

# TROUBLESHOOTING TECHNOLOGICAL AGGREGATES BASED ON MACHINE LEARNING

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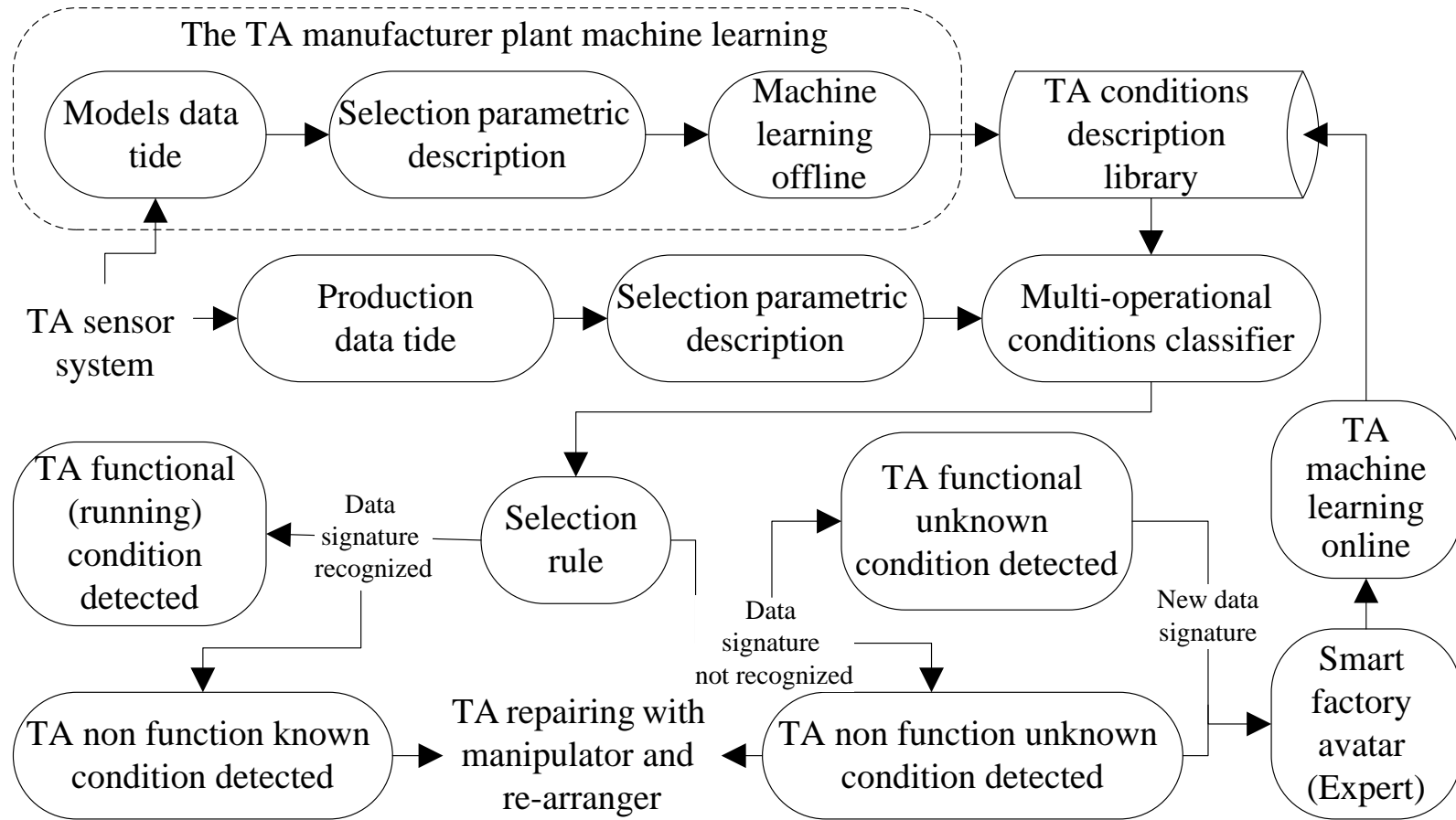
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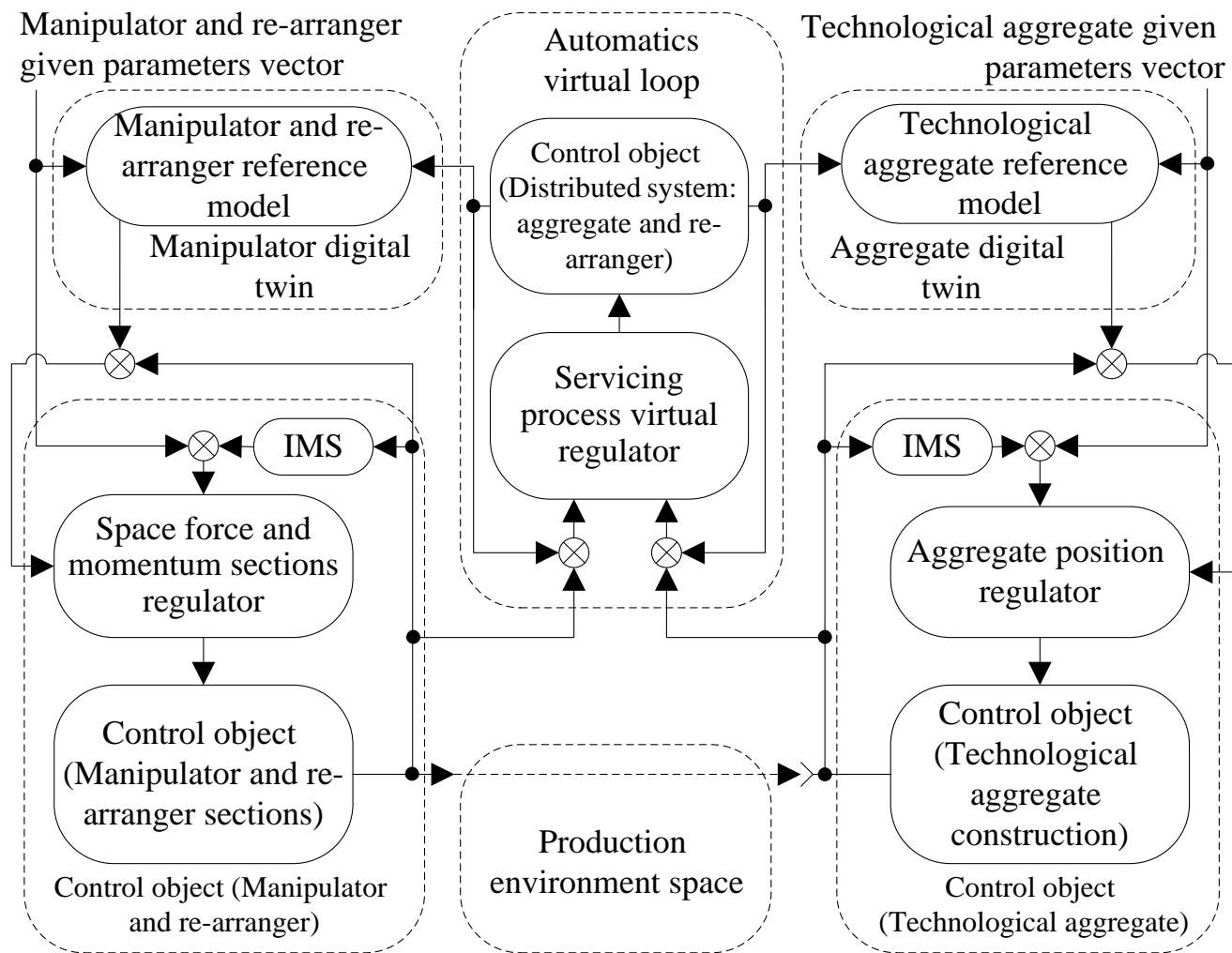
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**Abstract.** The technological aggregates preventive maintenance problem being researched is resistive against a type of failures. The preventive maintenance is a cyber-production control system function and is done by activation of re-arrangement manipulation system, which is used to eliminate technological aggregates failures. The technological aggregates restoration operation technology is viewed as a man substitution in the Industry 4.0 paradigm. The equipment failure is viewed as an incident of cyber-production functional safety system, which is capable to cause a potential complex damage. The equipment robotized maintenance model is oriented to increase the cyber-production functional reliability and to use the machine learning methods to make intellectual the industrial automatics. They analyze the repair and restoration works mechanisms in the process factory level (the physical workshop) and in the analytical factory level (the virtual cloud) for a cyber-production, which interact with operation system. There is the equipment robotized maintenance algorithm proposed, which gives the data to the control system for its actual state. There is the automatic control system scheme proposed to make a technological aggregates preventive maintenance. An option how to change a failed unit is selected after the technological aggregates conditions pre-history analyzing obtained in the stage of machine learning of collected statistics.



**Figure 1.** The Industry 4.0 production TA ML scheme.



**Figure 2.** The control system scheme for the production TA repair and restoration works (IMS – information and measuring system).