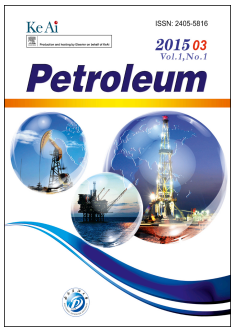
Accepted Manuscript



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PII: S2405-6561(17)30114-1

DOI: 10.1016/j.petlm.2017.11.003

Reference: PETLM 175

To appear in: *Petroleum*

Received Date: 15 June 2017

Revised Date: 22 September 2017

Accepted Date: 22 November 2017

Please cite this article as: P. Panja, R. Velasco, M. Pathak, M. Deo, Application of artificial intelligence to forecast hydrocarbon production from shales, *Petroleum* (2017), doi: 10.1016/j.petlm.2017.11.003.

Application of Artificial Intelligence to Forecast Hydrocarbon Production from Shales

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Abstract

Artificial intelligence (AI) methods and applications have recently gained a great deal of attention in many areas, including fields of mathematics, neuroscience, economics, engineering, linguistics, gaming, and many others. This is due to the surge of innovative and sophisticated AI techniques applications to highly complex problems as well as the powerful new developments in high speed computing. Various applications of AI in everyday life include machine learning, pattern recognition, robotics, data processing and analysis, etc. The oil and gas industry is not behind either, in fact, AI techniques have recently been applied to estimate PVT properties, optimize production, predict recoverable hydrocarbons, optimize well placement using pattern recognition, optimize hydraulic fracture design, and to aid in reservoir characterization efforts. In this study, three different AI models are trained and used to forecast hydrocarbon production from hydraulically fractured wells. Two vastly used artificial intelligence methods, namely the Least Square Support Vector Machine (LSSVM) and the Artificial Neural Networks (ANN), are compared to a traditional curve fitting method known as Response Surface Model (RSM) using second order polynomial equations to determine production from shales. The objective of this work is to further explore the potential of AI in the oil and gas industry. Eight parameters are considered as input factors to build the model: reservoir permeability, initial dissolved gas-oil