

# Predict Missing Log Curve with Machine Learning

**Hadyan Pratama**

Master of Petroleum Geoscience | Data Science Freelancer

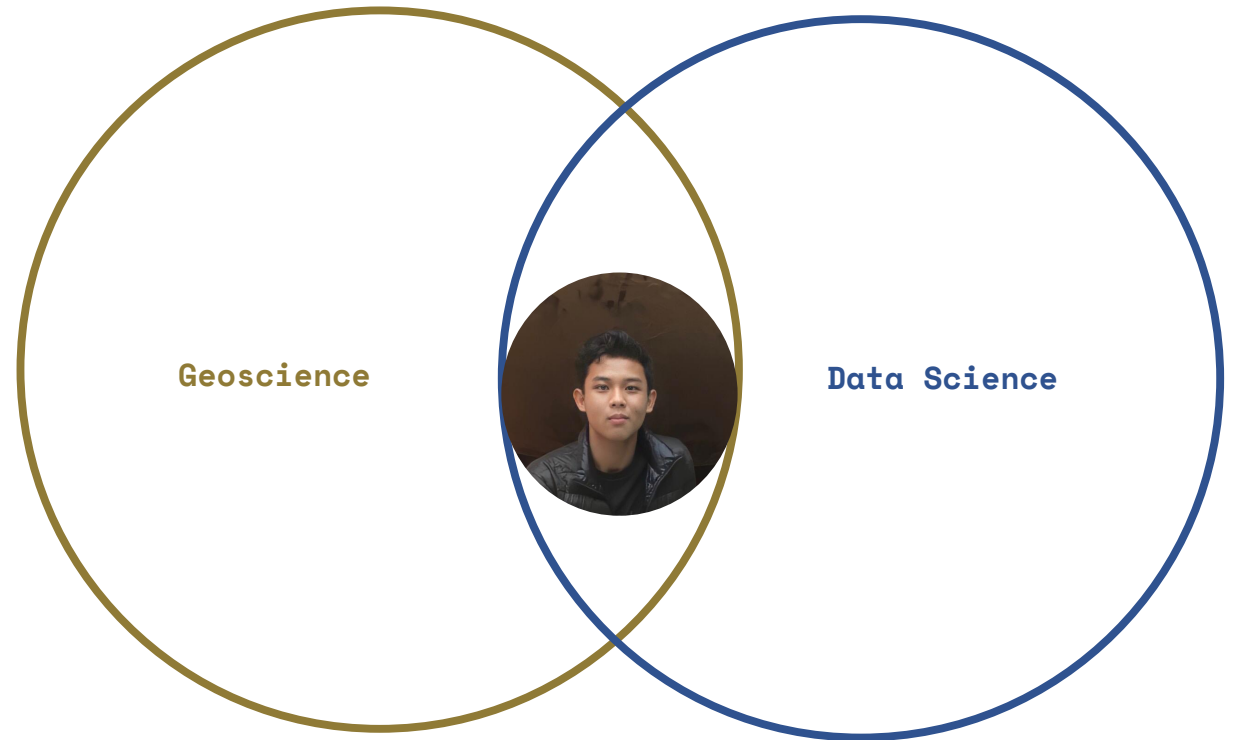
# Hadyan Pratama

## *Current*

Master student in **Petroleum Geoscience** based in Perak, Malaysia.

My research interest is to **apply AI** in **geoscience** world.

Outside of research, I am a Data Science Freelancer with 90+ projects and 70+ clients from various industrial backgrounds.

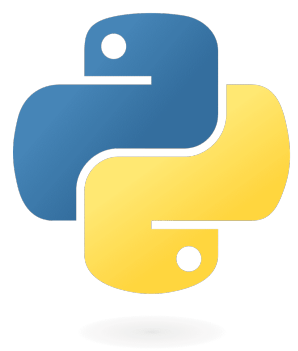




What will we  
do today?

- ✓ Load .LAS file into Python
- ✓ Exploratory Data Analysis (EDA) on log data
- ✓ Features selection
- ✓ Data preparation
- ✓ Model building
- ✓ Machine Learning Algorithms
  - Linear Regression, Decision Tree, Random Forest
- ✓ Model evaluation
- ✓ Missing log estimation on real data

