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A Proposed Method to Develop Shared Papers for Researchers at Conference

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***Abstract**: In conferences, the topics of interest for papers include variety of subjects, if the researcher wants to write a shared researched paper on specific subject with another researcher who is also interested in the same subject and wants to participate in the same conference, here the problem will arise especially when the topics of interest and number of researchers become large. The aim of the paper is to solve this problem by finding a suitable representation of researcher information of topics of interest that can be easily represented and then found shared researcher on the same topics of interest. Two proposed system algorithms are implemented to find the shared researchers in conference which gives an easy and efficient implementation.*
***Keywords:** Binary vector, conference topics, decimal vector, researcher interesting topics.*

I. Introduction

There has been growing interest in the use of binary-valued features [1]. These binary features have several advantages as they can be faster to compute, more compact to store, and more efficient to compare. Although it is fast to compute the Hamming distance between pairs of binary features, particularly on modern architectures, it can still be too slow to use linear search in the case of large datasets [2], it introduce a new algorithm for approximate matching of binary features, based on priority search of multiple hierarchical clustering trees. Their work has been compared to existing alternatives, and show that it performs well for large datasets, both in terms of speed and memory efficiency. In [3] Faro and Lecroq presented two efficient binary string matching algorithms for the problem adapted to completely avoid any reference to bits allowing to process pattern and text byte by byte.

In [4] Choi, Cha and Charles showed that dissimilarity and similarity through binary vectors has many measures. Some studies as in [4] tried to find a dissimilarity measures between a set of binary vectors for pattern recognition, other studies as in [6] uses similarity measures to identify binary vectors which are: SMC and Cosine similarity measures.

II. Enhancing The Proposed EDM System

This work will enhances the proposed EDM system in ISMAIL (2012) where the interesting subjects will increase the length of the binary vector. As shown in (Table 1), when the conference announce about the topics of interest that specified in the field the researcher can select his own interested topics and submit it to the conference, here the proposed system will store these data in files for further processing. As researchers continue registering their interesting topics, there will be a deadline for submitting. After that the proposed system will analysis these files to find another researcher how is also interested at same topics, as explained below:

Proposed System Outline

1. Conference announcement for topics of interest
2. Researcher registration for his own interesting topics using interface shown in (Fig. 1).
3. Proposed system analysis to find shared researcher:
   Proposal I: Convert interesting topics of the researcher to binary vector.
   Proposal II: Convert interesting topics of the researcher to decimal vector depending on index.
4. Construct a report for each researcher that gives all his interesting topics in the conference with a list of e-mails for the other researchers who has the sharing interest.

III. Design And Implementation Of The Proposed System

3.1 Conference Announcement for topics

When the conference wants to be established it announced for specific topics for example as in IJANS which is the *International Journal on Ad Hoc Networking Systems* on *http://airccse.org/journal/ijans/ijans.html* web site has 41 topics of interest for Ad Hoc Networking Systems [7], (Table 1).

Table 1: Interesting Topics in Ad Hoc Networking Systems Conference

1. Wireless mesh networks and cognitive networks
2. Vehicular networks and protocols
3. Mobile Ad Hoc Networks
4. Sensor networks
5. MAC layer design for ad-hoc networks and WSNs
6. MAC protocols (802.11, 802.15.4, UWB)
7. Multi-channel, multi-radio and MIMO technologies
8. Cross layer design and optimization
9. Wireless Local and Personal Area Networks
10. Home Networks
11. Ad Hoc Networks of Autonomous Intelligent Systems
12. Novel Architectures for Ad Hoc and Sensor Networks
13. Self-organizing Network Architectures and Protocols
14. Transport Layer Protocols
15. Routing protocols (unicast, multicast, geocast, etc.)
16. Media Access Control Techniques, routing and transport Protocols
17. Error Control Schemes
18. Power-Aware, Low-Power and Energy-Efficient Designs
19. Synchronization and Scheduling Issues
20. Mobility Management
21. Capacity planning and admission control in ad-hoc and sensor networks
22. Handoff / mobility management and seamless internetworking
23. Resource management and wireless QoS Provisioning
24. Key management, trust establishment in wireless networks
25. Security and privacy issues in ad hoc and sensor networks
26. Reliability, resiliency and fault tolerance techniques
27. Security, privacy issues in vehicular, DTNs, and mesh networks
28. Operating systems and middle-ware support
29. Novel applications and architectures for WSNs
30. Modeling, analysis and performance evaluation
31. Measurements and Hardware and Software Platforms, Systems, and Test bed
32. Mobility-Tolerant Communication Protocols
33. Location Tracking and Location-based Services
34. Resource and Information Management
35. Security , Privacy and Fault-Tolerance Issues
36. Experimental and Prototype and test beds
37. Quality-of-Service Issues
38. OFDM and MIMD techniques
39. Cross-Layer Interactions
40. Scalability Issues
41. Performance Analysis and Simulation of Protocols

