THE JOURNAL
OF ENGINEERING
IET Open Access Research

Energy - Oil and Gas Research; Report Summarizes Oil and Gas Research Study Findings from University of Texas Austin (Applying Convolutional Neural Networks To Identify Lithofacies of Large-n Cores From the Permian Basin and Gulf of Mexico: the Importance of the Quantity and ...)

573 words
1 November 2021
Journal of Engineering
JOENG
1207
English

2021 NOV 1 (VerticalNews) -- By a News Reporter-Staff News Editor at Journal of Engineering -- Researchers detail new data in Energy - Oil and Gas Research. According to news reporting originating in Austin, Texas, by VerticalNews journalists, research stated, "Convolutional neural networks (CNNs), one of the most widely employed deep learning techniques, have achieved great success in image recognition. However, few attempts have been made in sedimentary studies, partially because it is challenging to generate a large-scale training database for sedimentary data."

Financial support for this research came from STARR-30 program from the **Bureau of Economic Geology**.

The news reporters obtained a quote from the research from the University of Texas Austin, "We compile similar to 32,000 images with interpreted facies from similar to 3200 ft (similar to 1000 m) of cores from the Permian Basin and Gulf of Mexico. This database is used to train and evaluate a CNN model predicting the facies from core images. The best learned model achieves 83% accuracy when evaluated by the independent testing data. More importantly, we analyze the impacts of sample sizes on the prediction accuracy to understand how many samples is needed for a model to return satisfied performance. Accuracy does increase as sample number increases but even the learned model trained by 1% of available data (n = 300) can return 70% accuracy. This result suggests the deep learning model is able to provide fast sedimentary analysis and accelerate the core description processes with small amounts of training dataset. We also show that the model trained from the Permian Basin data set fails to predict the facies of the Gulf of Mexico cores because the two data sets are in different depositional environments. Therefore, a high-quality training database covering different depositional environments is critical in applying artificial intelligence in facies detection. This study suggests the model trained by small amounts of high quality data can aid human interpretation."

According to the news reporters, the research concluded: "It can efficiently provide basic information such as bed thickness, lithology, and net-to-gross ratio to free up geologists to conduct more complex tasks such as interpreting depositional environments."

This research has been peer-reviewed.

For more information on this research see: Applying Convolutional Neural Networks To Identify Lithofacies of Large-n Cores From the Permian Basin and Gulf of Mexico: the Importance of the Quantity and Quality of Training Data. Marine and Petroleum Geology, 2021;133. Marine and Petroleum Geology can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - www.elsevier.com; Marine and Petroleum Geology - www.journals.elsevier.com/marine-and-petroleum-geology/)

Our news correspondents report that additional information may be obtained by contacting Jinyu Zhang, University of Texas Austin, Jackson School of Geosciences, Bur Econ Geol, Austin, TX 78712, United States. Additional authors for this research include William Ambrose and Wei Xie.

Keywords for this news article include: Austin, Texas, United States, North and Central America, Oil and Gas Research, Energy, Convolutional Network, Emerging Technologies, Machine Learning, Networks, Neural Networks, University of Texas Austin.

Document JOENG00020211101ehb1002z7