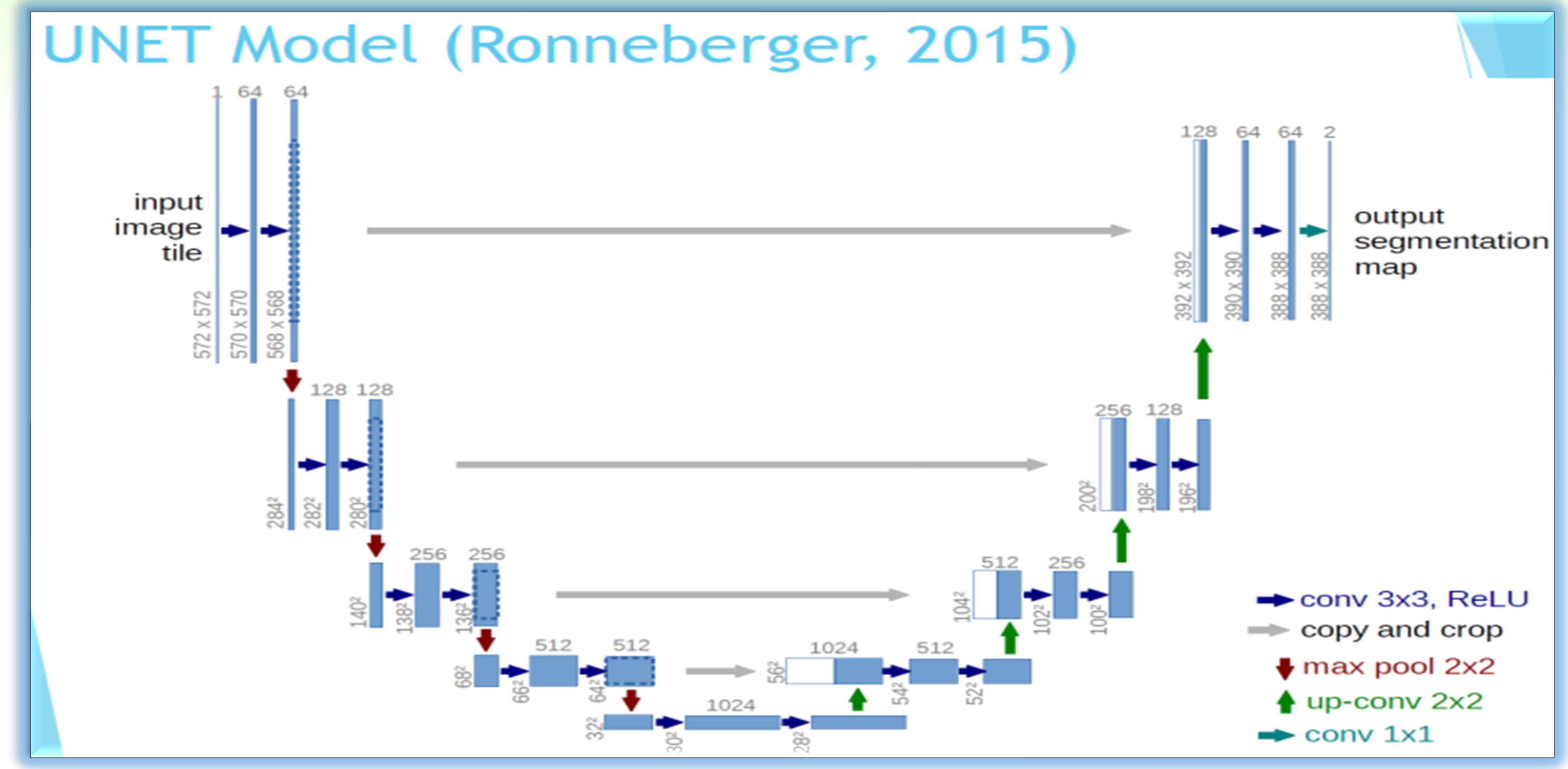


Network architecture:

