

# Predict Missing Log Curve with Machine Learning

**Hadyan Pratama**

Master of Petroleum Geoscience | Data Science Freelancer

# Hadyan Pratama

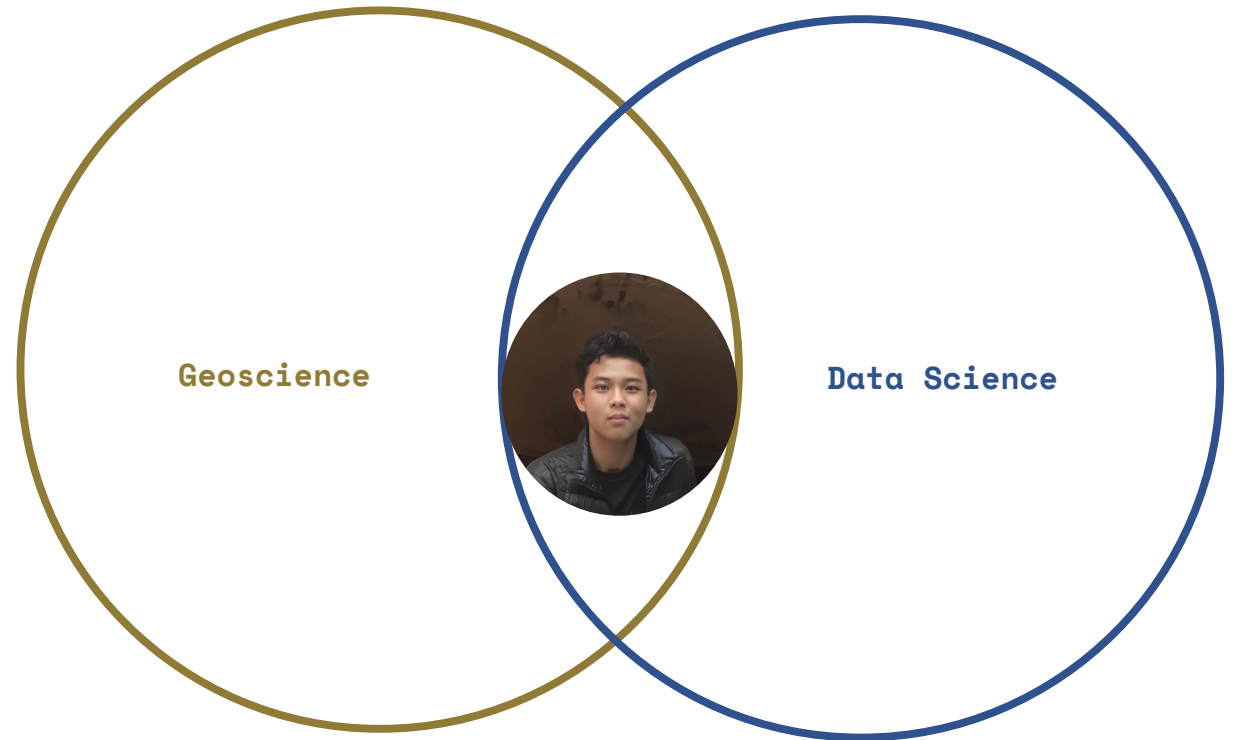
## *Current*

Master student in Petroleum Geoscience  
based in Malaysia.

Also a Research Officer at Center of  
Subsurface Imaging (CSI) Universiti  
Teknologi PETRONAS

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

Outside of research, I am a Data Science  
Freelancer with clients from various  
industrial backgrounds.

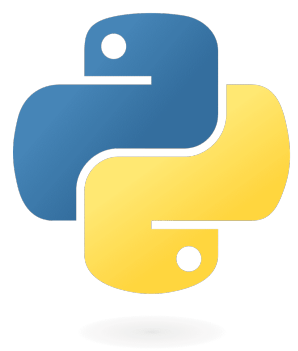




What will we  
do today?

