Optimizing the Holter Diagnostic Process Using a Real-time, Machine Learning-Powered, Ambulatory Event Monitor

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Malfunctions in the heart, known as Arrhythmia, are generally diagnosed with event monitors like the Holter monitor. However, the Holter diagnostics process has some inefficiencies that are addressed in this project. Firstly, a neural network was trained on a dataset of around 100,000 lines, allowing the network to classify ECG beats (1.5-minute intervals) into five predefined Arrhythmia classes, divided by ECG outcome and heart malfunction, and treatment. A prototype event monitor was created to deploy the model, consisting of a small computer, microcontroller, and three lead ECGs. The neural network trained produced a general accuracy of 95 on test data. A web server processed, classified, and organized beats, allowing for beats to be accessed by both patients and physicians. This project explored the development and vitality of a machine learning precursor in a Holter diagnostics flow, adding a real-time aspect to Holter diagnosis.