# Tools



python<sup>TM</sup>



Jupyter



pandas

matplotlib

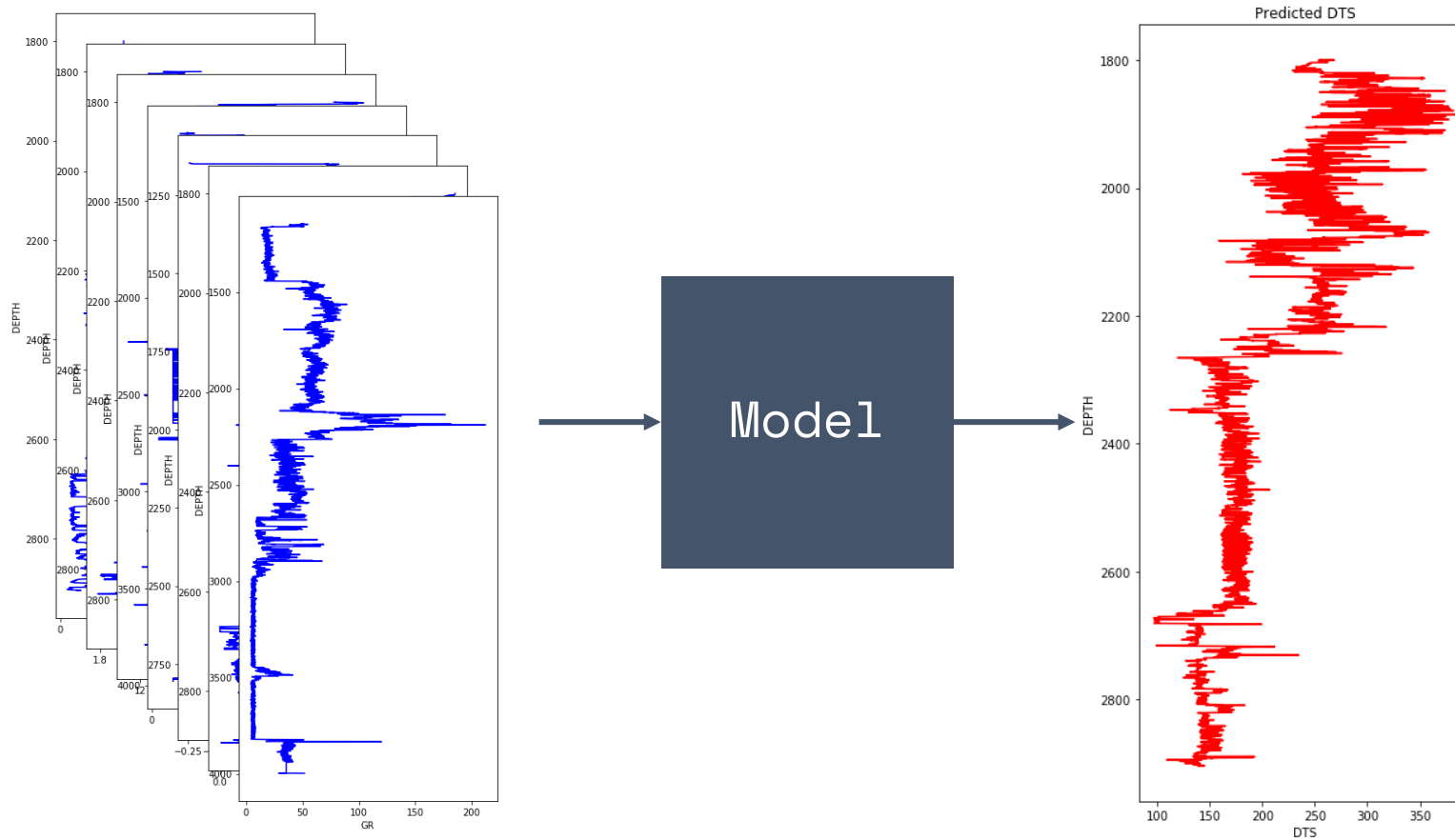


seaborn



*lasio*

# Estimating Log Curve



Input: Other well log curves

Output: Missing log curve

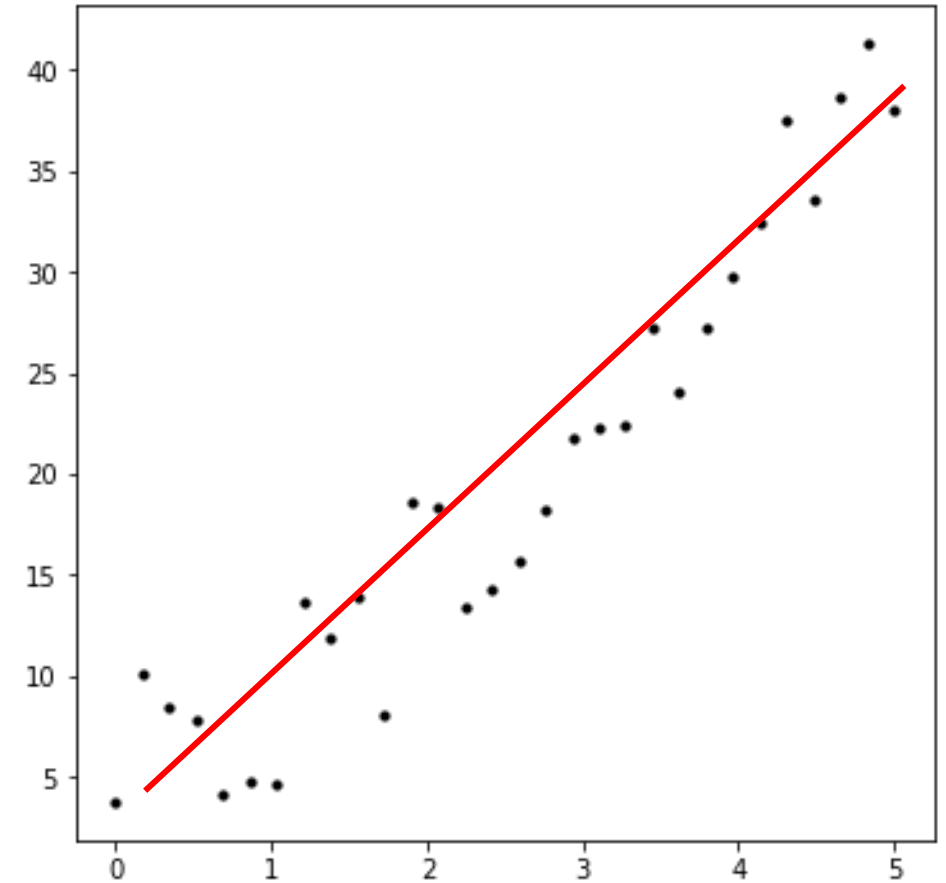
# Model: Linear Regression

Isn't it a technique from statistics?

**Yes!**

A **linear model**,  
e.g. a model that  
assumes a linear relationship  