Here the Interesting Topics in Ad Hoc Networking Systems Conference has many fields, so these subjects are converted into visual interface as shown in (Fig. 1): Visual Interface of the interesting topics in the conference, where the researcher will select the interesting topics easily.

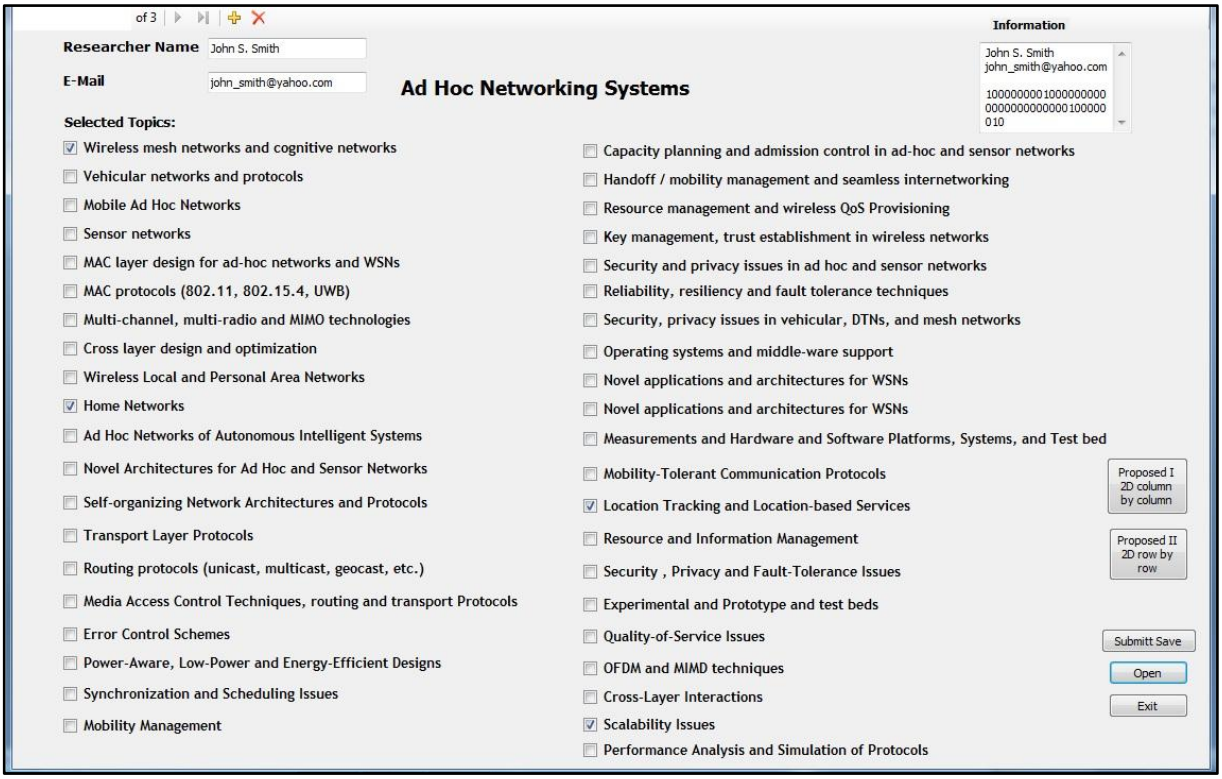

Figure 1: Visual Interface for the Interesting topics in the Conference

3.2 Researcher registration and selection the interesting topics

The researcher must enter his name and e-mail for registration then he can select any topics from the visual interface by clicking on the specified checked box, (Fig. 1). He has the ability to change his selection by click on the checked box again but after submission it is not allow to be changed. When the user press submit button a warning message will be appeared to have the permission from the user to share his e-mail and information with other researchers. All user information is stored in file for further processing.

Here, with each researcher it is important to have the e-mail to know the other researchers that will be have shared papers so they can send e-mail to them. All this information is stored in database that has: Researcher name, E-Mail and a file name that have the interesting topics.

3.3 Proposed system analysis to find shared researcher

This section will explain the two proposed system algorithms that are implemented to find the shared researchers in conference. In the first algorithm it is supposed to have a binary vector for interesting topics and in the second algorithm it is supposed to have a decimal vector for interesting topics that indicate the index of researcher selection of topics of interest in the conference.

3.3.1 Proposal I: Convert interesting topics of the researcher to binary vector

This proposal will find the shared researchers in conference that supposed to have a binary vector for interesting topics by following these steps:

Step 1: Binary vector representation of researcher information of topics of interest
Step 2: Converting binary vector to decimal vector for each researcher
Step 3: Searching for shared interesting between researchers
- Constructing 2D Array for all researchers
- Shared researchers topics

Steps and Algorithms of Proposal I:

Step 1: Binary vector representation of researcher information of topics of interest Researchers' interesting area is converted into binary vector where 1 indicates that the researcher is interested in the field that is specified in the proposed vector of subject for computer science and 0 indicates that the researcher is not interested in the field in the sequence as in conference topics where the length of the binary vector will equal to the number of interesting topics in the conference, so the proposed binary vector length will be 41 and initially it is all 0's.

Initial binary vector: 00000000000000000000000000000000000000000

Here the sequence is important;

- Index 1 in the binary vector indicates the first interesting topic in the table (1) which is "Wireless mesh networks and cognitive networks".
- Index 2 in the binary vector indicates the second interesting topic in the table (1) which is "Vehicular networks and protocols".
- Index 3 in the binary vector indicates the second interesting topic in the table (1) which is "Mobile Ad Hoc Networks".

For example suppose that the researcher after registration select the following topics of interest:
-Wireless mesh networks and cognitive networks
(which in no. 1 in the list that shown in table 1)
-Home Networks
(which in no. 10 in the list that shown in table 1)
-Location Tracking and Location-based Services
(which in no. 33 in the list that shown in table 1)

Index	**1**	2	3	4	5	6	7	8	9	**10**	11	12	……	29	30	31	32	**33**	34	35	36	37	38	39	40	41
Binary	**1**	0	0	0	0	0	0	0	0	**1**	0	0	……	0	0	0	0	**1**	0	0	0	0	0	0	0	0

So the researcher vector that represents the interesting topics will be:
10000000010000000000000000000000100000000
Here the proposed system will put 1 in the vector to indicate selection and 0 for non selection. So in index 1, 10 and 33 in the vector it has 1's and other indices will be 0's and the sequence is important in the binary vector.

Each researcher will have a binary vector that represents his interesting topics.
Researchers' vectors that represent the interesting topics:
Researcher 1:00000000000000000010000000000
Researcher 2:00000000000000000010000000000
Researcher 3:01000000000000000000000000000
Researcher 4:10000000000000000010000000000
Researcher 5:10001000000000000000000000000
Researcher 6:01000000000000000000000000010
Researcher 7: 10111000000001001010000001000
Researcher 8: 10000000011001001010100000010
And so on then all these vectors will be stored in files.

