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Pulsar Candidate Classification with Ensemble Methods and Optimized Dimensionality Reduction LUCAS LIMA, Florida Gulf Coast University — As the volume of pulsar candidate data continues to rapidly increase, filtering for pulsar signals becomes increasingly challenging with existing methods. Detection of pulsars is made inefficient because of the need for manual filtering of candidate signals, and this hinders the potential for collecting larger amounts of pulsar data. This research investigates low-cost methods of automating and optimizing this process of detecting pulsars between given candidates using ensemble machine learning algorithms and dimensionality reduction. Using labeled data published from the HTRU 1 and HTRU 2 surveys, classification models were trained after analyzing and processing the data and then implementing bagging and boosting algorithms. The models were optimized by using a brute-force algorithm that would evaluate the statistical features effects on the models predictive capabilities and remove those that were most detrimental. This would effectively reduce the dimension-size for the learning algorithms and increase overall robustness. The results demonstrate the ability to process almost 2 million candidates every second. In addition, one of the models experimented on HTRU 1 achieved a precision rate of 0.99 and a recall rate of 0.97, outperforming many other existing classifiers.

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