Between the input variables ( $x$ )  
and the single output variable ( $y$ ).

What if the relationship is  
**Not Linear?**



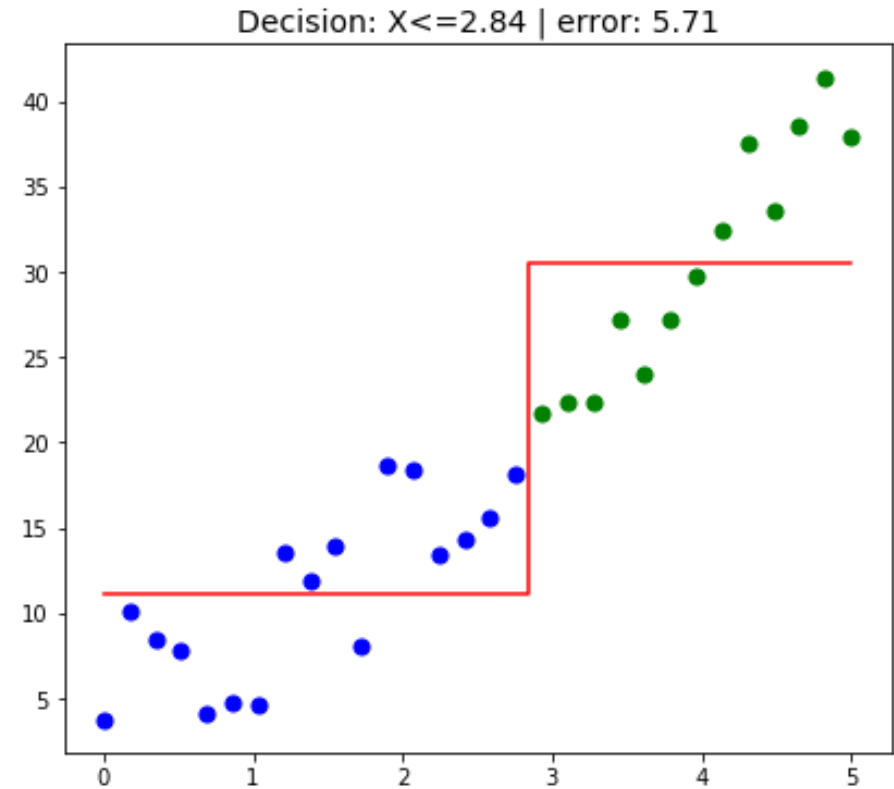
# Model: Decision Tree

Regression models in the form of a tree structure.

Wait, what?

So, It breaks down a dataset into smaller and smaller subsets.

Then this smaller subsets has two or more branches, each represents a decision on the numerical target.