- ✓ 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™



Jupyter



pandas

matplotlib

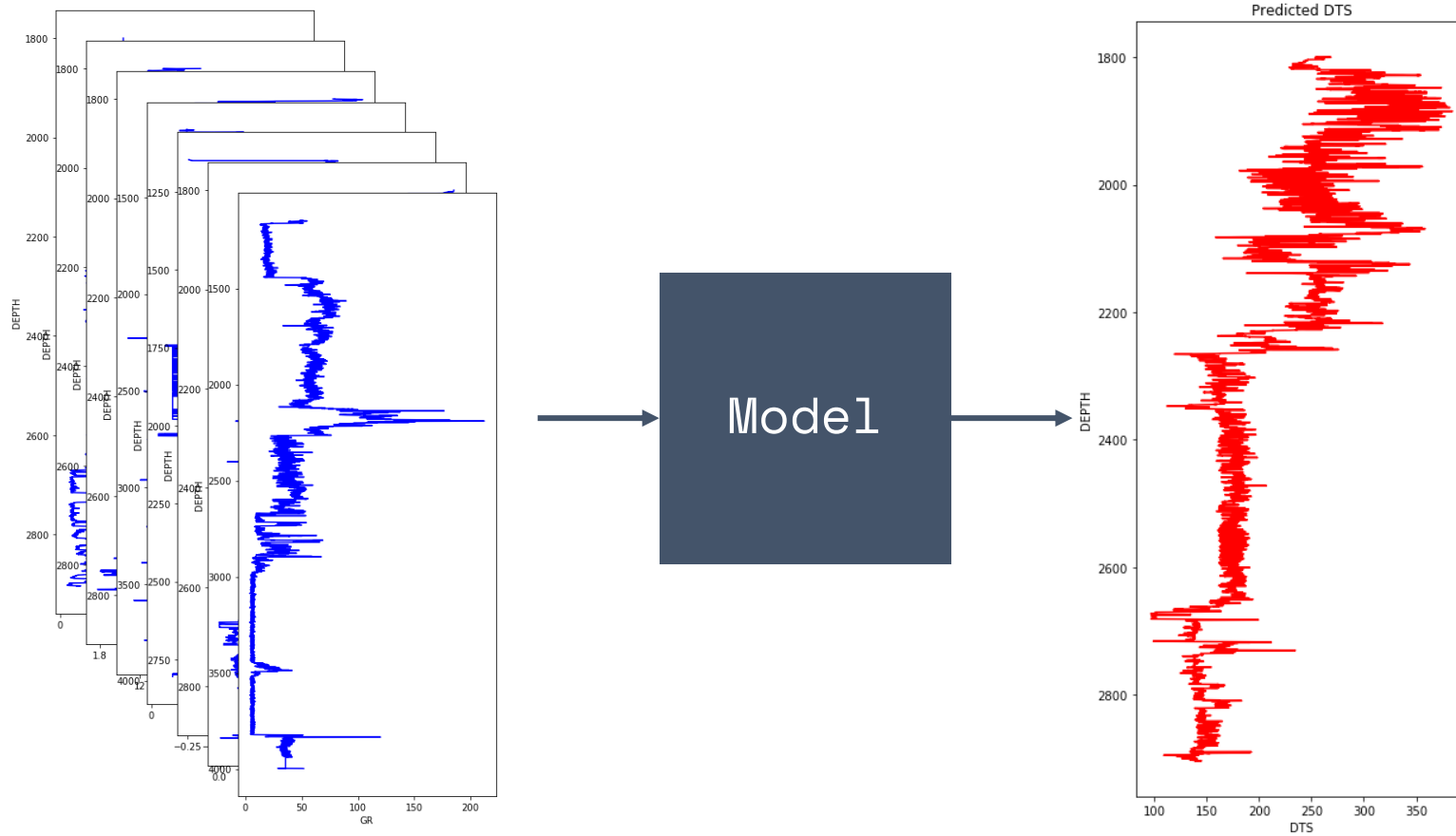


seaborn



*lasio*

# Estimating Log Curve



Input: Other well log curves

Output: Missing log curve

