
PREDICTIVE MAINTENANCE IN PROCESS MANUFACTURING

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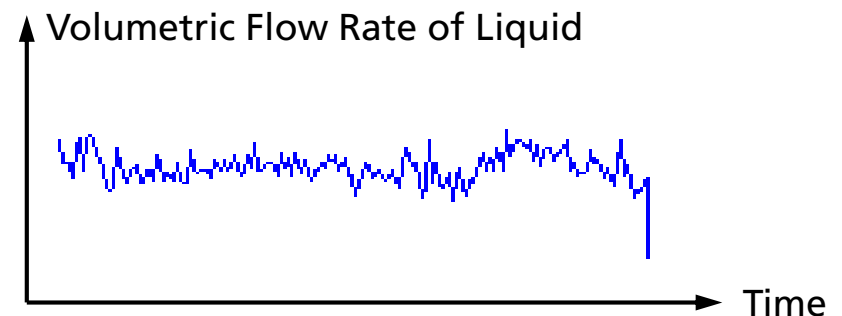
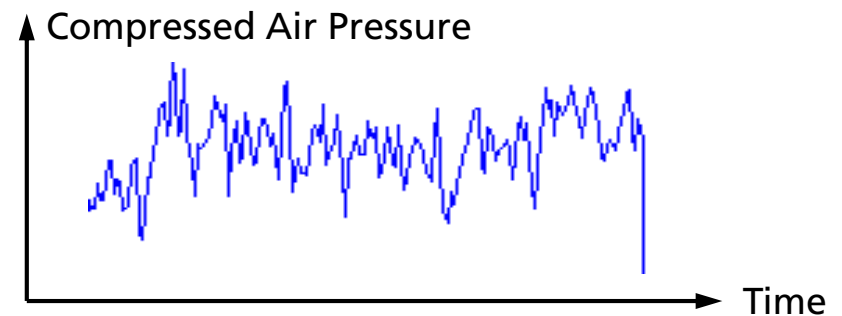
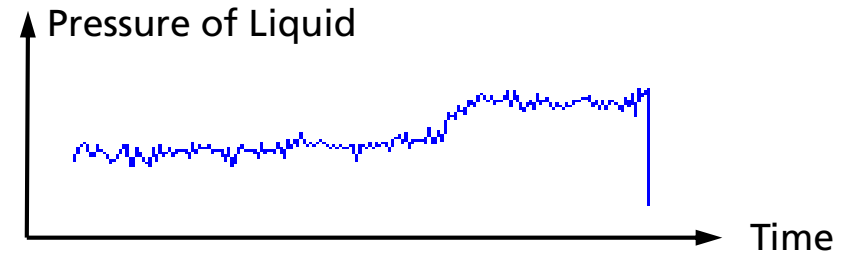
Objectives

- Reduction of unplanned shutdowns due to nozzle blocking
- Model development to forecast the probability of failure of the two-fluid nozzle
- Challenge: small number of incidents

