Abstract

Infant mortality is becoming a big issue for every country, including Indonesia; particularly for the case of fetal death in utero that reached 31.3% in the last ten years. One cause of this situation was due to the lack of monitoring of the health condition of the fetus in the womb. This indicates the need for early monitoring of fetal health conditions, one of which can be done through the cardiotocography tests. However, the cardiotocography test that is done manually by a gynecologist, besides it is subjective in nature, it can also lead to a misinterpretation. Therefore, a decision support system that can help gynecologists to determine the classification status of the fetus using cardiotocography test results will be very useful to be provided.

In this final project, a decision support system for diagnosing the fetal condition based on the results of cardiotocography tests was modeled as a fuzzy based classifier. Membership functions and fuzzy rules of the classifier were defined based on data obtained from the repository of cardiotocography data stored at the University of California at Irvine (UCI). Of the overall cardiotocography test data used, some of them were used to define the membership functions and weighted fuzzy rules, while the rest were used to test the performance of the system. The decision support system is realized into an application using the
Java programming language and is designed to run under the Windows operating system.

The application that has been successfully created was tested against the functionality and performance tests. Results of the functionality tests showed that the application has been able to function as expected. Results of the performance tests indicated that satisfactory results were obtained, where an overall accuracy of 95.30% was produced. In addition to this, the predicted classification results that are measured in terms of f-measure indicated that the application are capable of producing sufficiently good performance, where f-measure values of 97.51%, 84.34%, and 94.81% were produced for each fetal status condition (i.e., normal, suspicious, and pathology), respectively.

Keyword: decision support system, cardiotocography test, fetal condition diagnosis, weighted fuzzy rules