Step 2: Converting binary vector to decimal vector for each researcher

Then the proposed system will convert these binary bits to decimal numbers by arranging it as groups of 4-bits for each decimal number.

Binary vector	**1**000	0000	0**1**00	0000	0000	0000	0000	0000	**1**000	0000	0
Decimal vector	1	0	4	0	0	0	0	0	8	0	0

Algorithm (1): Converting binary vector to decimal vector
Input: Researcher file that contains Binary vector of interesting topics
Output: Decimal vector
Processing:
Begin
Step1: open researcher file
Step2: read the binary vector from file
Step3: for each 4-bit convert it to decimal
Step4: put it in the decimal vector and save it as file
Step5: close researcher file
End

Step 3: Searching for shared interesting between researchers

Each researcher will have a file that contains decimal vector; all these files are opened to read it and stored in 2D array and scan it in order column by column to organize shared interesting between researchers as explained in algorithm (2) and algorithm (3).

Algorithm (2): Constructing 2D Array for all researchers
Input: Researcher files that contains decimal vector of interesting topics
Output: 2D Array of decimal vectors that contains all researchers interesting topics
Processing:
Begin
Step1: read the no._ researchers
Step2: for i = 1 to no._ researchers
for j = 1 to 10
open researcher file #i
a[i, j]= read researcher file #i
next j
close researcher file #i
next i
End

Algorithm (3): Shared researchers topics
Input: 2D Array of decimal vectors that contains all researchers interesting topics and researcher files
Output: Shared researchers topics stored in file for each researcher
Processing:
Begin
Step1: read the no._ researchers
Step2: For i = 1 To 10
For j = 1 To no._ researchers
entity = a(i, j)
For k = 1 To no._ researchers
If entity = a(k, j) Then
Store researcher#k e-mail in file#i
MsgBox(i & j & k & j)
End If
Next k
Next j
Next i
End

Example

Start searching column by column to find equal decimal numbers; means finding shared interesting topics.

Researcher 1: 0000 0000 0000 0000 0010 0000 0000 0 .....
Decimal : 0 0 0 0 2 0 0

Researcher 2: 0000 0000 0000 0000 0010 0000 0000 0 …….
Decimal: 0 0 0 0 2 0 0

Researcher 3: 0100 0000 0000 0000 0000 0000 0000 0 …….
Decimal: 4 0 0 0 0 0 0

As in the example Researcher 1 and Researcher 2 have sharing topics (decimal 2 is found).

3.3.2 Convert interesting topics of the researcher to decimal vector depending on index

This proposal will find the shared researchers in conference that supposed to have a decimal vector for interesting topics by following these steps:

Step 1: Decimal vector representation of researcher information of topics of interest depending on index
Step 2: Searching for shared interesting between researchers
Steps and Algorithms of Proposal II
Step 1: Decimal vector representation of researcher information of topics of interest depending on index

If we limit the researchers' interesting area to 4 topics only that can be selected form conference then the length of the decimal vector will be 4, so each decimal vector will hold an index for the topic that is selected. (4 topics is chosen over 41 topics because it is found after implementing the proposed system that over 60 researchers each researcher choose between 5%-10% of the interesting topics of the conference)

For example suppose that the researcher after registration select the following topics of interest:
-*Wireless mesh networks and cognitive networks*
(which in no. 1 in the list that shown in table 1) *(index 1)*
-*Home Networks*
(which in no. 10 in the list that shown in table 1) *(index 10)*
-*Location Tracking and Location-based Services*
(which in no. 33 in the list that shown in table 1) *(index 33)*
-*Scalability Issues*
(which in no. 40 in the list that shown in table 1) *(index 40)*

So in index 1, 10, 33 and 40 will be the selected interesting topics for the researcher, then the researcher decimal vector that represents the interesting topics will be:
1 10 33 40
Each researcher will have a decimal vector that represents his interesting topics.

Researchers' vectors that represent the interesting topics as index
Researcher 1: **6 8 20 25**
Researcher 2: **1 4 7 30**
Researcher 3: **3 15 23 40**
Researcher 4: **9 11 28 32**
And so on then all these vectors will be stored in files.