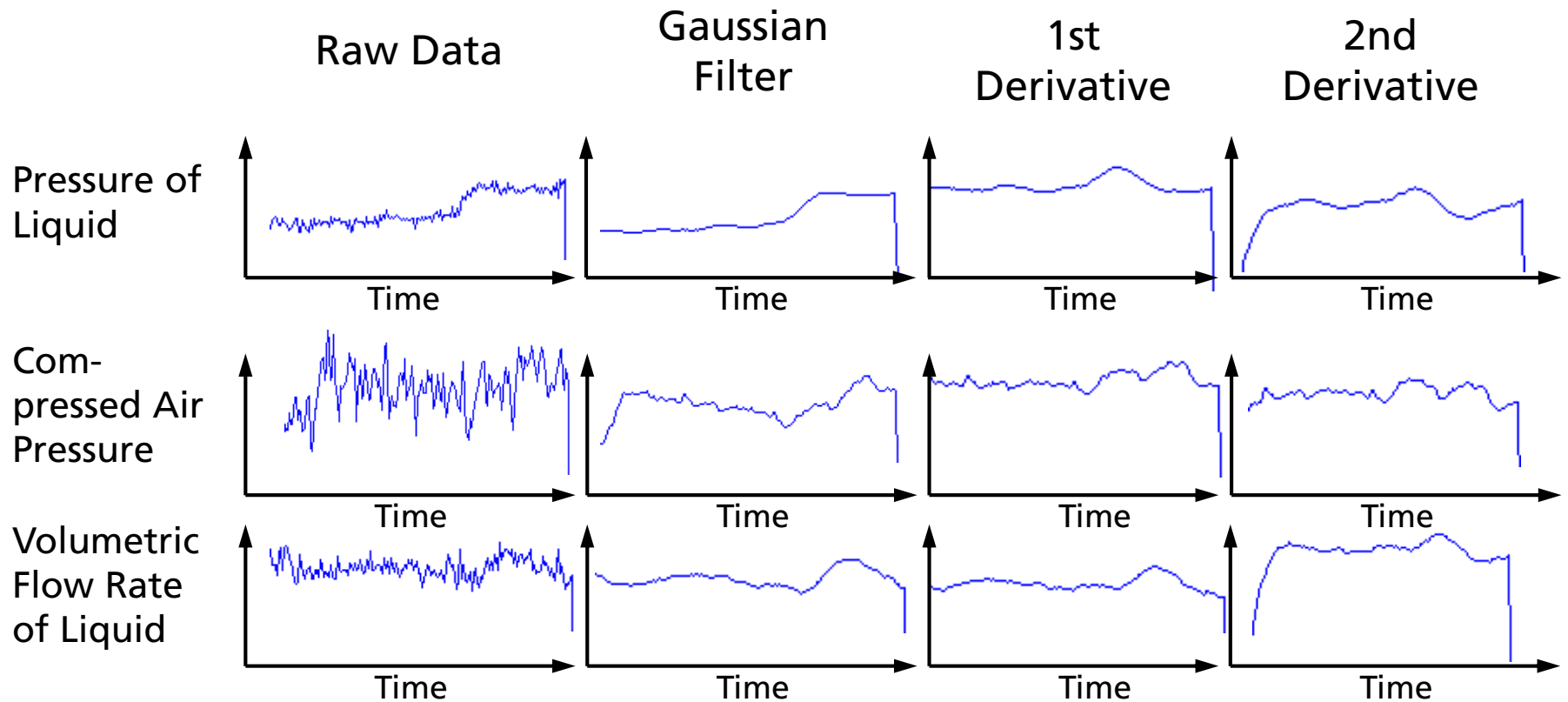


Data Base

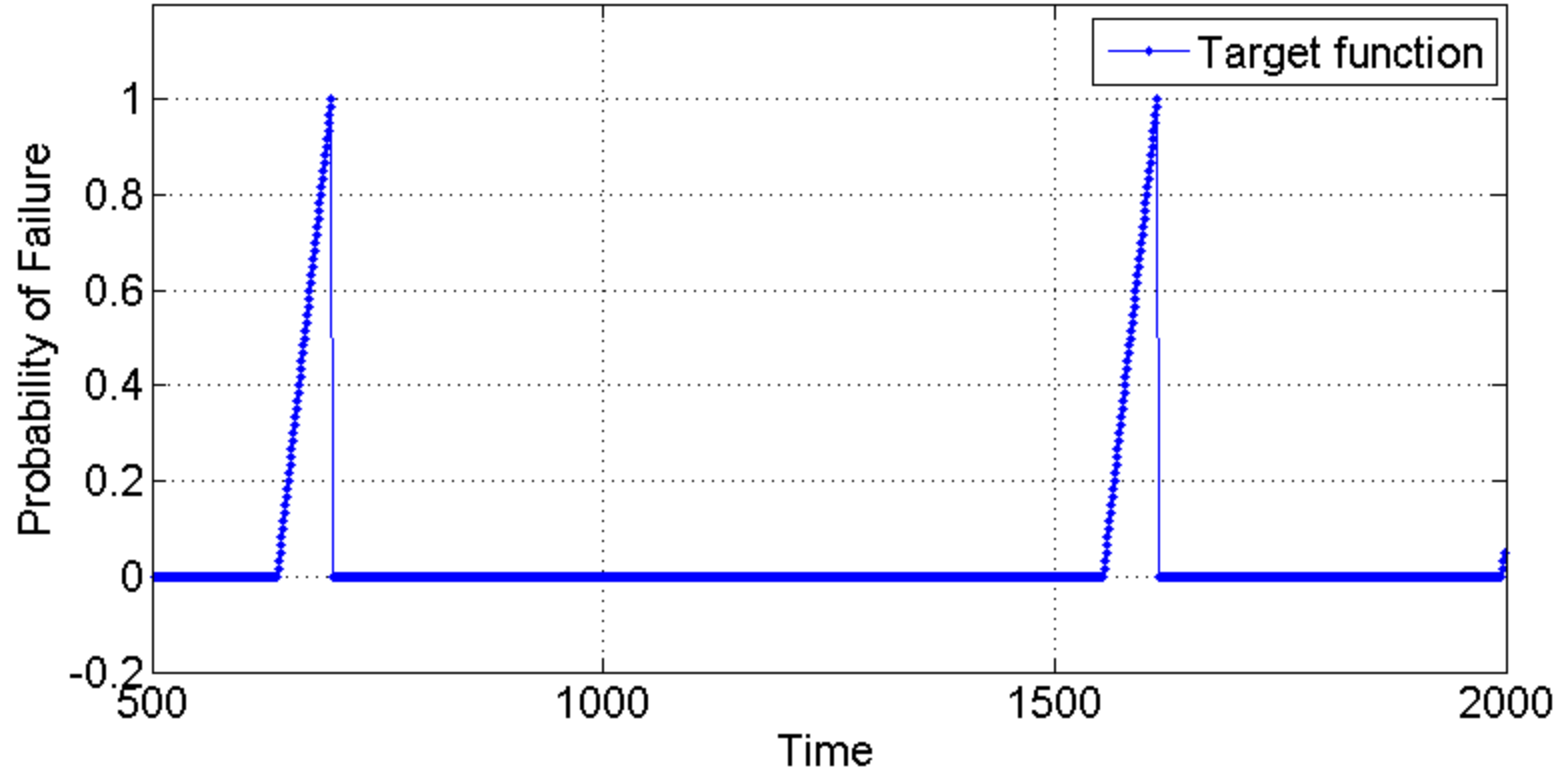
- Time Frame: One Year
- Number of Incidents: 12
- 3 Features: approx. 1,5 MB (1 Hz)



