

# AI Applications In Oil Extraction, Review and Case of Study: Convolutional Neural Networks Applied to Seismic Image Analysis

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SUPERCOMPUTING AND ENERGY FOR MEXICO

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# Some Energy Sectors in Which Artificial Intelligence (AI) is Already Applied



Electricity



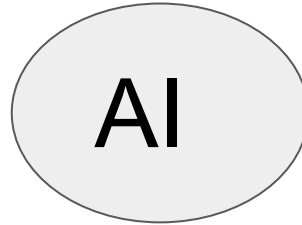
Eolic Energy



Oil and Gas



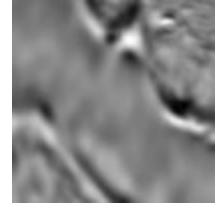
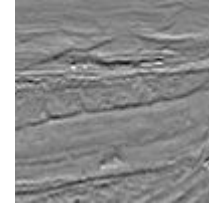
Solar Energy



# AI Applications in Oil/Gas Industry



Exploration



Seismic Data

Oil Corrosion/Risk  
Analysis



Materials  
Management

Data Analysis

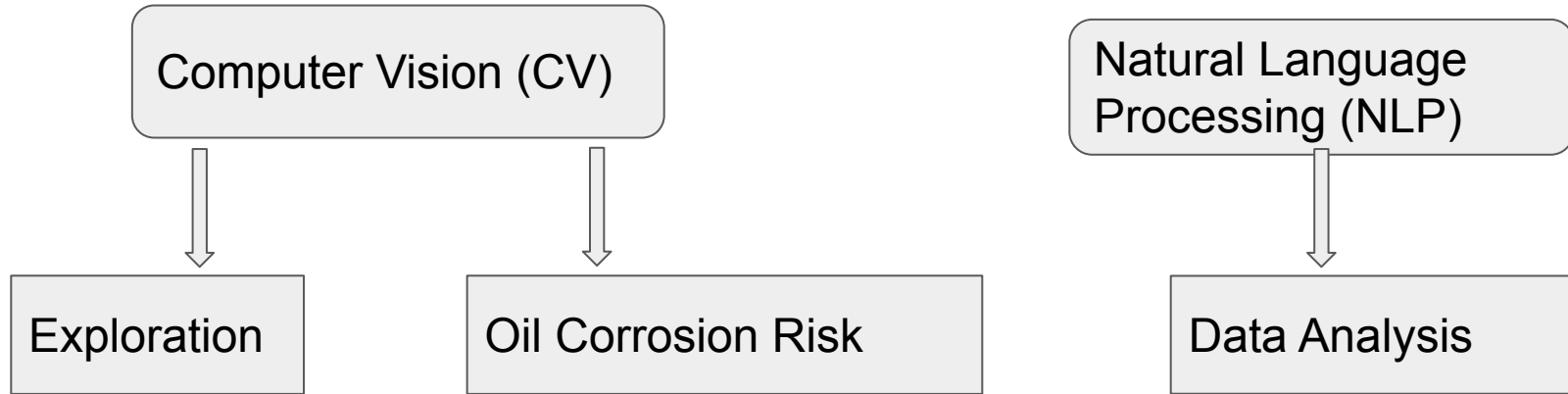


Big Data



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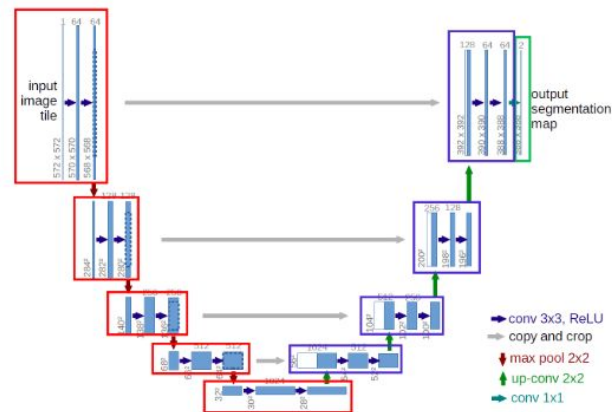
# Main AI Techniques Applied... so far



# Case of Study: Seismic Image Analysis

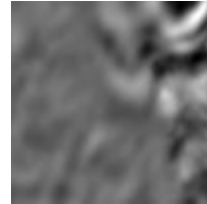
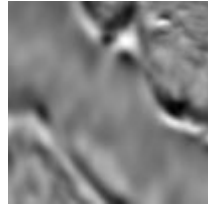
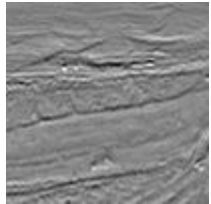
AI Technique: Computer Vision