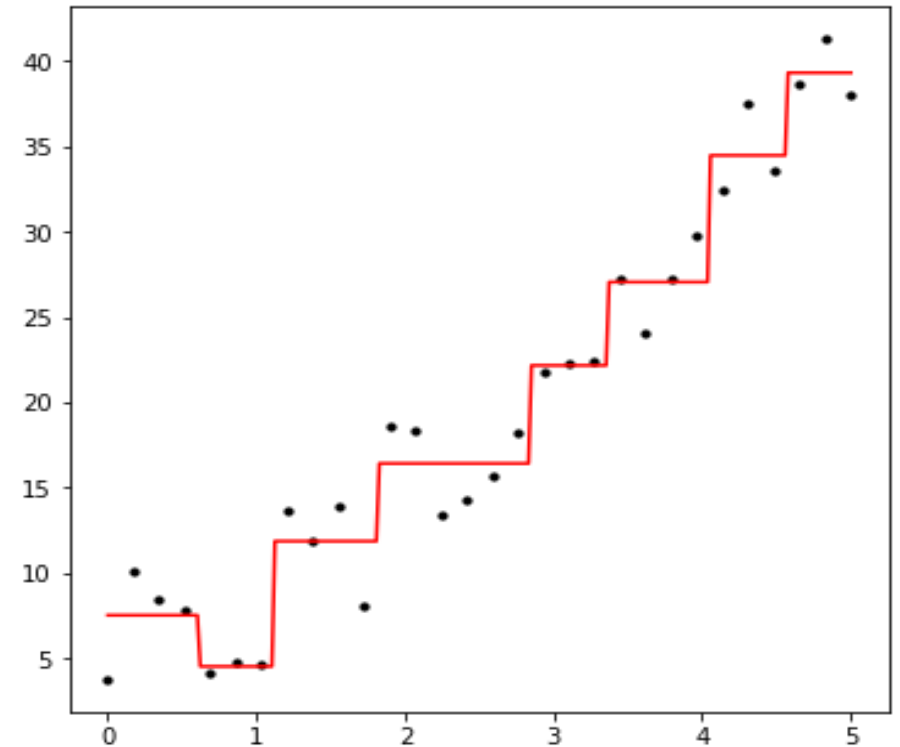
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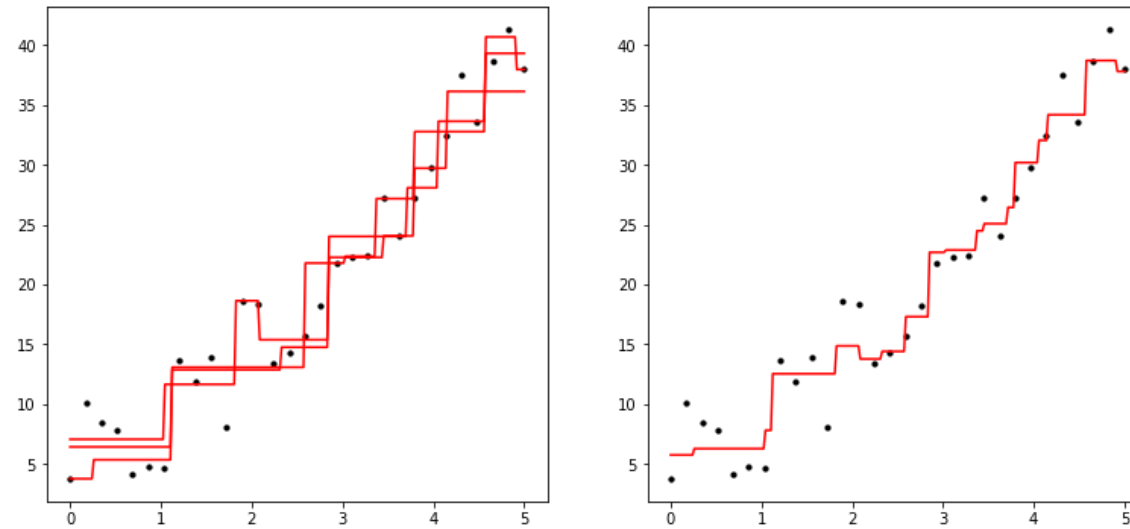


# Model: Random Forest

Supervised learning algorithm that uses **ensemble learning** method for regression 📌






combines predictions from multiple machine learning algorithms to make a more accurate prediction than a single model.

**Random Forest Combine many Decision Tree models into one single model**



Live Coding Session

# Reference

-  [Linear Regression](#)
-  [Decision Tree](#)
-  [Random Forest](#)
- Data  [GEOLINK North Sea wells](#)
- Awesome machine learning visualization   
[Luwiji by jcop](#)

# Thank you!

Keep in touch!

**Hadyan** Pratama

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