Analysis of Oil and Gas Big Data Using Artificial Intelligence
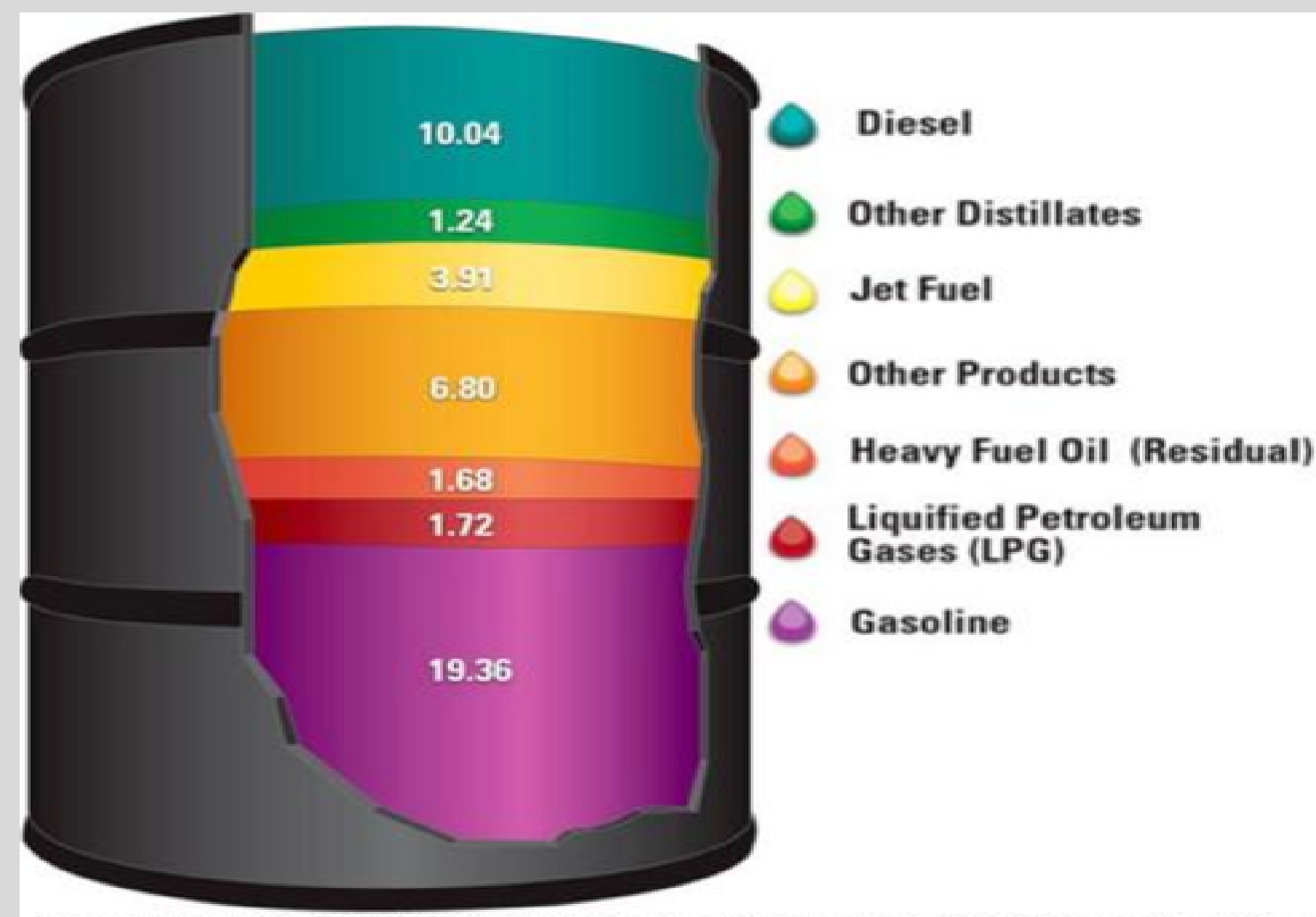
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INTRODUCTION