Data Pre-Processing

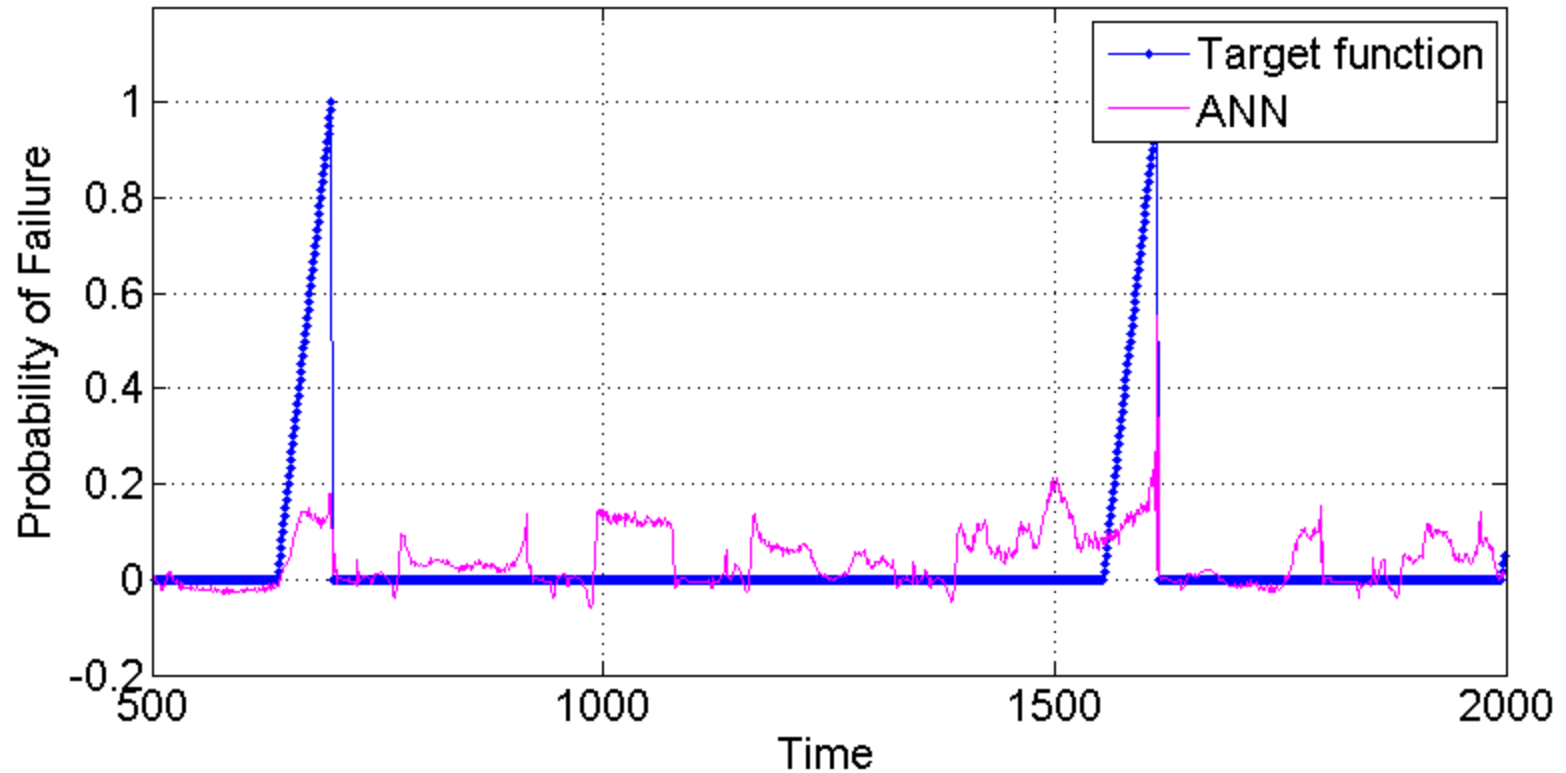


Target function



Intermediate Results

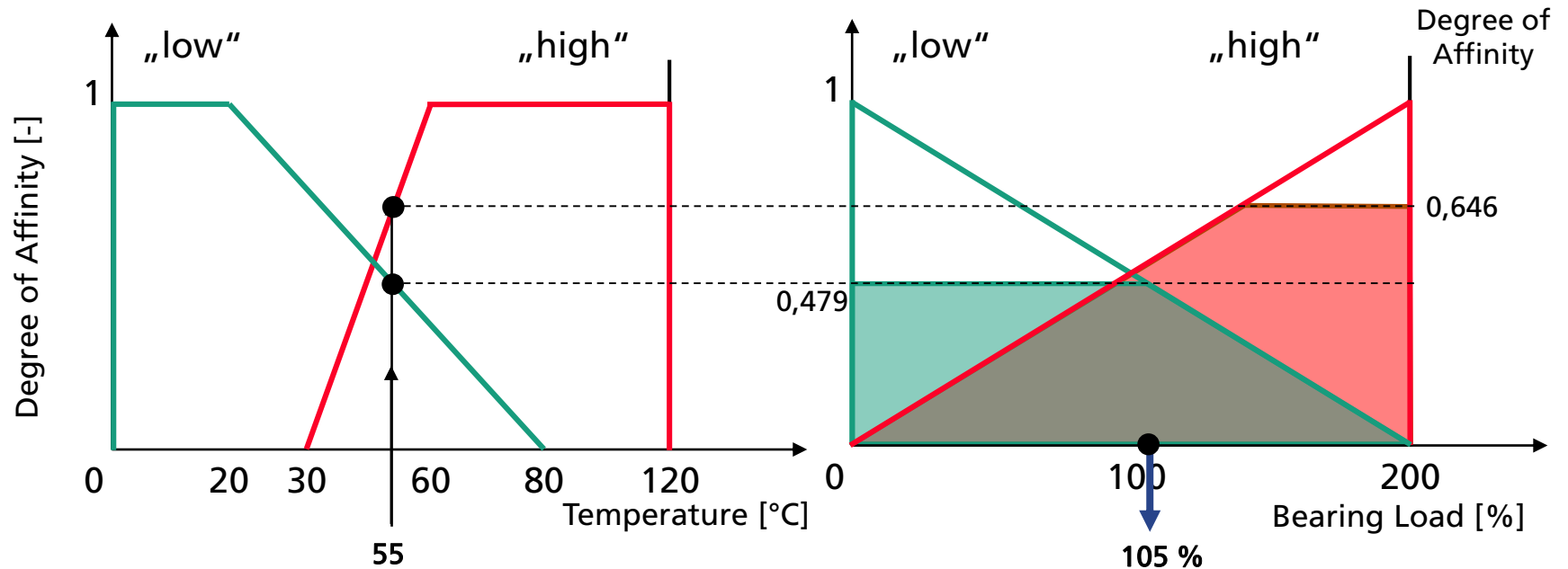
