Artificial Intelligence (AI) Techniques Applied for the Development of a Clinical Decision Support System (CDSS) for Diagnosing Ischemic Heart Disease (IHD)

International Journal of Computer Applications
© 2014 by IJCA Journal

Volume 101 - Number 9
Year of Publication: 2014

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10.5120/17716-8567

Abstract

Ischemic Heart Disease (IHD) is difficult to diagnose since most of the symptoms and clinical presentations are similar to other diseases. It is a very common, harmful disease, which is identified mostly during the mortality of an individual. The objective is to build a clinical decision support system, which will diagnose the presence of IHD with an integrated automated classifier using Artificial Intelligence (AI) techniques. A retrospective data set that included 800 clinical cases was taken for the work. A total of 88 sets were discarded during pre-processing. Tests were run on 712 cases using the Weka classifiers available in Weka 3.7.0. Out of 113 classifiers, 16 were identified to be the best based on the following parameters: sensitivity, specificity, accuracy, F-measure, kappa statistic, correctly classified cases, time taken to run the model, and the Receiver Operating Characteristic (ROC) curve. The diagnoses made by the Clinical Decision Support System (CDSS) were compared with those made by physicians during patient consultations. The KSTAR algorithm showed the best diagnoses with the highest accuracy 97.32%, sensitivity 98%, specificity 97% kappa 0.95, and ROC 0.995. The authors thus conclude that a CDSS can be developed to assist expert physicians in separating the positive and the negative cases of heart disease.
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References

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2012).

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Index Terms

Computer Science

Artificial Intelligence
Keywords
Clinical Decision Support System (CDSS); Artificial Intelligence (AI) techniques; Ischemic Heart Disease (IHD); Sensitivity; Specificity; Accuracy; F-measure; Kappa statistic; Receiver Operating Characteristic (ROC).