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Chapter 9
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Conclusion and Further Work

9.1   Introduction

The previous chapter discussed about the evaluation process of the system. It also discussed about the experimental setup and finally about the results. In this chapter the conclusion will be presented based on the data collected on the evaluation process. It has been also included the achievements of each objectives and also about a major problem encountered during this project. It will also indicate further improvements that can be done to this tool in this chapter.

9.2   Conclusion

When the SOAP optimization tool is used it has reduced the transferred message length to 25% on average. Therefore the reduction ratio is around 75% on average. Test results shows that this ratio is not relevant to the length of the SOAP message. But this will be related to the content of the message being transferred.

When considered the individual data collection of the testing and evaluation it can be seen that when the message length is lower, the total time taken to transfer the SOAP message through optimizer tool is more than the time taken without the optimizer tool. But when considered the trend line of both total time graphs (see the figure 8.2 on previous chapter) it can be seen that the total time taken by the tool is less than the total time taken without the optimizer tool. When the message length is getting larger, the time gap is also getting larger.

By above results it has been proved that it is possible to optimize the web service communication by reducing some commonly repeating parts of the message and then attaching them again on the receiver end. And also this commonly repeating static content can be identified using the Multi Agent Negotiation method with the help of Genetic Algorithms.

During the project first it has been studied about the current approaches taken to optimize the SOAP message communication. It has been also studied about the

context based communication and the knowledge representation while doing the human communication. Then it has been decided to continue on this project and it has been decided to use data clustering to recognize the content patterns and therefore it has been studied about several AI methods to do the data clustering. Finally it has been decided to use multi agent systems to do the data clustering and therefore it has been started studying on multi agent systems. Mean time it has been continued on finding more on current approaches to optimize the SOAP communication. Analysis and design has been started with identifying the core functionality of the system and then assigning core modules for those functionalities. Then it has been identified the agents to be used in the system and implemented them. The evaluation of the prototype has been done by using a sample web-service application.

9.3   Problems encountered

One of the main problems encountered during this project was to find the correct mechanism to do the clustering. After choosing to use multi agent systems, it was found that there are multiple models of multi agent systems that can be used in data clustering process. Then when choosing the most appropriate method of clustering it was found that sometimes it is not converging for a solution because of the nature of the sample data used. Therefore it has been decided to improve the sample data used in clustering process by using genetic algorithms.

9.4   Further improvements

The JGAP java open source library has been used for implementing the Genetic Algorithm part of this tool. During the testing phase it was found that JGAP is not supporting the concurrent instances of populations by multiple agents. Therefore it has made a static synchronized method to access the genetic algorithm functionality and therefore only one agent is allowed to use the genetic algorithm at a given time. If there are multiple agents, then others need to wait until the first one is finished. This will reduce the performance of the clustering process. Therefore as a further improvement to this tool I would like to suggest using a different library to implement the genetic algorithms and improve the performance.

Currently it is processing the complete XML document to find the keywords of the document. But it is not required most of the time. Therefore this tool can be improved

by introducing a mechanism to extract the keywords from XML document by accessing part of the document.

9.5 Summary

This chapter presented the conclusion of the project. Finally it has been concluded that the context based approach can be used to optimize the SOAP message but time improvement can be achieved when the communication is done through the internet or through low bandwidth networks. It is also discussed about the major problems encountered in this project and also about the future improvements that can be done to this tool.