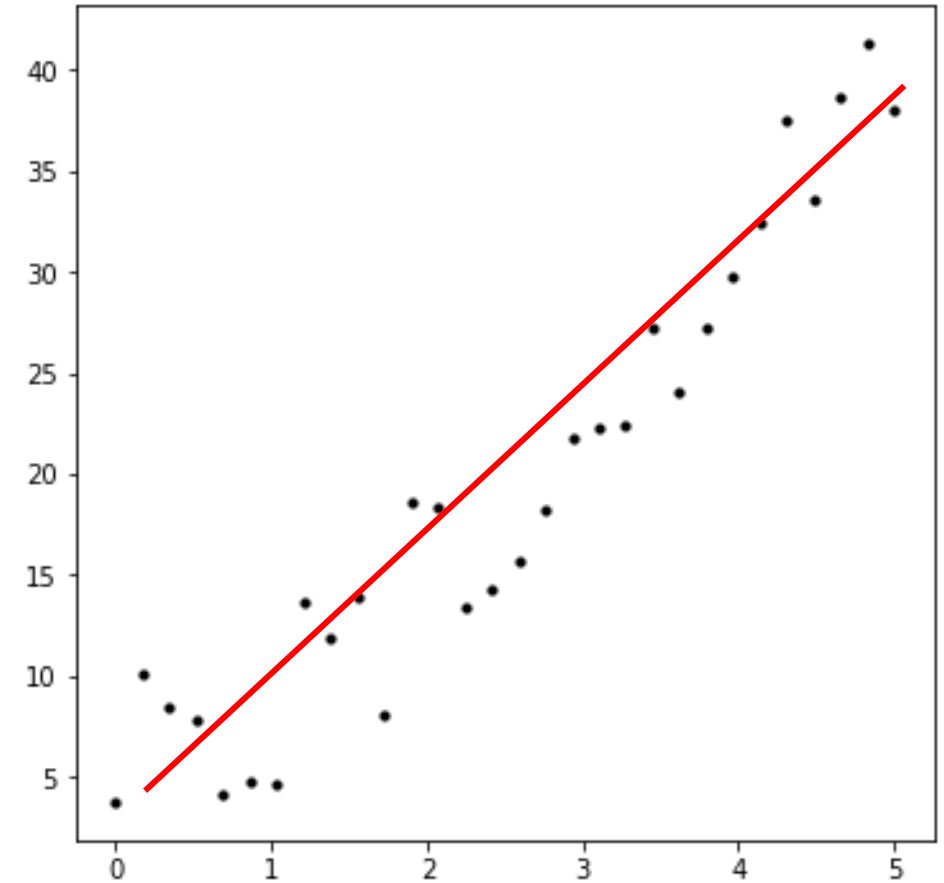
# Model: Linear Regression

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?**



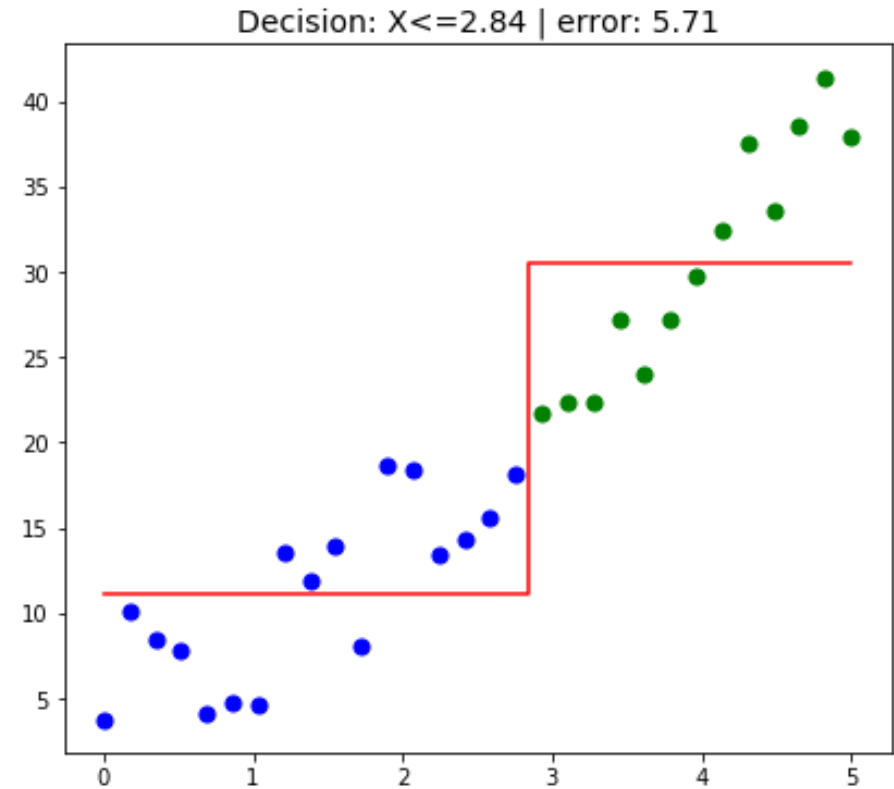
# Model: Decision Tree

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.





