



## **Root to Fruit (3): A Framework to Manage Knowledge about Sorting Algorithms**

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### **ABSTRACT**

This paper continues with the initial thought of evolutionary study of sorting problem and sorting algorithms (Root to Fruit (1): An Evolutionary Study of Sorting Problem[1] and Root to Fruit (2): Evolutionary Approach for sorting algorithms)[2] and concluded with a suggestion of creating a framework to manage sorting algorithms related /around knowledge. This paper also consist some possible difficulties and problems in the implementation of suggested knowledge base framework.

**Key words:** Evolutionary study of sorting, Sorting algorithms,  
Knowledge management system for sorting algorithms.

### **INTRODUCTION**

The Evolutionary study of the sorting algorithms consist not only algorithms and related theory but also consist of method of doing research; difficulties and problems occurred during research and how did inventor solved these problems<sup>3</sup> It inspires other researchers and motivates to continue with their efforts<sup>4</sup> Since from the dawn of computing numerous sorting algorithms were found<sup>5</sup> however, some of them only are in use because of inadequate knowledge about sorting algorithmic space<sup>6</sup> Though, This algorithmic activity (Sorting) is identified as significant computer activity<sup>6</sup>. However most of time of computer spent (Approximately 30%) to do sorting task alone<sup>7</sup> therefore ,still this problem falls under unsolved category<sup>8</sup>

There are various reasons which make this domain emaciated as far as depth of knowledge concern. Some of them are as follows

1. Computer professional are unaware about the all the sorting algorithms<sup>6</sup>
2. They has insufficient information about sorting algorithms like
  - a. When to use which sorting algorithm
  - b. In which situation it gives best results
  - c. What are the Benefits of one over other sorting algorithms
3. Computer professionals favor only some of the sorting algorithms over other. Whereas, it has to be used based on the situation and applicability
4. If students asked which memories they carries about sorting algorithms then answers came with only two or three famous sorting algorithms

which are fundamental and which they learnt in their academia<sup>9</sup>

To drop all this flaws and it is essential to study of sorting algorithms from fundamental level and need to form a knowledge management framework which contain information about sorting algorithms from root to fruit.

### **Knowledge Management System for Sorting algorithms**

In this knowledge centric world accurate information is like business asset<sup>10</sup>. Knowledge management perspective has emerged in the strategic management branch<sup>11</sup>. Knowledge has several characteristics which used to decide the depth/quality of the knowledge. proper understanding of the knowledge is the first step of managing knowledge<sup>10</sup>. before suggesting any framework or model for any domain it is require to form a blue print/skeleton for it first<sup>12</sup>

It is not possible to form all approved knowledge management system .since ,knowledge changes continuously therefore moving model is always gives effective results<sup>10</sup> than static one. Before designing a knowledge management system for sorting algorithms ; it is necessary to confirm requirement of knowledge management system for sorting algorithms through some basic questions and their answers<sup>13</sup>

- What is depth of problem?
- How much KM 1 solution is efficient for presented problem?
- Which clues indicates that system should be built?
- Who are the users of it?
- What development strategy and process should be used to build the KM1System for sorting algorithms?

### **KM: Knowledge Management What is depth of problem?**

Study of sorting algorithm always attracts researchers due to its significant role in computing. However, still sorting problem is unsolved. Domain of sorting algorithm is rich in terms of availability of study material and research but there are many loop holes are present in the present domain. Sorting

domain fails to concatenate on certain context and which leads the doubt about the existing study material perhaps this doubt may stand wrong but there is absence of reliable literature in the sorting algorithms space. It indicates that somewhere problem starts from the basic/root level .It ignite the evolutionary study of sorting algorithms. since Evolutionary approach allow the revisit to past or history to dig out the truth or original knowledge and gives chance to correct the mistakes also .[9]

Current sorting algorithm domain consist of certain classification and anatomy to study each of the sorting algorithm in term of complexity, input provided, type of data, its applicability etc. this available classification is not enough to explain various other dimensions of sorting algorithm like; Transition of sorting algorithms from one state to other ,Basic sorting algorithms and their variants, relation amongst various type of sorting algorithms, current status of sorting algorithm(application areas),credential to inventors etc. therefore there is need of knowledge base or KM2 system which contain all the information about the sorting algorithms from the root to fruit and provide space to continues revolution of knowledge in future.