- Diesel — 10.04
- Other Distillates — 1.24
- Jet Fuel — 3.91
- Other Products — 6.80
- Heavy Fuel Oil (Residual) — 1.68
- Liquified Petroleum Gases (LPG) — 1.72
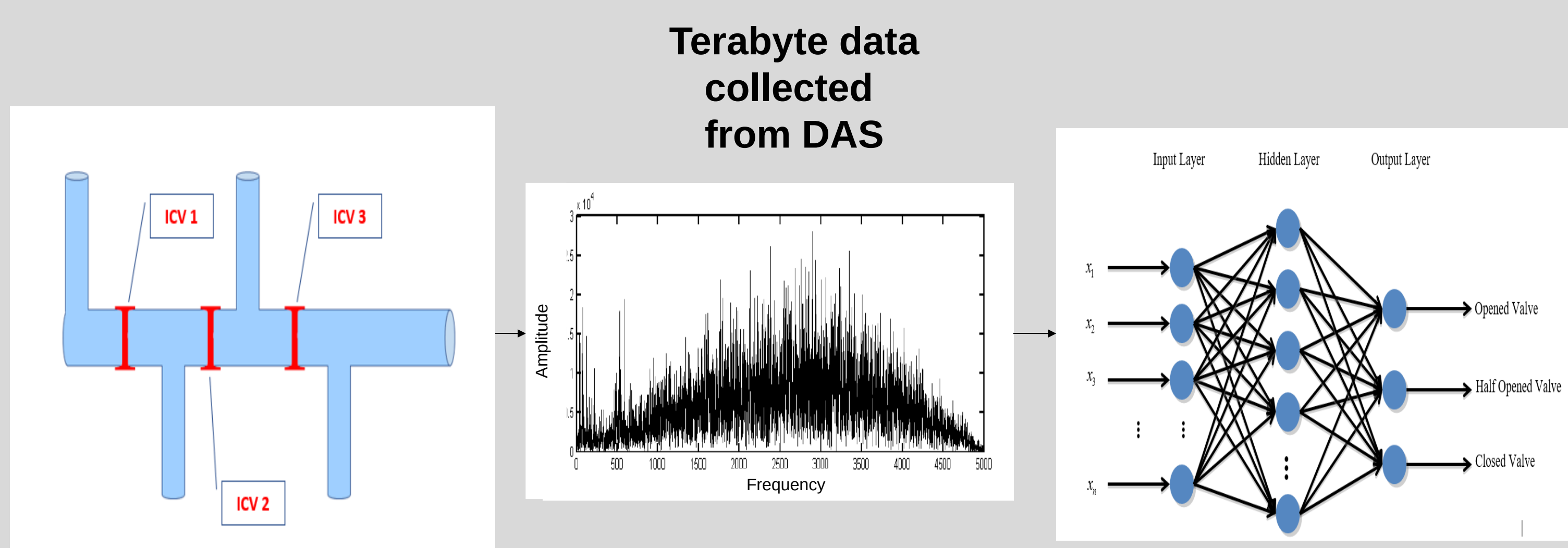- Gasoline — 19.36

Refining extracted oil is costly!

Cost of refining oil is c.75% of the total processing cost.

