Component Retrieval Using Genetic Algorithm Based Optimization Technique

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Abstract
Reusable components stored in a repository are useful in developing early System with better quality. One of the most fundamental problems of retrieving software components from a large repository. To reuse a software component, you first have to find it with help of Genetic Algorithm based on Optimization technique. Retrieval of component should be less time consuming and efficient. Genetic Algorithms and Optimization technique is used for finding the best component. Genetic algorithms first short list the components and these components are then refined using Ant colony optimization. Problems such as selecting and retrieving the best component from a repository can be solved by ant colony.

Keywords
Component, Component Retrieval Process, Component Repository, GA based Optimization

I. Component
A component is an existing piece of software written with reuse in mind that can be deployed with little or no modification. “A software component is a unit of composition with contractually specified interfaces and explicit context dependencies only”. A software component can be deployed independently and is subject to composition by third parties.

II. Component Retrieval Process
In the retrieval process, the IR system extracts the documents or more generally, the pieces of information, which will presumably answer the information need formulated by the user.

III. Component Repository
“Component Repository” to store the components that are identified as commonly used components. Currently this repository stores more than 100 reusable components.

IV. Genetic Algorithm
Genetic algorithms are nondeterministic search algorithms based on the mechanics of natural selection and natural genetics in a biological system. Genetic algorithms are robust in many application areas and search a huge problem space while exploiting historical information to speculate on new search points with expected improvement of performance [8]. The genetic algorithms attempts to find a very good or appropriate solution to the problem by genetically breeding the population of individuals.

V. GA Based Optimization
Genetic algorithms are non-deterministic search algorithms based on the mechanics of natural selection and natural genetics in a biological system. The genetic algorithms attempts to find a very good or appropriate solution to the problem by genetically breeding the population of individuals.
Genetic Modification: In this step, genetic operators are applied to the individuals in the previous generation to generate the next generation of individuals. It involves three stages.

- Selection and reproduction
- Crossover
- Mutation

### VI. Comparative Analysis Techniques for Component Retrieval

<table>
<thead>
<tr>
<th>METHODOLOGY</th>
<th>KEYWORDS</th>
<th>PURPOSE/ISSUE</th>
<th>FUTURE SCOPE</th>
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<tbody>
<tr>
<td>Component Classification and Retrieval Using Data Mining Techniques [1]</td>
<td>Data Mining, Component Retrieval, Software Reuse, Artificial Intelligence</td>
<td>Provides an optimal balance between precision and recall rate</td>
<td></td>
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<tr>
<td>Using Genetic Algorithm to Improve Information Retrieval Systems [3]</td>
<td>Cosine similarity, Fitness function, Genetic Algorithm, Information Retrieval, Query learning,</td>
<td>Present a new fitness function for approximate information retrieval which is very fast and very flexible, than cosine similarity fitness function.</td>
<td>Compare the results of two variant algorithms (Classical IR and GA1) with our fitness function (GA2).</td>
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<tr>
<td>Applied Genetic Algorithm in Information Retrieval</td>
<td>genetic algorithms , vector space model, query and documents</td>
<td>Online information retrieval using genetic algorithms to increase information retrieval efficiency. Under vector space model, information retrieval is based on the similarity measurement between query and documents.</td>
<td>The continuous study is testing with larger databases and represents retrieved documents by sequence of fitness values which represent user desire.</td>
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<td>Retrieval of Most Relevant Reusable Component Using Genetic Algorithms [13]</td>
<td>Genetic algorithms, Software Reuse, Software Component Software Repository</td>
<td>Enhances the chance of retrieving appropriate component from the repository that can be reused</td>
<td>Evaluated the small repository containing only code fragments, but same technique with more number of component attributes specific to work product like design documents,</td>
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<td>Effective Software Assembly for the Real time systems using Multi-level Genetic Algorithm [2]</td>
<td>COTS software, Software Assembly, Genetic Algorithm, Dependency Chart.</td>
<td>Multilevel genetic algorithm is used to find the sequence of the assembly order of the software components among the chosen reusable components and effective solution for component assembly in CBSE.</td>
<td>Study for ERP system is used to illustrate the applicability of the proposed approach, and also, it can be extended to any system.</td>
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<td>Automated Component Retrieval and Adaptation Using Formal specifications :</td>
<td>As Per John Penix et.al:</td>
<td>Software reuse, specification-based retrieval, software architecture formalisms.</td>
<td>Identification and retrieval of components pertinent to a problem, and selection and application of architectures available for adapting these components.</td>
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<tr>
<td>Enhancing Component Reuse Using Search Techniques</td>
<td>Zheying Zhang et.al</td>
<td>Component, Search, Reuse, Faceted Classification.</td>
<td>Design a Faceted Component Search Tool in a Meta CASE Environment is Analyzed based on an overview of current information retrieval technique and Comparison of four search techniques</td>
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VII. Conclusion
This paper gives a summary of some soft computing techniques of software Component reuse as well as retrieval from software reuse repository system that is based on CBSE. There are certainly other directions for further research; however, the value of any such future work depends on the specific goals of each particular investigation. These papers represent and attempt to highlight the relevant issues related to reusability of software for component based development using Genetic Algorithm with optimization technique. Challenges related to reusability issues in CBD have been outlined also considering the important issues related to software reusability, some high-level reusability guidelines have been suggested, which will further help in enhancing quality, increases efficiency and productivity activities within organizations adopting CBD using GA based on Optimization Technique.

References

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