

Learning Operator Interaction from Alarm and Process Data Traces (SA/MA)

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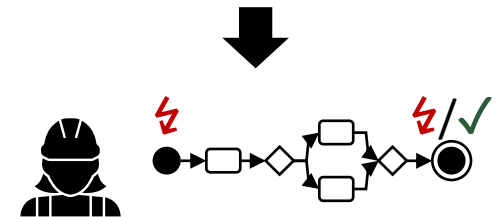


Task Description:

Industrial production machine emit alarms to inform operators about process conditions. In addition, sensor values and state information of the machine are recorded as process data. Previous work shows that Bayesian structure learning uncovers recurring sequences of alarms. Thereby, multiple alarms in a sequence indicate that the operators did not properly fix the original fault.

Your task is to combine the alarm sequence detection described above with process data and expert knowledge about the machines of our partner company Somic. Thereby, you shall automatically generate state charts or behavior trees describing the historical interactions of human operators with the machine and contrast this with Somic's expected troubleshooting behavior. Your work shall include a visualization of the operator behavior.

Alarm c	Area	Alarm text	Status text
25	HMI_RT_1:Alarming	Temp_High	Incoming
26	HMI_RT_1:Alarming	Temp_High	Incoming
27	Alarm	HMI_RT_1:Alarming	Normal
28	Alarm	HMI_RT_1:Alarming	Normal
29	Alarm	HMI_RT_1:Alarming	Normal
30	Alarm	HMI_RT_1:Alarming	Normal
31	Warning	HMI_RT_1:Alarming	Incoming
32	Warning	HMI_RT_1:Alarming	Incoming/Outgoing
33	Warning	HMI_RT_1:Alarming	Removed
34	Warning	HMI_RT_1:Alarming	Incoming
35	Warning	HMI_RT_1:Alarming	Incoming
36	Warning	HMI_RT_1:Alarming	Incoming/Outgoing
37	Warning	HMI_RT_1:Alarming	Incoming/Outgoing
38	Warning	HMI_RT_1:Alarming	Normal
39	Warning	HMI_RT_1:Alarming	Normal



Preliminaries:

- Experience and knowledge in machine learning and statistics
- Knowledge about industrial automation and IEC 61131-3 programming
- Independent and self-reliant work ethic



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