Artificial Neural Network



Quantifying Operator's Experience with Fuzzy-Logic

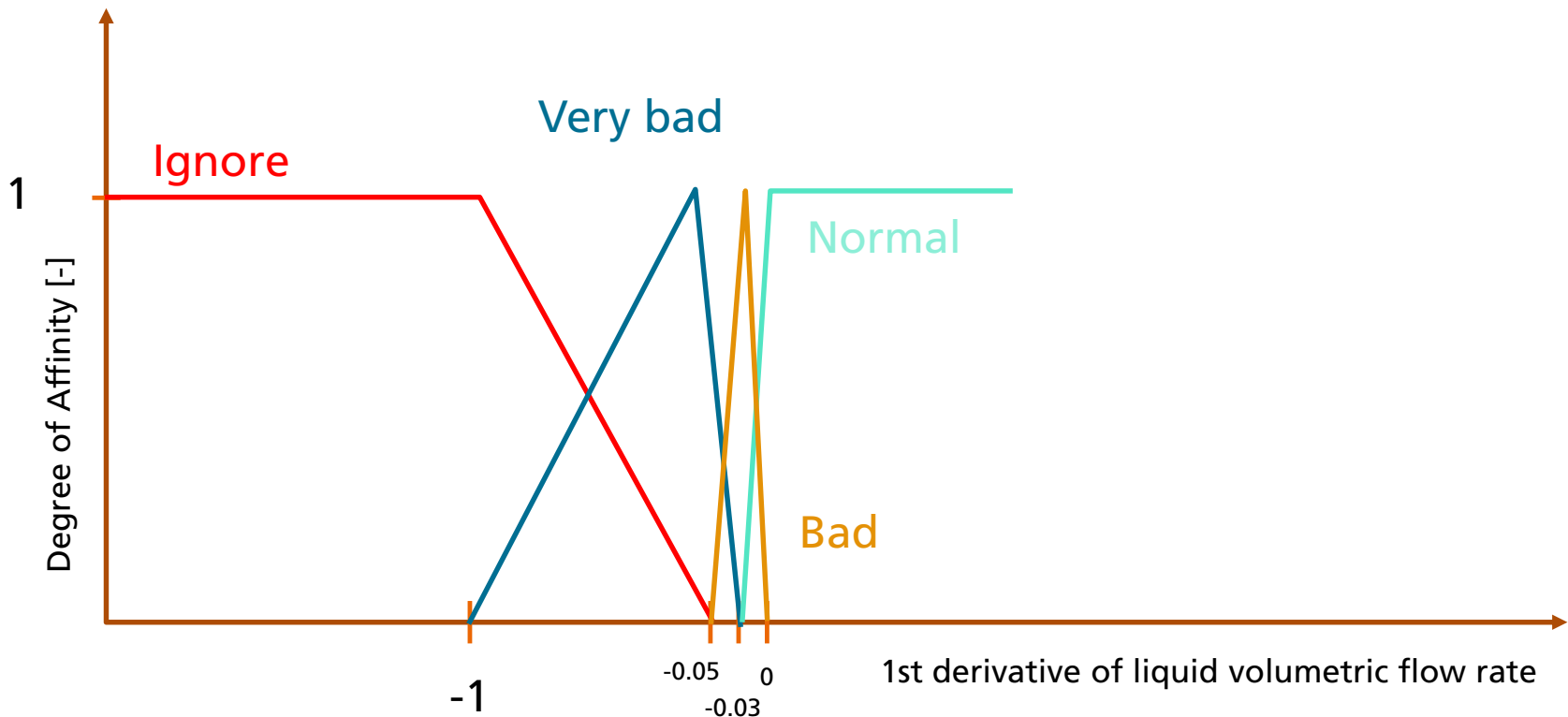
Example: Bearing Load

