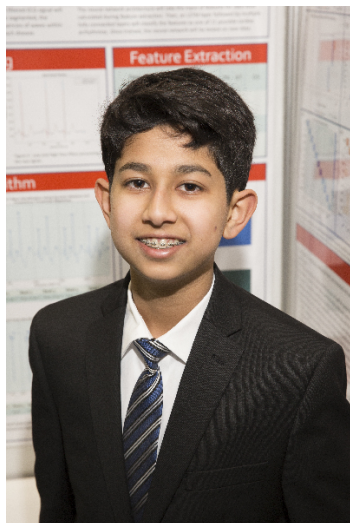


CWSF 2019 - Fredericton, New Brunswick



Shayan Mahmood

DeepWave: Cardiac Arrhythmia Diagnosis Using a Deep Learning ECG System

Challenge: Innovation

Category: Junior

Region: Thames Valley

City: London , ON

School: Mountsfield P.S.

Abstract: Cardiovascular diseases are the leading cause of deaths worldwide. The electrocardiogram (ECG) is commonly used to measure the electrical activity of the heart. Manual interpretation of ECG signals is often prone to errors. DeepWave presents an efficient method for interpreting ECG signals to detect cardiac arrhythmias using a recurrent neural network. DeepWave predicts arrhythmias with 90% accuracy and identifies related arrhythmia classes with similar morphologies.

Biography

Shayan Mahmood is a Grade 7 gifted student at Mountsfield Public School. This is his first CWSF and has been involved in regional science fairs since grade 4. At the Thames Valley Science and Engineering fair he won a gold medal along with 3 special awards including the IEEE award, Research Western Imagination Award and the Beckett Smith Memorial Bit-By-Bit Camp Technology Award. He loves applying STEM in creative ways to solve challenging problems. He plays a variety of sports such as soccer and basketball, loves to read books and enjoys solving math problems. He has also won many awards in math competitions run by Brock and Waterloo University. Shayan created DeepWave, a novel early diagnostic tool for cardiovascular diseases using an intelligent ECG system. This includes the development of a Recurrent Neural Network, along with a segmentation/feature extraction algorithm, which can accurately classify ECG signals into a total of 11 types of cardiac arrhythmias. He would advise other students to never ignore ideas that seem too difficult, with hard work and dedication, anything can be achieved.

Awards

Value

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|---|----------------|
| Excellence Award - Junior - Silver Medal Sponsor: Youth Science Canada | |
| Western University Scholarship Silver Medallist - \$2000 Entrance Scholarship Sponsor: Western University | \$2 000 |
| Total | \$2 000 |