Our **Aim** is to

- Extract better quality oil, to lower refining costs
- Maximise oil production
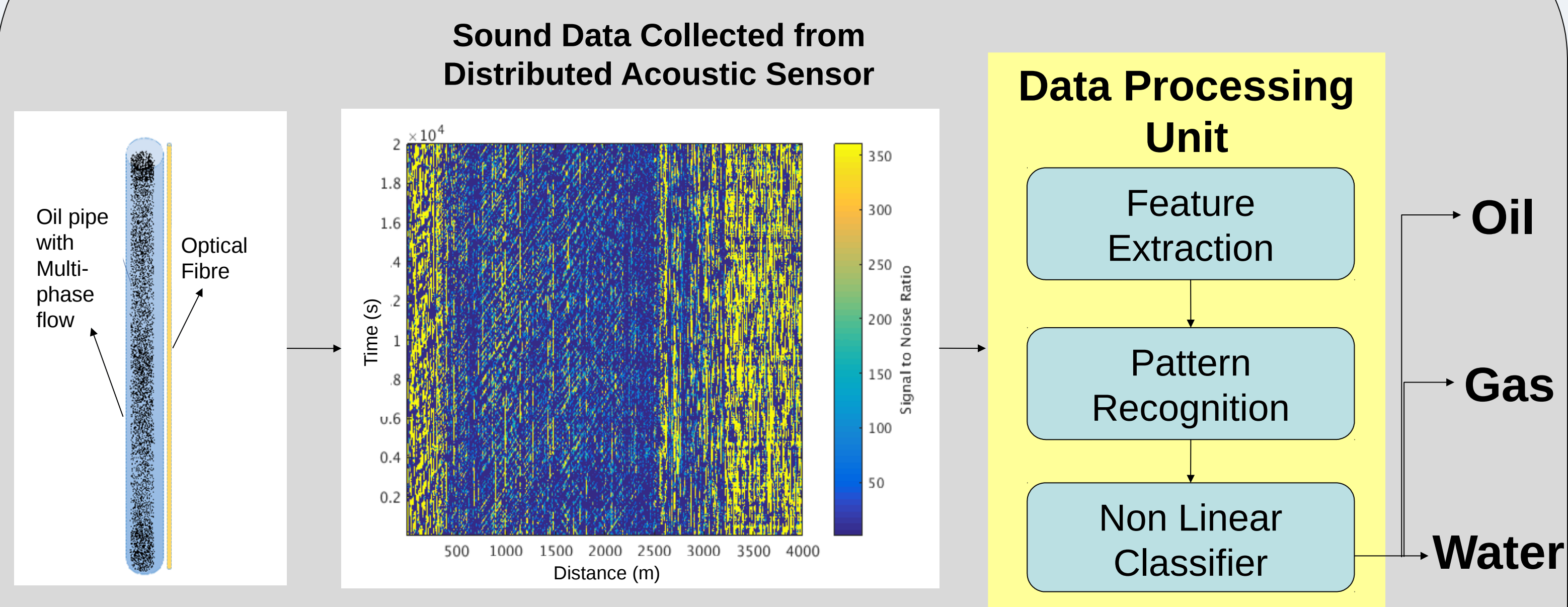- Detect the setting of Inflow Control Valve

METHODS

Inflow Control Valve

Terabyte data collected from DAS

Inflow Control Valve has three settings which are unknown to well operators.

Ratio of Fluid

Sound Data Collected from Distributed Acoustic Sensor

Data Processing Unit
- Feature Extraction → Oil
- Pattern Recognition → Gas
- Non Linear Classifier → Water

Tera byte sound data collected from over 4000 Sensors during 2 days period.

RESULTS

The well operators can detect the settings of the Inflow Control Valve with accuracy of 99.1% using our method and adjust the ICV to open, half open or close.

