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CMPE 257

Project Proposal

The PHM Society holds a data challenge every year, the first place winners have the opportunity to publish a research paper in the conference journal. While analyzing the data and challenge for the PHM Society Conference of 2022, I noticed that the procedure chosen by the winners was excessive and not practical. They chose a hybrid approach that achieved a 100% success rate for the classification of faults, but this was done by using Deep Learning, Depth-wise convolution, Domain adaptation, Metric Learning, Pseudo label technique, Dynamic Time Warping, Cross-correlation, CNN classification, and SVM. The data is sinusoidal time series and labeled, several of the methodologies don't make sense based on the type of data provided, it is clean and has thousands of data points. I would like to attempt to use the methods we're learning in this class to either match or achieve a competitive accuracy with a real world approach. I consulted with one of the PHM Society organizers and their comment was, "They competed with a solution to win, but not one people should in practice use to solve problems.". The third place winners achieved an accuracy of 99.04%, my goal is to obtain an accuracy greater than that.

Citations:

- Oh, H. J., Yoo, J., Lee, S., Chae, M., Park, J., & Youn, B. D. (2023). A hybrid approach combining data-driven and signal-processing-based methods for fault diagnosis of a hydraulic rock drill. *International Journal of Prognostics and Health Management*, 14(1). <https://doi.org/10.36001/ijphm.2023.v14i1.3458>
- Jakobsson, E., Frisk, E., Krysander, M., & Pettersson, R. (2022). Dataset for fault classification in Rock Drills, a fast oscillating hydraulic system. *Annual Conference of the PHM Society*, 14(1). <https://doi.org/10.36001/phmconf.2022.v14i1.3144>