Architecture Used: U-Net

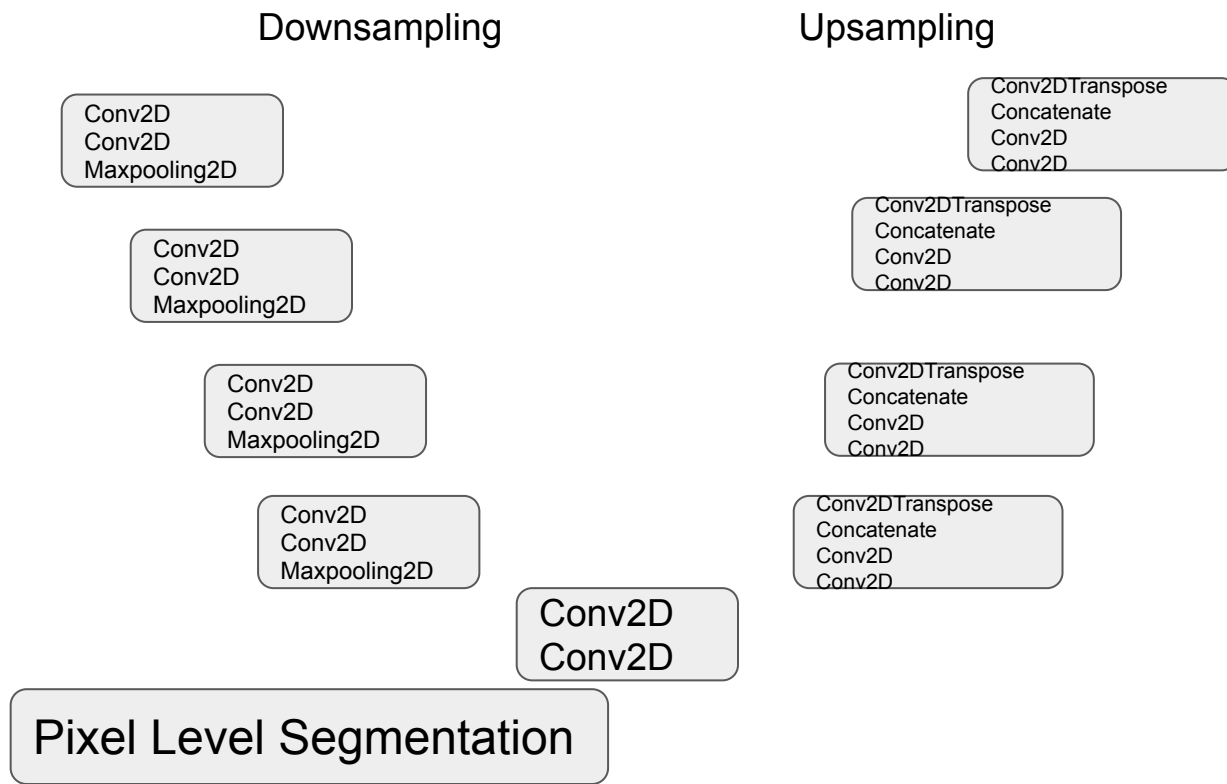


## U-Net: Convolutional Networks for Biomedical Image Segmentation

# Data

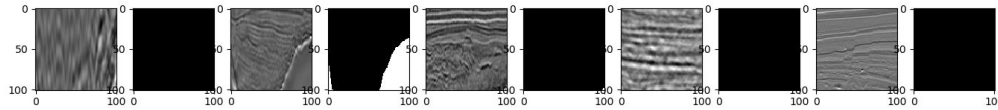


# AI Deep Learning Architecture: U-Net





# Results

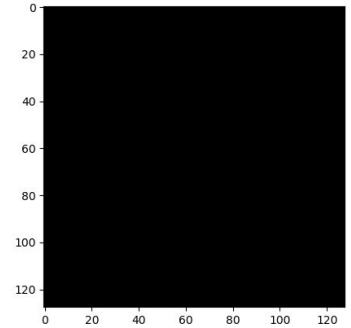
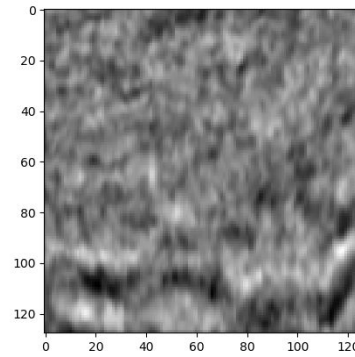
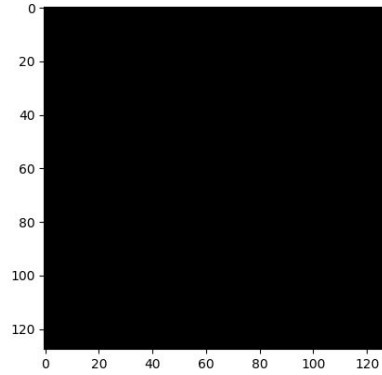
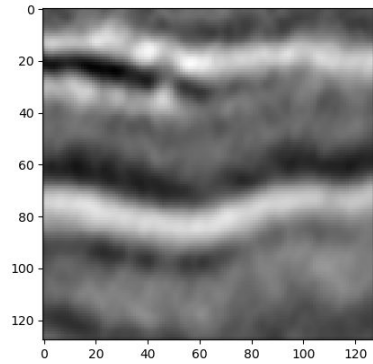


Exploring the Data



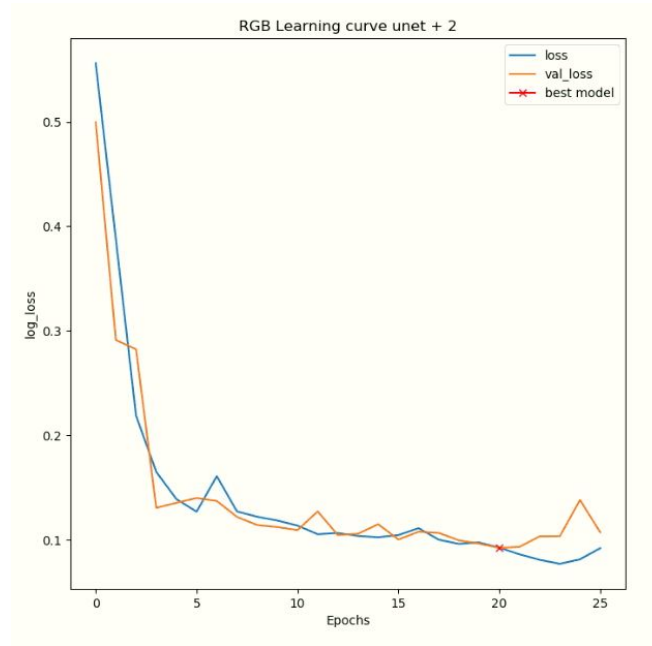
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# Resized and filtered data



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# Learning Curve



