the student was viewing his history.

Admin Mai Admin Mai	n Page × +	%20Elearning%	520Recomr	mendation%20Approach%20Ba	ased%20on%20Learners%	%20Influence%20Propagat 🛧 🖉	- ០ × . 0 <u>គ ប៉</u> 🔉 :
	H 🧱 Toloka: earn money						🗅 All Bookmarks
	Welcome to AD	MIN		View Search Hi	story	_	
	List All Documents				Story		
	List Authors			Studentname	Keyword	Date & Time	í l
	List Students			Raju	Java	01/08/2019 16:03:09	
	List All Searched History						
	Find Outlier Detection			tmksmanju	Java	01/08/2019 16:41:25	
	Logout			tmksmanju	Java	01/08/2019 16:45:05	
				tmksmanju	an	01/08/2019 16:45:48	3,6
				tmksmanju	Java	01/08/2019 16:47:17	
				Manjunath	Python	01/08/2019 17:30:33	
				Manjunath	Python	01/08/2019 17:31:34	
				Manjunath	Java	01/08/2019 17:33:10	
				Manjunath	Angular	01/08/2019 17:33:22	
				Manjunath	her	01/08/2019 17:33:54	
				Manjunath	01/08/2019	01/08/2019 17:34:16	

In the above screenshot the admin was viewing all the search history search by the students.

# Fig 5.7: Document Score:

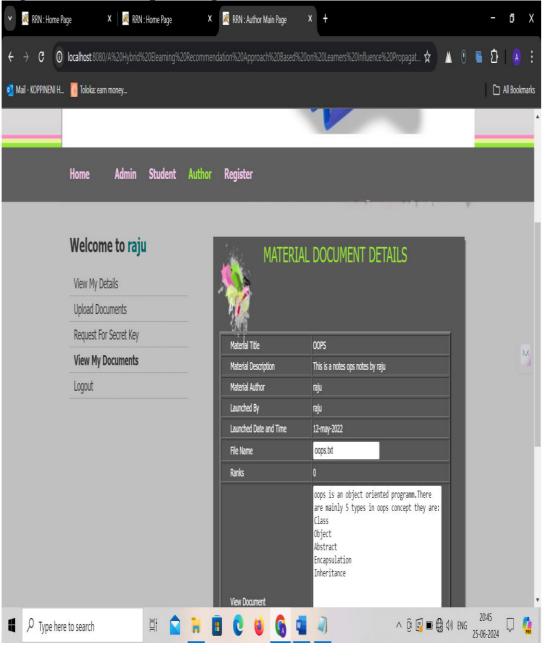
👻 🔀 Admin Main Pa	ige X	+												-	ð	Χ
← → C ()	localhost:8080//	4%20Hybrid%	20Elearning%2	ORecommenc	lation%20Ap	oproach%2	0Based%2(	0on%20Lear	ners%20Influ	Jence%20Pr	opagat 🖈	٨	0	Ď		÷
🕺 Mail - KOPPINENI H	Toloka: earn i	money												0,	ll Bookm	arks
	Home	Admin	Student	Author	Registe	r										*
	Welcom	e to ADI	MIN				D	ocume	nt Scor	e			ĺ			
	List All Docu	ments			<mark>JS</mark> chart	8										
	List Authors			4												h
	List Students	;			24											
	List All Searc	hed History			24 22 20 18 16	_										
	Find Outlier	Detection			18 - 16 -		_								>	c
	Logout			-	Y 14 12 10 8 6 4 2 0	lava D	ot Net Bi	gdata And	iroid X PHF	Angular_	IS Python	java notes			,	
Type here	e to search		Ħ		0	Ú	6				^ ĝ ∎	€ (1)		1:18 6-2024	$\Box$	PRE

# Fig 5.8: Material Recommendation:

👻 📈 View Recomm	ends X +										-	٥	Χ
← → C 0	localhost:8080/A%20Hybri	id%20Elearning%2	ORecomme	ndation%2	)Approach%	620Based%20on%20	Learners%201	nfluence%20Prop	pagat 🛠 🔺	0	Ð		:
🔨 Mail - KOPPINENI H	. 🔣 Toloka: earn money										<u>C</u> A	l Bookm	arks
	Home Admin	Student	Author	Regis	ster								
	Welcome to A	uthor		VIEW	ALL M	ATERIAL RE	COMME	NDATION	DETAILS	L			
	Logout			Id	Materia Id	Recommended User	Matrial Name	File Name	Recommeded Date and Time				
				14	8	Raju	Java	Java.txt	01/08/2019 16:03:12			),	,
				15	13	tmksmanju	Angular_JS	Angular_JS.txi	01/08/2019 : 16:47:29				
				16	14	Manjunath	Python	Python.txt	01/08/2019 17:31:36				
				17	15	dinesh	java notes	java.txt	13/06/2024 13:28:16				
				Back									Ţ
f 🔎 Type her	e to search	ă 🛓				6		٨	ê 📴 🖩 🤀 🕅	INC	20:08 06-2024		RE

