

## **A Proposed Decision Tree Classifier for Atherosclerosis Prediction and Classification**

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Cardiovascular diseases (CVD) represent a big threat to human lives. As most of CVD symptoms are developed silently inside our cardiovascular system, the prediction of the disease before it comes to threaten human's life, represents an appreciated achievement. The tracking of the silent development of atherosclerosis inside arteries may yield to new methods for early detection and prevention of CVD. Atherosclerosis is one of the main causes of CVD. The more silent atherosclerosis is, the more difficult to be detected. It represents a chronic disease that causes arterial wall to be stiffen. Normally, people are not visiting a diagnostic center nor consulting their doctor, unless the risk reaches high level. This study utilized features extracted from photoplethysmogram (PPG) for tracking and evaluating the high-risk atherosclerosis. A sample of 196 participants are enrolled in this study. Their carotid intima-media thickness (CIMT) test were recorded. The PPG's indices along with Age index are fed to a decision tree classifier developed in MATLAB to predict and classify new data into high-risk atherosclerosis or normal atherosclerosis. The developed classifier showed promising results in which it revealed an overall accuracy of 82.6%. Additionally, it showed a sensitivity of 89.3% and specificity of 69.2%. These results represent a new possible method to be valid surrogate measure for atherosclerosis along with the used CIMT test.

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