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An OMFIT Module for Event Detection Using Semi-Supervised Learning[1] KEVIN MONTES, CRISTINA REA, ROBERT GRANETZ, Massachusetts Institute of Technology MIT, DIII-D TEAM — This contribution describes the development of a new OMFIT[2] module designed to accelerate the assembly of large databases of disruption precursor events. Given a dataset of relevant 0D signals from a large number of shots and a few manually recorded times at which the event of interest occurs, the module implements an event detection algorithm based on the label propagation[3] and label spreading[4] methods. Each step in the module workflow is supported by a graphical user interface, allowing for ease of analysis and validation of individual event detections. For a dataset of $\sim$ 300 discharges with manually identified events, it has been shown that both H-L back transitions and initially rotating locked modes can be detected with high accuracy (>85%) when <3% of the events are initially labeled by the user. In addition to reproducing this analysis with a predefined dataset used in the study, users can apply the module to detect other events in a large dataset for which manual identification of events is too time consuming.

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[2]Meneghini O. et al., Nuclear Fusion 55 083008 (2015)
[3]Zhu X. et al., "Learning from labeled and unlabeled data with label propagation." (2002)
[4]Zhou D. et al., Advances in Neural Information Processing Systems 16, 321-328 (2004)

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