

A multi-agent prediction-based diagnosis system

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Abstract: Model-based diagnosis [1] has been successfully applied to several domains including the chemical industry for online diagnosis of plants and processes. Currently most diagnosis systems use their own way to store, load the process system model, the observations and the inference methods.

At the same time, many artificial intelligence (AI) methods have been developed to assist the control engineer in diagnosing faults using e.g. expert systems [2] or neural networks. The notion of multi-agent systems [3] emerged in AI is used to refer to all types of systems composed of multiple autonomous components. This approach represents a new and promising solution for diagnosis based on information from heterogeneous knowledge sources. Thus a multi-agent system can be used for describing the behaviour and the structure of the elements in a diagnosis systems, such as the system model, the observations, the diagnosis and loss prevention methods by using a well established way of formal description. Our aim is to investigate and modify when needed the algorithms of multi-agent systems for diagnosing process plants, especially granulation processes that are able to give advices for the operator to reduce the loss besides of passive diagnosis.

In this paper we describe the design of a framework for a multi-agent prediction based diagnosis system, that includes the exchange of diagnosis information between agents, and the algorithms for improving the diagnosis and loss prevention based on specialized distributed effective and efficient use of the available diagnostic information. The framework is based on a hierarchy of agents that cooperate with each other in order to diagnose a fault.

References

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