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```
Epoch 00014: val_loss did not improve from 0.10424
Epoch 15/30
297/297 [=====] - 17s 57ms/step - loss: 0.1063 - mean_iou: 0.6427 - val_loss: 0.1046 - val_mean_iou: 0.6483

Epoch 00015: val_loss did not improve from 0.10424
Epoch 00015: early stopping
===== Plotting the loss-log learning curve =====

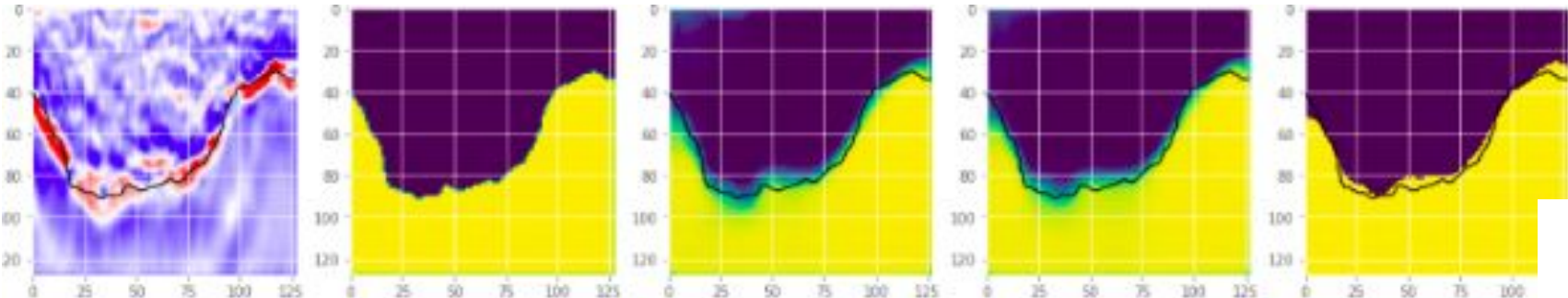
Process finished with exit code 0
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Seismic Image

Ground Truth

Predictions

Predictions  
Binary



**Thank You!**



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