### **How much KM solution is efficient for presented problem?**

KM solution would be efficient solution for presented problem. since, There are absences of generic solution of sorting algorithm<sup>14</sup>. Even it is not possible to prepare generalization of sorting algorithms because of sorting algorithms change from situation to situation<sup>7</sup>. It means for the available solution there is possibility of sorting solution and if it is not available need to find solution for the same .Unfortunately we don't have any system to check whether for any particular situation , availability of solution or not in history?

If it is available one can use directly (1.Which can save time and efforts, 2.Avoid reinvention) and if it is not in place we will think for construction (here is scope for research). And therefore to inculcate sorting algorithmic domain it is necessary to store all sorting related information at one place. Therefore there is requirement of a common container which manages all the affairs related to the sorting algorithms from its origin

to so far. And it also having capacity to predict future trend of the research with support of past and current position of knowledge base .this kind of research would be open doors of abstracted or tacit knowledge which is unknown or kept aside (Intentionally or non-Intentionally )

To pursue this study further and to get appropriate result from this movement there is requirement of knowledge base or a KM system for study of sorting algorithm

#### Which clues indicate that system should be built?

Following indicators implies requirement of KM for study of sorting algorithmic domain.

a. Availability plenty of information in scattered form

- b. Existence of folk lore about sorting algorithms which indicates that people comments on sorting algorithms as per their connivance without any trustworthy reference.
- c. Available classification has several inadequacy in term of chronology
- d. Injustice with scientist and early pioneers, their contribution kept unpublished<sup>9</sup>
- e. There is a absence of relationship amongst various sorting algorithms and their variants
- f. To avoid repetition of same research work requires to visit KM once
- g. Conflicts in the invention years and inventors
- h. This is the high time to conserve available knowledge about sorting otherwise hardly next generation may receive this knowledge
- i. Computer professionals know only some of