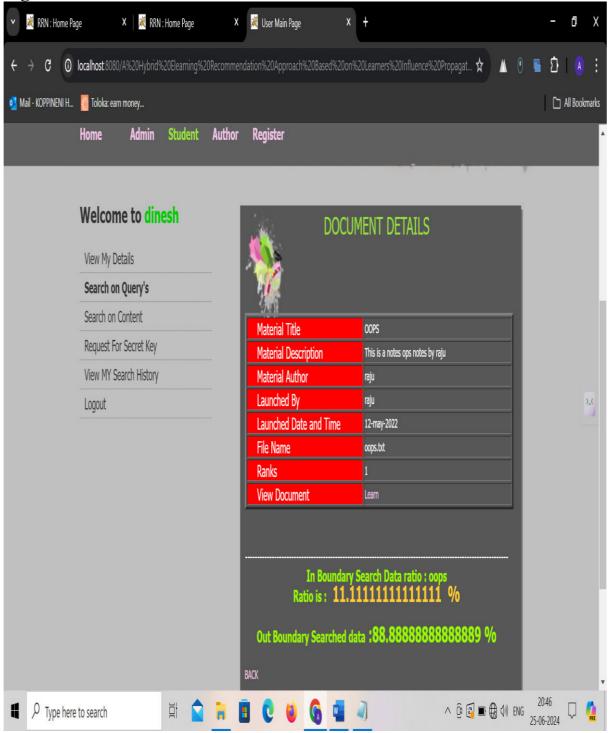
### Fig 5.9: Author document details:

🔹 🤘 RRN : Home Pa	ige X 🛛 💐 RRN	: Home Page	X	🤾 Author Main Page	x +			- 0	Х
← → C 0	localhost 8080/A%20Hybrid9	620Elearning%20	Recommen	dation%20Approach%20Bas	ed%20on%20Learners%20Influence%2	OPropagat 🗙 👗	0	ប់ 🛛	
🛃 Mail - KOPPINENI H	🧱 Toloka: earn money						ļ	🗅 All Boo	okmarks
				-					<b>A</b>
							Y		
	Welcome to raj				DOCUMENT DETAILS				
	View My Details			<u>, 🛝</u> 👘					
	Upload Documents			- <u>W</u>					
	Request For Secret Key			Material Title	Java	1			ľ
	View My Documents			Material Description	Java is OOP				
	Logout		**	Material Author	Herbetz Shield				
				Launched By	TATA				
				Launched Date and Time	01/08/2019				>.<
				File Name	Java.txt				
				Ranks	25				
				View Document	View				
				Material Title	Dot Net				
				Material Description	Dot net is programming language				
				Material Author	Microsoft				
				Launched By	Microsoft		00.4	2	٣
f 🖓 Type here	e to search	ği 😭		0 🕴 🕄	4	^ ĝ 🛃 🖬 🔀 🕪 E	20:1 NG 25-06-		<b>M</b>



#### Fig 6.10: Author uploading a new document:





### CONCLUSION

Different from e-commerce fields, e-learning faces excessive information scarcity, which hinders the application No. 61370137), the National 973 Project of China (No. 2012CB720702), Ministry of Education China Mobile Research Foundation Project (2016/2-7), Beijing emergency project (No, Z171100004417031), and the Fundamental Research Funds for Beijing University of Civil Engineering and Architecture (No. X18070).

#### **7. REFRENCES**

[1] J. K. Tarus, Z. D. Niu, and G. Mustafa, "Knowledge-based recommendation:

a review of ontology-based recommender systems for e-learning," Artificial Intelligence Review, vol. 50, no. 1, pp. 21–48, 2018.

[2] O. Bourkoukou, E. ElBachari, and M. ElAdnani, "A Recommender Model in E-learning Environment," Arabian Journal for Science and Engineering, vol. 42, no. 2, pp. 607–617, 2017.

[3] P. Georgiadis, V. Christophides, and N. Spyratos, "Designing personalized curricula based on student preferences," in Proceedings of the 25th annual ACM international conference on Design of communication. ACM, 2007, pp. 55–62.

[4] G. Adomavicius and A. Tuzhilin, "Toward the next generation of recommender systems: A survey of the state-of-the-art and possible extensions," Knowledge and Data Engineering, IEEE Transactions on, vol. 17, no. 6, pp. 734–749, 2005.

[5] J. Son and S. B. Kim, "Content-based filtering for recommendation systems using multiattribute networks," Expert Systems with Applications, vol. 89, pp. 404–412, 2017.

[6] W. Chen, Z. Niu, X. Zhao, and Y. Li, "A hybrid recommendation algorithm adapted in e-learning environments," World Wide Web, vol. 17, no. 2, pp. 271–284, 2014.

[7] H. Drachsler, K. Verbert, O. C. Santos, and N. Manouselis,

"Panorama of recommender systems to support learning," in Recommender systems handbook. Springer, 2015, pp. 421–451. [8] T. Di Noia, J. Rosati, P. Tomeo, and E. D. Sciascio, "Adaptive Mult attribute diversity for recommender systems," Information Sciences, vol. 382-383, pp. 234– 253, 2017.

[9] X. Zhao, Z. Niu, and W. Chen, "Interest before liking: Two-step recommendation approaches," Knowledge-Based Systems, vol. 48,pp. 46–56, 2013.

[10] z. Wang, j. Liao, q. Cao, h. Qi, and z. Wang, "Friend book: a semantic-based friend recommendation system for social networks,"IEEE Transactions on Mobile Computing, vol. 14, no. 3, pp.538–551, 2015.