Step 2: Searching for shared interesting between researchers

Each researcher will have a file that contains decimal vector of 4 topics; all these files are opened to read it and stored in 2D array and scan it in order row by row to organize shared interesting between researchers as explained in algorithm (2) and algorithm (4). Call algorithm (2) to construct 2D array for all researchers then algorithm (4) as explained below:
Algorithm (4): Shared researchers topics

Input: 2D Array of decimal vectors that contains all researchers interesting topics and researcher files
Output: Shared researchers topics stored in file for each researcher
Processing:
Begin

```
Step1: read the no._ researchers
Step2: For i = 1 To 4
         For j = 1 To 4
            xx = a(i, j)
            For ii = 1 To 4
               For jj = 1 To 4
                  If xx = a(ii, jj) Then
  Store researcher#ii e-mail in file#i
                     MsgBox(i & j & ii & jj )
                  End If
               Next jj
            Next ii
         Next j
       Next i
```

End

Example

Start searching row by row in 2D array to find equal decimal numbers; means finding shared interesting topics. This example searches for topic 8 in all array of 2D to find a shared researcher.

Loop 1:
Researcher 1: **6 8 20 25**
Researcher 2: **1 4 7 30**
Researcher 3: **3 15 23 40**
Researcher 4: **9 11 28 32**
Loop 2:
Researcher 1: **6 8 20 25**
Researcher 2: **1 4 7 30**
Researcher 3: **3 15 23 40**
Researcher 4: **9 11 28 32**
Loop 3:
Researcher 1: **6 8 20 25**
Researcher 2: **1 4 7 30**
Researcher 3: **3 15 23 40**
Researcher 4: **9 11 28 32**
.
.
.

3.4 Constructing report for the researcher

Finally, as algorithm (3) and algorithm (4) will find the shared researchers topics for all researcher a final report will have the E-mails for other shared researchers as shown in (table 2) Where each researcher will have a report.

Table 2: Final Report for the researcher that contains E-mails for other shared researchers

Name: **John S. Smith** E-mail: **john_smith@yahoo.com**	
Researcher Interesting Topics	***Researchers' E-mail***
Wireless mesh networks and cognitive networks	DrMD@yahoo.com
Home Networks	engFRF@gmail.com; DrFK@yahoo.com
Location Tracking and Location-based Services	softwareIT@yahoo.com

IV. Results

All the researchers' information is stored in files including; name, e-mail and interesting topics these files can be used for analysis to find another researcher how is also interested at same topics. In the ISMAIL (2012), the SMC similarity measure and COS similarity measure are implemented between the researchers in order to find the similarity. To enhanced the proposed EDM this proposed system is searching for any topic that is shared between researchers that are selected from the conference topics and not full matching so the SMC and COS are not used. In this Enhanced EDM (proposal I and II) system the 2D data structure with linear search over columns and rows as processing instead of **and** logic operator.

As shown in (table 3) which explains the relationship between the number of researchers that registered in the conference of Enhances EDM system and the number of bits that will be processed. As the number of the researchers increase the number of bits will be increase which then effects the time for processing and searching.

Table 3: Proposed Enhanced EDM for No. of researchers Vs. No. of bits to be processed

No. of researchers	20	60	100	250
No. of bits to be processed	820	2460	4100	10250

The final reports for researchers are important both to the researcher himself and to the conference committee to give indicator for the conference committee about the ideas of researchers that want to participate in the conference and the shared papers over researchers.

V. Conclusion And Recommendations

The binary representation of researcher interesting gives less size for storing information compared to text and also less time when searching for the pattern. Also the decimal representation which depends on index of researcher selection can give less size and time when searching for interesting topics. Here in the proposed system it is not necessary to have full matching between researchers, the proposed system are searching for any topic that is shared between researchers that are selected from the conference topics and not full matching.

For developing the proposed system the researcher may change his interesting areas after registering and submission for future works, but now to solve this problem the proposed system suppose that the researcher will not have the ability to change his selection after submission.

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