TOPIC	**Real-Time Performance Monitoring and Diagnostics of Rod Pump System**
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Machine learning, process modeling, control and optimization
SPEAKER	Dr. Wei Dai, Research Scientist in Rockwell Automation
DATE	Friday September 15, 2017
TIME	3:00 – 4:00 P.M. (EST)
VENUE	Fort IRC 410, North Carolina A&T State University, UTSA and SIPI will be joining through video-conferencing
FEES	No Charge

SYNOPSIS

Rod pump systems are the most commonly used mechanism for oil lifts in the world. The ability to monitor the rod pump operation and diagnose any impending problems with the pump and/or the well is therefore of primary interest to oil field operation. Downhole dynamometer cards (obtained by plotting the measurements of the rod displacement vs. the computed load on the pump, originally developed by Walton E. Gilbert) are viewed as the main information source for performance monitoring and diagnostics of the rod pump and the well today.

Methods to deduce the operating condition of the well and the pump from downhole dynamometer card data are reported both by academia and industry. The use of downhole dynamometer cards are at the heart of many commercial software/hardware products that target performance monitoring and diagnostics of rod pump systems in oil fields around the world.

In this talk, we present a systematic method for automated performance monitoring and diagnostics of the well and pump operating conditions where the streaming card data is processed in real-time. The proposed algorithm uses a hybrid classification approach where both labeled and unlabeled card data would be consumed to generate insight for the operators. The key objective here is to enable the detection of an anomaly in the operation by maximally utilizing prior knowledge while enabling automatic capture of the unique characteristics of a well/rod pump unit solely based on the live operation data.

ABOUT THE SPEAKER

Wei Dai is a Research Scientist in Rockwell Automation. He received his B.S. degree in Automatic Control from Zhejiang University, China in 2010 and Ph.D. degree in Chemical Engineering from Rensselaer Polytechnic Institute, NY in 2014. He was a process control engineer in Corning Incorporated before joining Rockwell Automation. His research interests include machine learning, process modeling, control and optimization with over 10 articles and book chapters in Proceedings of the National Academy of Sciences, AIChE Journal, Control Engineering Practice and others. Dr. Dai also serves as a referee for Scientific Reports from Nature Publishing Group, IEEE Transactions on Automatic Control, International Journal of Robust and Nonlinear Control and other mainstream journals.