Statement: „Bearings are harmed by elevated temperatures“



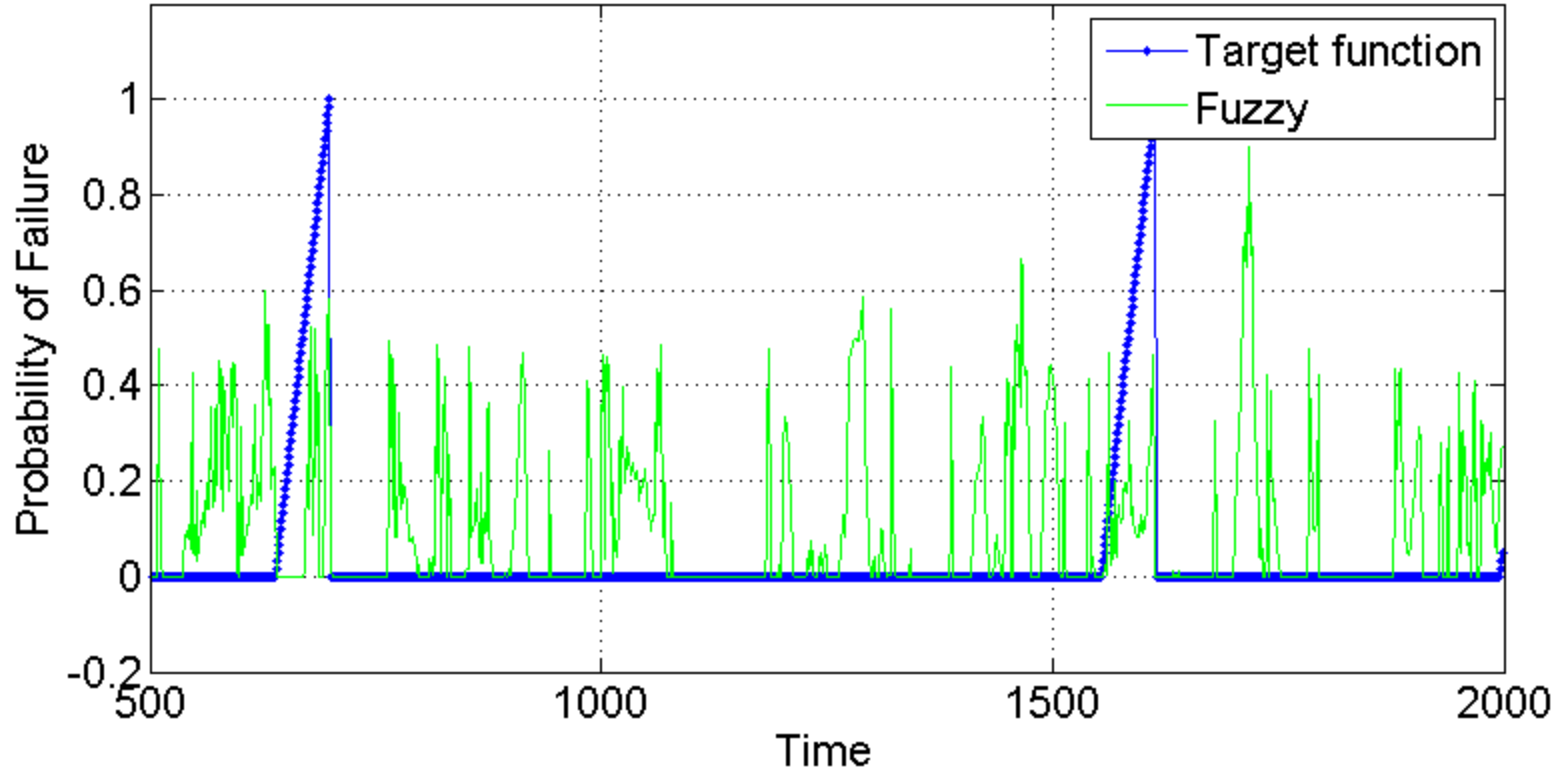
Quantifying Operator's Experience with Fuzzy-Logic