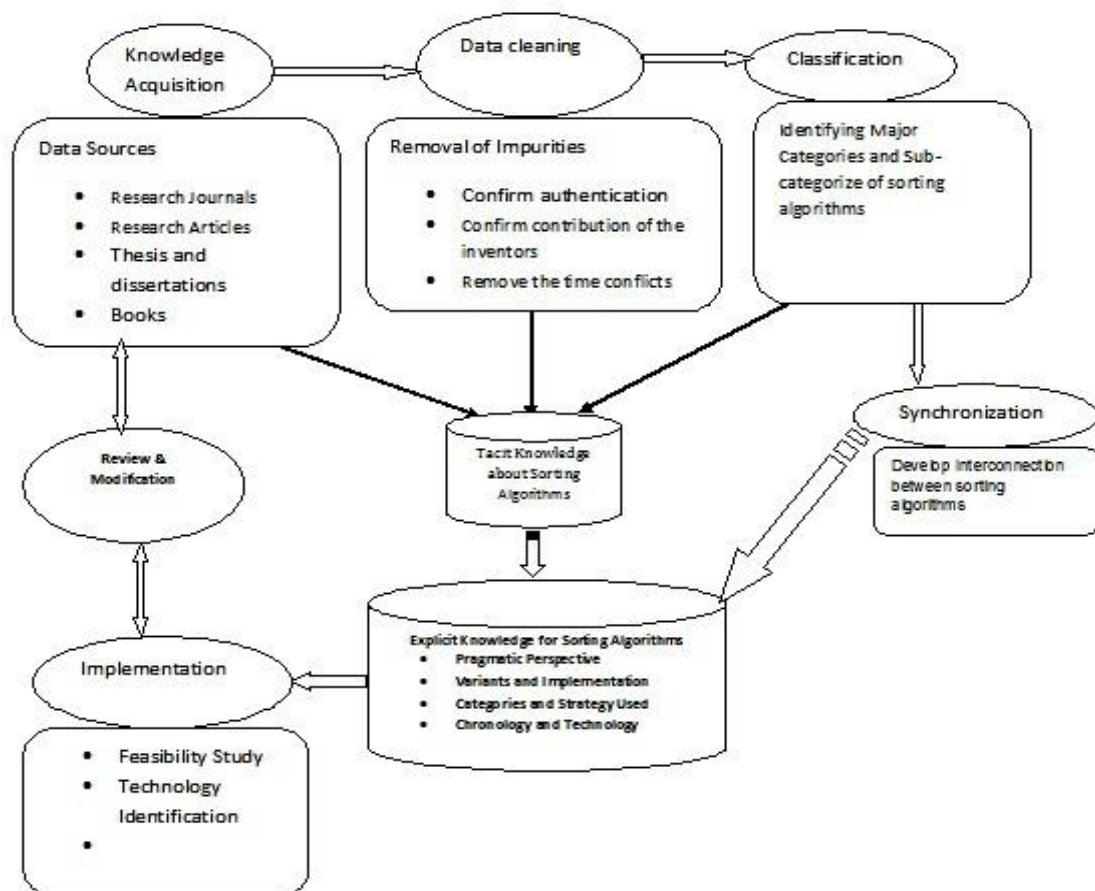


Fig.1. Knowledge Management system for sorting Algorithms

- the famous sorting algorithms which they learn in their academia
- j. academia consist only fundamental algorithms and inventors contribution
  - k. KM useful to find future trend and focus

#### Who are users of it?

KM system or framework for sorting algorithms is useful to the all knowledge seekers .it is more useful to the almost all computer savvy users with various ways. Students, researchers and scientist, computer professionals, academicians etc. are key users of the presented KM

Students: there is significant role of Knowledge management system for sorting algorithm in student's life. KM would be like encyclopedia of sorting algorithms. Which have ability to answer any queries related to sorting algorithms? KM would be motivation and inspiration for them since, which problems faced by early researcher and how did they chase the problem? Their success their struggle and hard work may motivates students a lot

Researcher and scientist: Information from the suggested KM would be beneficial for researchers or scientist in all their aspects it gives cross reference which may avoid the reinvention and repetition of the work. Suggested KM may navigate them to find current position of the research and further .Meaning of research -does not mean invention only. It consist development/ modification in the current scenario also .Some of the past researcher failed due to unfeasible conditions .Now, there is likelihood of feasibility of it in current scenario with the use of advanced research tools and technique .therefore here is scope for researcher to check whether earlier failed research is feasible in the available condition or not ?

A famous Newtonian statement "If I seen further than other because I stand on giants of other" also agrees importance of knowledge base in research i.e. If researcher continues research from current stage then it may save his valuable time and they can provide quality time for the further research

work and automatically it inculcate the KM system which would be great contribution to the body of knowledge

Academician: Academicians plays vital role in the use of KM system. Although, major information which Student having are peculated from their teachers /guide. Therefore, role of academician is equally important in the use of suggested KM system. Suggested KM system would keep them updated.

Computer professional: sorting algorithms have pragmatic importance and this perception of study found that computer professional are unaware about sorting algorithmic space<sup>6</sup>. They know only some of the sorting algorithms which they either use in daily practices or learnt in their academia. Whereas numbers of efficient sorting algorithms are available in this domain suitable to various situations and conditions .Suggested KM system would help them to choose sorting algorithms which best fits the situation and condition

#### What development strategy and process should be used to build the KM System for sorting algorithms?

KM System has several benefits; by imparting of Knowledge an organization can make exponential advantages from KM as individuals gain from it<sup>13</sup>. Figure given below indicates the development strategy of KM system for sorting algorithms. This goes through six processing steps

- I. Knowledge Acquisition
- II. Data Cleaning
- III. Classification
- IV. Synchronization
- V. Implementation
- VI. Review and Modification

