

A Machine Learning Algorithm for Detection and Measurement of Hydrate Droplets and Agglomerates in Flowlines

Daniel Croce^{C, S}, Hannah Stoner, Kattie Elis and Carolyn Koh

*Chemical and Biological Engineering Department - Hydrate Research Center, Colorado School of Mines,
Golden, CO, U.S.A.
dcroce@mines.edu*

In this work, we show the results of an image analysis algorithm based on machine learning principles, to study the population size distribution of hydrate particles on experimental flow loops during hydrate formation. The algorithm returns the hydrate particle population size distribution of image batches, reducing the time required per image from an average of over 30 minutes to around 10 seconds, when compared to previous image analysis methods (ImageJ software) with comparable results. The images were obtained in a test flow loop using a particle video microscope (PVM) probe, circulating crude oil, gas and water, at temperature and pressure conditions that allowed the formation of hydrates in the line. The automation of the image analysis process reduced the time effort and provided more continuous and discrete data of the particle size behavior in transient state conditions.