Example: Two-Fluid Nozzle



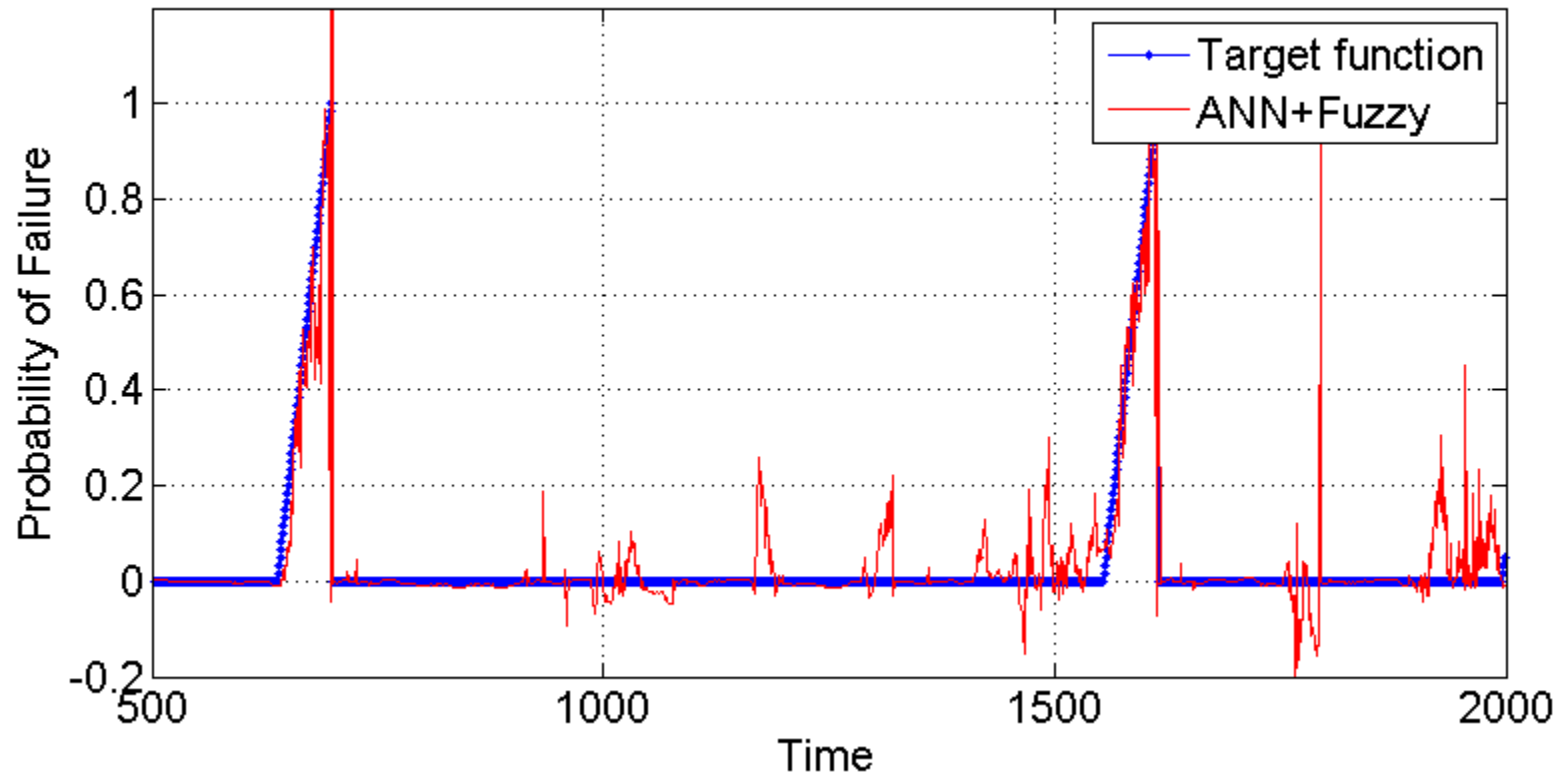
Intermediate result

Fuzzy-Model



Final Result

Combination of Fuzzy-Model with ANN



Acknowledgement



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