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Software Description

PyLogFinder: A Python Program for Graphical Geophysical Log Selection

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Abstract

Background

Many petrophysical or geophysical applications often involve using the same type of geophysical logs from different locations, stored in different Log ASCII Standard (LAS) files. The LAS format is a structured ASCII file format containing log curve data and header information for records of several sub-surface measurements as functions of depth. Checking for specific logs in a large database of LAS files can be painstaking process taking several days. This process is further complicated by the use of mnemonics (different names) for the same log-type by different companies.

New information

PyLogFinder is a Python program for automating the process of analyzing a large database of LAS files and selecting the LAS files that contain specific geophysical logs needed. PyLogFinder uses a mnemonic database of 2665 common mnemonics in searching the LAS file database. The mnemonic database can be easily edited and expanded by the user. This affords the user the possibility of searching the LAS database using mnemonics they are familiar with. PyLogFinder then generates a list and a graphical representation displaying the results.

Keywords

Python; Log Finder; Geophysical logs; Well logs; Wireline Logs

Introduction

The LAS format is a standard file format common in the oil and gas and water well industries for storing well-logging data; it contains records of several sub-surface measurements as functions of depth. Many petrophysical and rock physics processes require using the same type of log present in numerous LAS files from different locations (see Amosu and Sun 2017a, Amosu and Sun 2017b, Amosu and Sun 2017c, Amosu and Sun 2017d, Amosu and Sun 2017e). However, searching for logs in a large database can be a complicated process involving opening multiple LAS files to see if they contained the needed logs. This can be a time-consuming process spanning several days for a moderately large database. PyLogFinder is developed to address this problem. PyLogFinder is a Python program for automating the process of analyzing a large database of LAS files and selecting the LAS files that contain specific geophysical logs needed. PyLogFinder uses a mnemonic database containing 2665 common mnemonics in searching the LAS file database. The mnemonic database can be easily edited and expanded by the user. This affords the user the possibility of searching the LAS database using mnemonics they are familiar with.

Usage and demonstration

The software and example files can be found at the web URL link: https://doi.org/10.5281/zenodo.1149502.

To run it, make sure "PyLogFinder.py" is in the same directory with the directory containing LAS files and the excel spreadsheet "Database.xls'.

The program can be run in the command line as follows:

- python PyLogFinder.py Foldername_containing_LAS_files, List_of_Mnemonics_separated_by_commas
- For example: python PyLogFinder.py TEST_DATA,DT,DTS,GR,LLD,PE

PyLogFinder generates a list and a graphical representation displaying the results. Fig. 1 shows an example of the generated graphical representation for a search for four log types: DT (sonic travel time), GR (gamma ray), LLD (deep lateral log resistivity), and PE (photoelectric factor) in a database. The LAS files that have the logs are shown in green while those that don't are shown in white. PyLogFinder provides a quick visual analysis of LAS files in a database, appropriate for specific petrophysical or geophysical applications.

	DT	GR	LLD	PE
./TEST_DATA/FILE1.LAS		🟩		
./TEST_DATA/FILE2.LAS		🟩		
./TEST_DATA/FILE3.LAS	🟩	🟩		
./TEST_DATA/FILE4.LAS		🟩		
./TEST_DATA/FILE5.LAS	🟩	🟩	🟩	🟩
./TEST_DATA/FILE6.LAS	🟩	🟩		🟩
./TEST_DATA/FILE7.LAS		🟩	🟩	🟩
./TEST_DATA/FILE8.LAS			🟩	🟩
./TEST_DATA/FILE9.LAS	🟩	🟩	🟩	🟩
./TEST_DATA/FILE_10.LAS	🟩	🟩	🟩	🟩

Figure 1. `doi`

Graphical representation of logs present in several LAS files. The green color represents logs present and the white color represent logs which are not present.

Project description

Title: PyLogFinder: A Python Program for Graphical Geophysical Log Selection

Study area description: Data used in this study is from the Maracaibo basin, Venezuela

Web location (URIs)

Download page: https://doi.org/10.5281/zenodo.1149502

Technical specification

Platform: Cross-Platform

Programming language: Python

Usage rights

Use license: Creative Commons Public Domain Waiver (CC-Zero)

References

- Amosu A, Sun Y (2017a) FischerLab: An interactive program for generating dynamic Fischer plots from wireline logs and stratigraphic data. AAPG Annual Convention and Exhibition. AAPG
- Amosu A, Sun Y (2017b) Sequence stratigraphy, chronostratigraphy and spatio-temporal stratigraphic thickness variation of the Agbada Formation, Robertkiri and delta fields, Niger Delta, Nigeria. Gulf Coast Association of Geological Societies Transactions 67: 3-12. https://doi.org/10.6084/m9.figshare.5687791.v1
- Amosu A, Sun Y (2017c) WheelerLab: An interactive program for sequence stratigraphic analysis of seismic sections, outcrops and well sections and the generation of chronostratigraphic sections and dynamic chronostratigraphic sections. SoftwareX 6: 19-24. https://doi.org/10.1016/j.softx.2016.12.003
- Amosu A, Sun Y (2017d) WheelerLab: An interactive program for sequence stratigraphic analysis of seismic sections and the generation of dynamic chronostratigraphic sections. AAPG Annual Convention and Exhibition. AAPG https://doi.org/10.6084/m9.figshare.5688451
- Amosu A, Sun Y (2017e) Visualization of angular unconformities and tectonic angular discordance measurement constraints by structural geometrical flattening: Case studies in the Permian (California), Grand Canyon (Arizona), Chad Basin (Nigeria), Algarve Basin (Iberia) and the Aegean Sea Basin (Turkey). Gulf Coast Association of Geological Societies Transactions (67)13-21. https://doi.org/10.6084/m9.figshare.5688469