

AE-Sensors and Multimodal Sensor Data Fusion in Liquid Flow metering

Master's thesis number: MT - 91-22

Introduction and background:

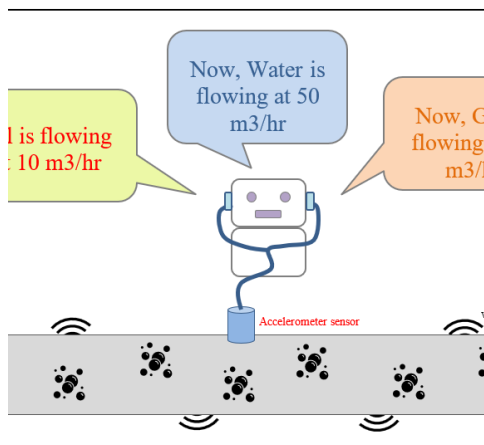
One of the biggest challenges in Oil and gas industries is finding convenient method for accurately measuring flow rate of multiphase materials flowing through a system. There are different approaches done to handle this situation and each ended up with different results. To continue research & development on this topic, two such experiments sites in this case rigs are present, one is in USN and other one in Equinor.

Problem description and objective:

This thesis objective is :

- To determine type of flow flowing inside pipe i.e. Water, Oil or Gas
- To estimate single phase flow velocity using clamp-on accelerometer sensors fitted on outer surface of pipes.

Raw accelerometer data along with other sensor data like temperature, differential pressure is collected at both rigs. Since the main focus is on accelerometer data, complete thesis is done using only accelerometer data. The data is analysed using FFT and PSD plots, filtered and pre-processed. Feature extraction is done. Classification and Regression models are developed and training and testing is performed. Performance of all the models and how good they are able to classify type of flow and predict flow velocity is described in thesis.



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