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Dataset Bias in Human Activity Recognition for Industrial Processes

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When creating multi-channel time-series datasets for Human Activity Recognition (HAR), researchers are faced with the issue of subject selection criteria. It is unknown what physical characteristics and/or soft biometrics, such as age, height, and weight, must be considered to train a classifier to achieve robustness toward heterogeneous populations in the training and testing data. This contribution statistically curates the training data to assess to what degree the physical characteristics of humans influence HAR performance. We evaluate the performance of three neural networks on four HAR datasets that vary in the sensors, activities, and recording for time-series HAR. The training data is intentionally biased to human characteristics to determine the features that impact motion behavior. The evaluations brought forth the impact of the subjects' characteristics on HAR. Thus providing insights regarding the robustness of the classifier with respect to heterogeneous populations. The study is a step forward in the direction of fair and trustworthy artificial intelligence by attempting to quantify representation bias in multi-channel time series HAR data.

Type of presentation

Invited Talk

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