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Title: Generating actionable information through the fusion of text and timeseries data: A case study of extreme weather effects at Photovoltaic plants

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Technical Abstract: Extreme weather events can lead to critical infrastructure outages by causing disturbances such as on-site equipment faults or grid disruptions. Monitoring the health of critical infrastructure during these events is done in diverse ways, including evaluations of domain-informed performance data and onsite technical checks. The latter is commonly captured as text-based records that often allow operators the freedom to document relevant details, including specific assets involved and time of the event. However, when considering a collection of events and their impact on performance of critical infrastructure, the unstructured nature of text-based records makes it challenging to contextualize impacts on performance. The analysis presented here addresses this issue by translating the information-dense text data into a structured format using natural language processing techniques. The extrapolated information is then compared to time-series performance data via statistics-derived pattern analysis. Using a case study of utility-scale photovoltaic plants, our findings demonstrate the value of fusing operations and maintenance logs (i.e. text data) and energy production (i.e. time-series data) data for improving understanding and generating actionable information regarding weather impacts.

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