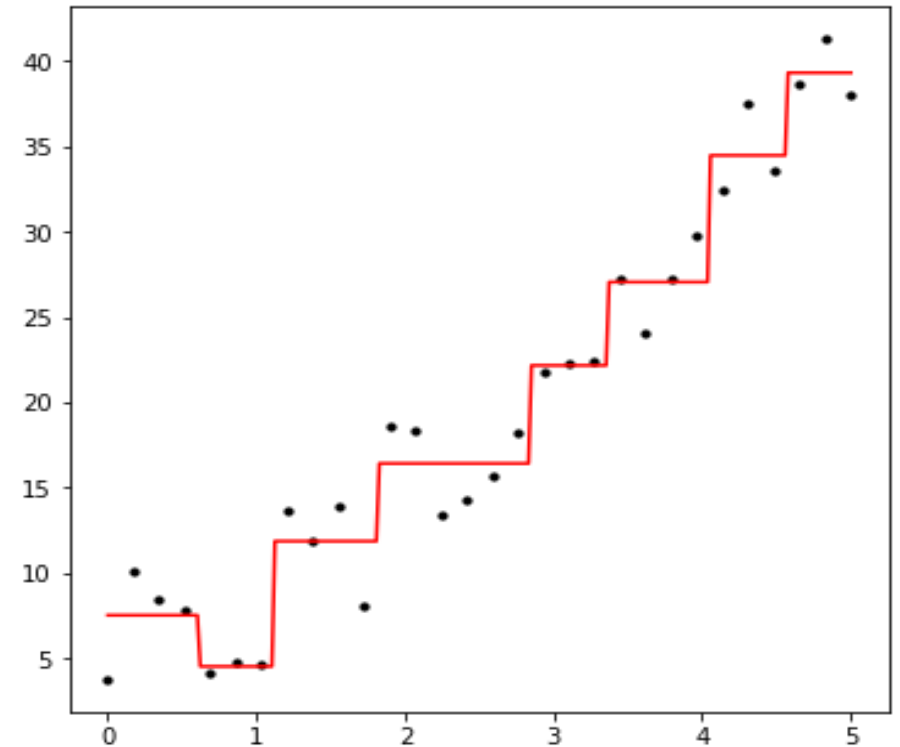
# Model: Decision Tree

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.

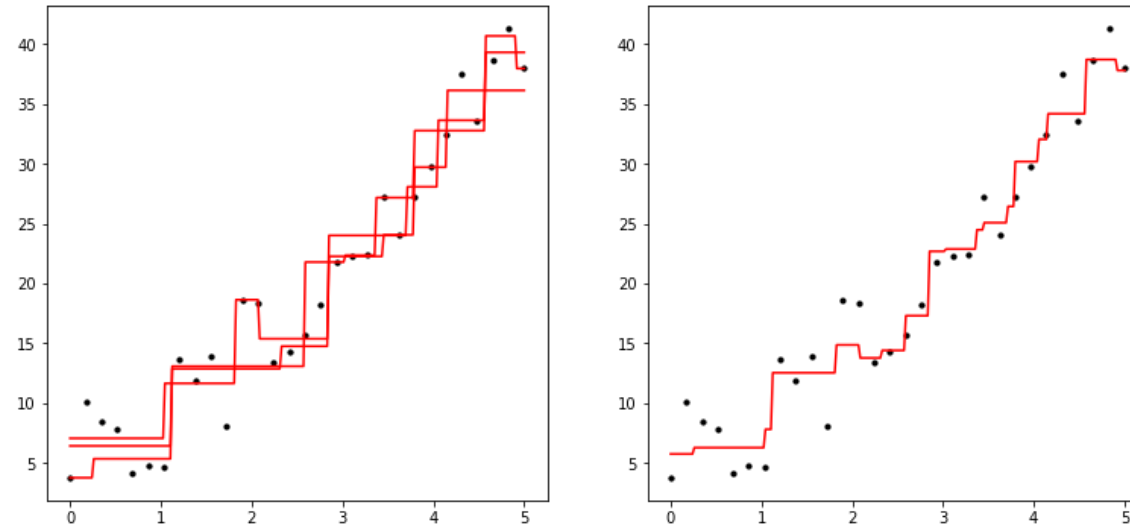


# Model: Random Forest

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

# Github Link

<https://bit.ly/githublogai>

# 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

@hadyanpratama | [hpratama.github.io](https://hpratama.github.io) | [hadyanpratama14@gmail.com](mailto:hadyanpratama14@gmail.com)