Each of these processing steps are indicated with oval ( ) and connected square ( ) symbols consist of activities involved in each of these process. Symbol of container ( ) indicates database storage and arrows ( ) shows the flow of system

### Knowledge Acquisition

Knowledge acquisition is the process of fetching, organizing and managing information. It is identified as initial step of KM system for sorting algorithms and which is major one. Accomplishments of KM mostly rely on the quality of knowledge acquisition. This process collects all required information (further converted in to knowledge) about sorting algorithms from various reliable sources it could be research papers, research articles, thesis and dissertation from trustworthy journals /Journal databases (e.g ACM, IEEE, JGATE, Proquest), books, information from valid internet sources etc.

### Data Cleaning

All collected information from the previous step is not useful for KM. It may consist of certain impurities in terms of relevancy, valid references and truth worthy literature. Data cleaning is the process which responsible for the purifying data, removing of impurities and to make data more reliable

Data cleaning process of KM system for sorting algorithm consist confirmation of contributors credential, removal of time conflict occurred in invention year on the basis of evolutionary study of sorting algorithms. Finally all cleaned information stored at storage point of tacit knowledge<sup>3</sup>.

### Classification

Literature revealed that there are multiple classifications are available in sorting algorithmic domain. Whereas classification which said here is responsible for identification of major categories and sub categories of the sorting algorithms (It consist of all previous study of classification with advantage and disadvantages and tries to make a advanced classification which minimizes disadvantages and loop holes of earlier classifications)

### Synchronization

Sorting algorithmic domain is rich in terms of various sorting algorithms. However these all are not distinct in comparison with each other. there are number of algorithmic are exist in this domain which are nothing but the modification in the earlier one, called as variants of the main one. Perhaps,

more or less sorting algorithms are related to each other with common thread. Synchronization is the process which creates/generate relationship amongst the various sorting algorithms and it is very much essential in the building of KM for sorting algorithms.

### Implementation

Once all above said process does well and technology is feasible for KM system then process of Implementation of KM treats as a final step of KM system for sorting algorithms. In which knowledge collected from the various sources are in together know as explicit knowledge<sup>4</sup>.

### Review and Modification

After implementation of KM system; it is require to managing and maintaining KM system for sorting algorithms for use of human kind. And users have all the rights to make modification in the KM system with valid proof and reference by the protocol decided by KM system developers. This way system automatically will get inculcate and rich.

### Possible barriers for implementation of KM for Sorting algorithm

It seems that, following barriers may come in the implementation of KM for sorting algorithms

1. While capturing KM requires expertise views it is very complicated process to decide who is expertise? So there is need to develop parameters first to decide expertise.
2. Tacit knowledge resides in the minds of expertise. Other side almost all early developers are/were from various part of world .therefore it is complicated task to compile tacit knowledge
3. Heavy cost and human efforts may involved in the prima facie process of KM i.e. for capturing of genuine knowledge, filtrations etc.
4. In the process of synchronization if relationship fails connect sorting algorithms. It results in possibility of isolation of sorting algorithms from the main stream.
5. It is tough task to check knowledge for authentication before posting

### CONCLUSION

Even, rich set of literature, there are certain tribulations and conflicts are exist in the current sorting algorithmic domain .To drop all this flaws and problems it is essential to study of sorting algorithms from fundamental level and need to form a knowledge management framework (fig.1) which contain information about sorting algorithms from root to fruit and to confirm necessity of KM for sorting algorithms some of the following questioned are raised.

- What is depth of problem1?
- How much KM 5 solution is efficient for presented problem?

- Which clues indicates that system should be built?
- What are users of it?
- What development strategy and process should be used to build the KM System for sorting algorithms?

Satisfactory answers of all revealed questions are defines the need of KM system for sorting algorithms .which requires inputs in the form of information from the dawn of computers to so far. Through this system it is possible to solve issues and problems exist in the current sorting algorithmic domain. However, there is possibility of some barrier for implementation it.

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