Classification Errors

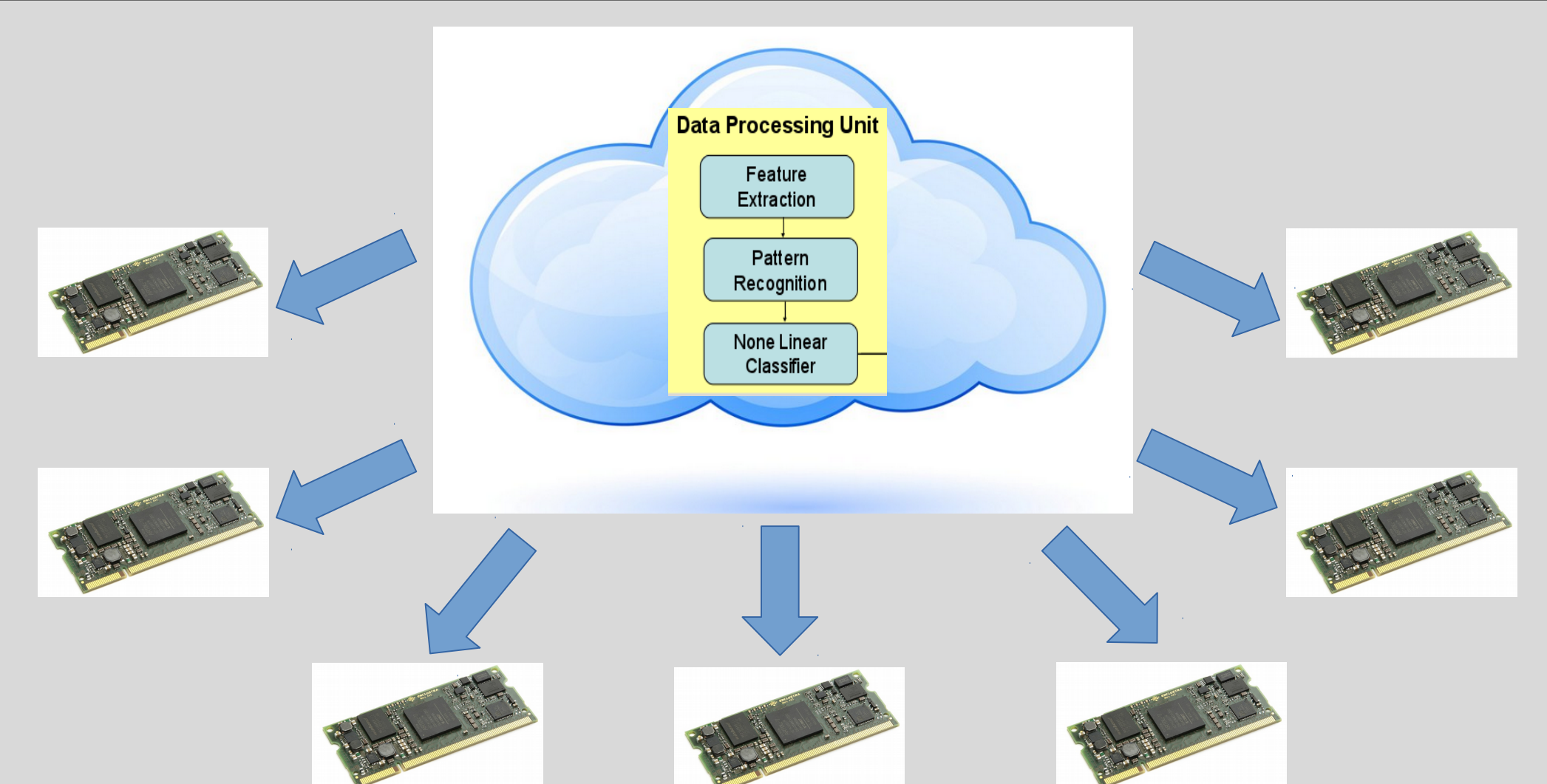| Validation	Testing	All
1.8%	0.5%	0.9%

The ratio of oil, gas and water estimated at most distance along the pipe.
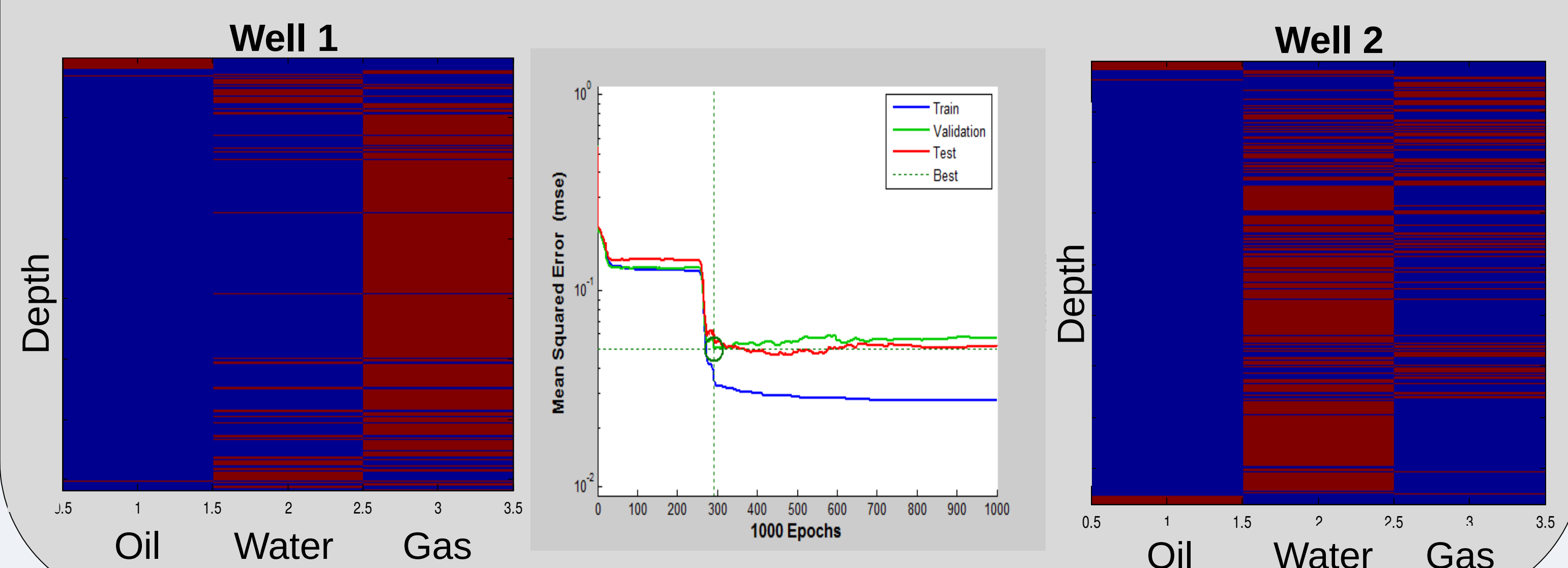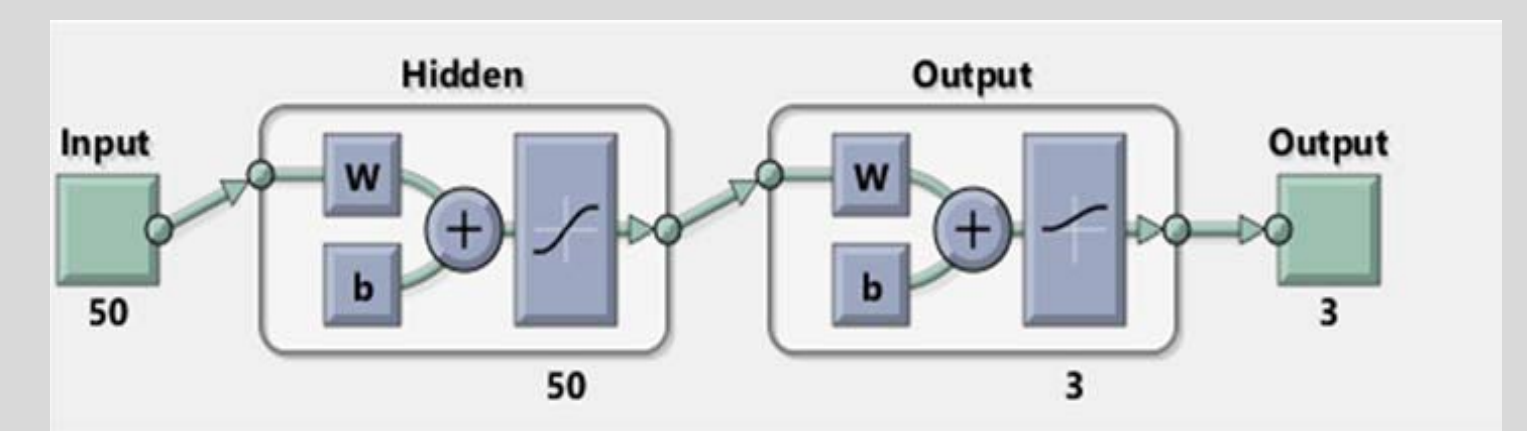
FUTURE WORK

Making our algorithm **efficient**, **fast** and **online**;

- **Real time** processing of big data using CPU, GPU and Field Programmable Gate Array (FPGA).
- **Parallel processing** using cloud computing data for analysis of Terabyte data.

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