Abstract Submitted
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Predicting high-current disruptions on NSTX with stacked regression trees[1] NATHANIEL BARBOUR, Yale University, KORNEE KLEIJWEGT, Eindhoven University of Technology, LEONARD LUPIN-JIMENEZ, Stanford University, EGEMEN KOLEMEN, Princeton University — Disruption mitigation and avoidance are critical objectives for the successful operation of ITER. Of particular interest is the prospect of predicting disruptions during its first high-plasma-current experiments, when only low-current data will be available. Toward achieving those objectives, data from an initial sample of 1,000 shots are separated into two groups by plasma current. Four regression tree algorithms are then used as disruption predictors: AdaBoost, random forests, extremely randomized trees, and bootstrap aggregating ("bagging"). Each algorithm is trained using data from low-current shots and used to predict disruptions in the sample of high-current shots. To improve prediction accuracy, multiple methods of scaling the input signal data are examined. The creation of a meta-estimator from the predictions of the four regression tree algorithms is explored. A future extension is to predict high-current disruptions on other devices using a meta-estimator trained with low-current data from NSTX and NSTX-U.

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