Assessing Medical Condition Severity Through AI Analysis of Textual Symptoms

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The purpose of this engineering design project is to create and optimize an AI-based tool that uses a patient's textual descriptions of symptoms to predict the potential severity of their condition. Train a classification model to identify diseases based on a list of symptoms. Then, parse verbal descriptions of symptoms through a pre-trained Medical NER Model to get a specific list of the symptoms and descriptors. Determine the severity of each descriptor using the severity algorithm, and use the classification model to predict the disease using each symptom. Depending on the potential harm the disease can have, add a disease constant to the sum of the severities of each descriptor to determine the final severity. For the following designs, change the classification model used to diagnose the diseases, the hyperparameters used in the training of the classification model, and the algorithm used to determine the severity of each individual symptom. The winning design has the highest accuracy and the lowest non-zero standard deviation. The winning design was the one with the ANN Disease Classification model, trained with a Learning Rate of 0.00005 and 15 epochs, and the average of the BioClinical-BERT saliency value and the SentiWordNet value as the symptom severity algorithm, as its average accuracy was 95.01% ± 0.07488 and its average standard deviation was 0.2125 ± 0.02075. The model from this experiment can aid individuals facing long waiting times, inefficient care, and other serious problems with the modern healthcare system by assessing the severity of their condition.

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