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Maintenance Scheduling for an End-Effector of an Industrial Robot with the Aid of Influence Diagrams

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Abstract: Methods of predictive maintenance are deployed to forecast in which time period maintenance actions should be performed depending on the current condition of equipment and machinery. The advantage of this approach is the ability to perform maintenance at a scheduled point in time when the maintenance activities are most cost-effective and before the equipment loses its performance. In this paper, we describe how to plan maintenance activities depending on the state of several variables of the respective production process. These variables include the wear of the component to be maintained as well as environmental factors like temperature or humidity and observational factors like unusual noise or high pressures. An Influence Diagram has been developed reflecting the dependencies between these variables together with their relations to some utility or cost functions. This influence diagram model enables the planner to create an optimal maintenance schedule. We will exemplify this with the aid of a vacuum seal of an industrial robot's end-effector.

Keywords: Predictive Maintenance, Influence Diagrams, Decision Support, Dynamic Bayesian Networks