Machine Learning; University of Texas Austin Reports Findings in Machine Learning (Strategic Placement of Infill Wells In the Midland Basin: Addressing Stress Depletion From Parent Well Production)

653 words
27 April 2026
Journal of Robotics & Machine Learning
JRML
5473
English

2026 APR 27 (VerticalNews) -- By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning -- Investigators publish new report on Machine Learning. According to news originating from Austin, Texas, by VerticalNews correspondents, research stated, "The growing interest in closely spaced drilling units highlights the need to understand well performance under interference conditions in shale oil reservoirs, particularly in the Permian Basin. Over time, studies of the impact of well completion optimization on production performance, along with studies on parent- child interference, have become more mature."

Financial supporters for this research include University of Texas at Austin's **Bureau of Economic Geology** (BEG) Tight Oil Resources Assessment (TORA) industrial associates' program, BEG management, Publication Grant from the **Bureau of Economic Geology**.

Our news journalists obtained a quote from the research from the University of Texas Austin, "However, the geomechanical effects of stress reduction due to pressure depletion and its influence on child well placement remain underexplored and could potentially play an important role in future well planning. In this study, we examined this effect in the Midland Basin to demonstrate the geomechanical impacts of production- induced pressure depletion on child wells at representative spacings, derived from basin- wide well spacing statistics. Additionally, we consider the relationship between depletion and production performance as a key factor in both early- and late- stage evaluations. We began with hydraulic fracture propagation simulations for two representative horizontal wells as parent wells in the Wolfcamp A (WCA) and Wolfcamp B (WCB) formations. This was followed by coupled flow and geomechanical simulations, yielding insights into changes in the principal stresses during production. To examine whether well spacing and parent well depletion play essential roles in the productivity of nearby new wells (child wells) over time, we utilized machine learning methods, specifically extreme gradient boosting (XGBoost) and SHapley Additive exPlanations (SHAP), to identify critical factors across two representative time periods, using the field data and in- house geological model data. With the knowledge of basin- wide well spacing patterns, we evaluated potential child well placement strategies at various horizontal spacings and stacked placement scenarios at different times during the parent well's production life (1 year and 5 years). Asymmetric growth behavior was quantified to indicate the effectiveness of infill well stimulation. The machine learning analysis shows that for wells completed from 2018 onward, productivity is primarily driven by well spacing and depletion, in addition to well- known productivity drivers (i.e., completion parameters and reservoir pressure). This highlights the importance of spacing and depletion effects in optimizing stimulation performance for recent tightly spaced drilling unit development. In addition, the coupled simulation results indicate that for both WCA and WCB wells, fracture asymmetric growth is not obvious at 1 year of their parent wells' production. WCA child wells show more obvious asymmetric growth characters at later time (5 years) of their parent wells' production, suggesting earlier infill is preferred."

According to the news editors, the research concluded: "Additionally, staggered well placement appears more beneficial for WCA child wells than for those in WCB."

This research has been peer-reviewed.

For more information on this research see: Strategic Placement of Infill Wells In the Midland Basin: Addressing Stress Depletion From Parent Well Production. Spe Journal, 2026;31(3):2033-2048. Spe Journal can be contacted at: Soc Petroleum Eng, 222 Palisades Creek Dr, Richardson, TX 75080, USA.

The news correspondents report that additional information may be obtained from Yiwen Gong, University of Texas Austin, Jackson School of Geosciences, Bur Econ Geol, Austin, TX 78712, United States.

Keywords for this news article include: Austin, Texas, United States, North and Central America, Cyborgs, Emerging Technologies, Machine Learning, University of Texas Austin.

Document JRML000020260427em4r0009d