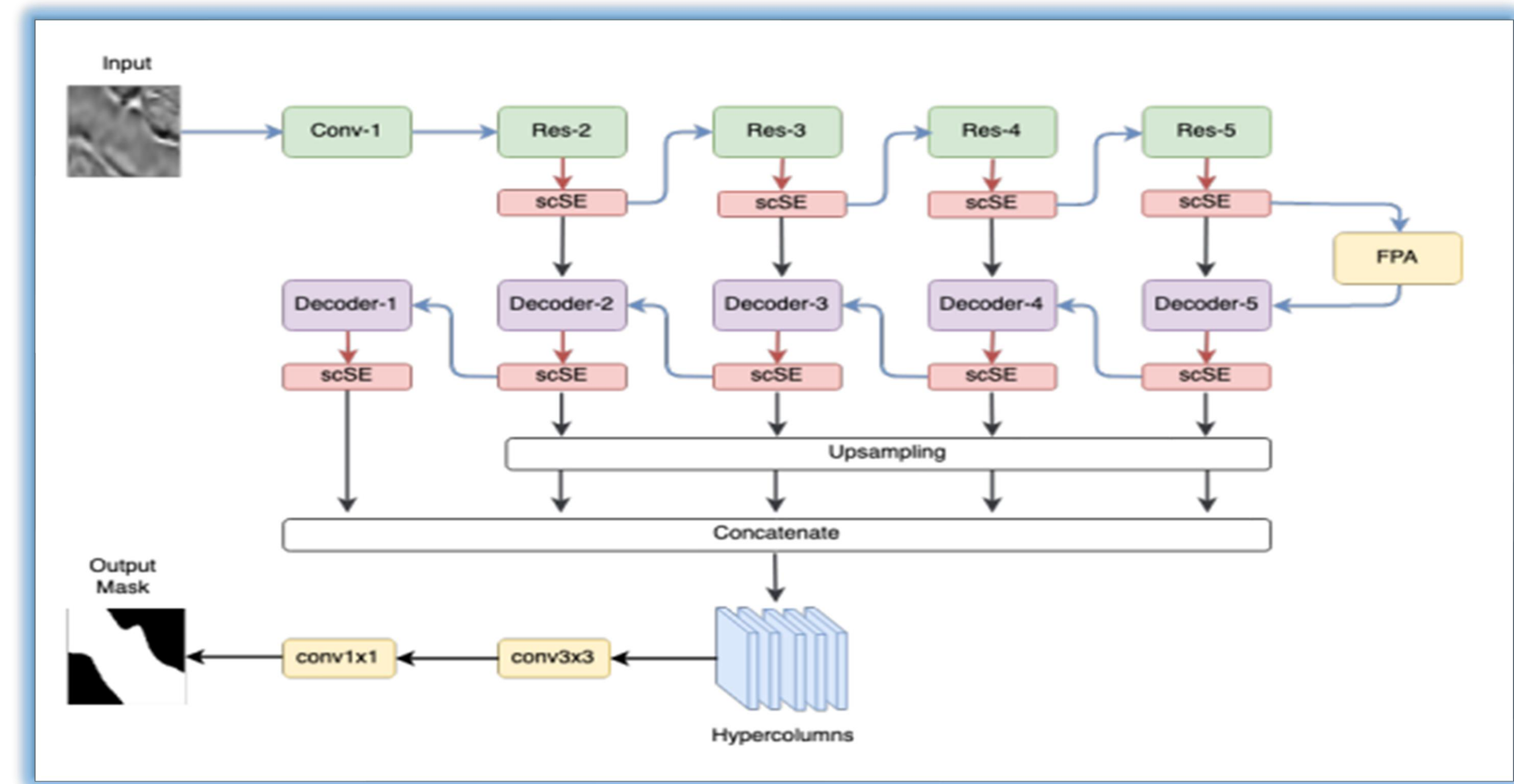
I developed U-Net-based neural networks for salt body identification in seismic images for Hydrocarbon Exploration. I employed pre-trained models with ResNet34 and ResNeXt50, integrating attention techniques like Squeeze and Excitation (SE) modules to highlight critical features and a Feature Pyramid Attention (FPA) module for improved multi-scale data gathering.

Implementation details

The innovative approaches for seismic facies identification were tested. Initially, semantic clustering with nearest neighbors was used for image classification, the approach shifted to Differentiable Feature Clustering for image segmentation, improving accuracy. Successful segmentation and categorization of distinct reflector bodies in 32x32 image patches were demonstrated. Finally, the study employed a DFC method for seismic facie identification.



The U-net Architecture



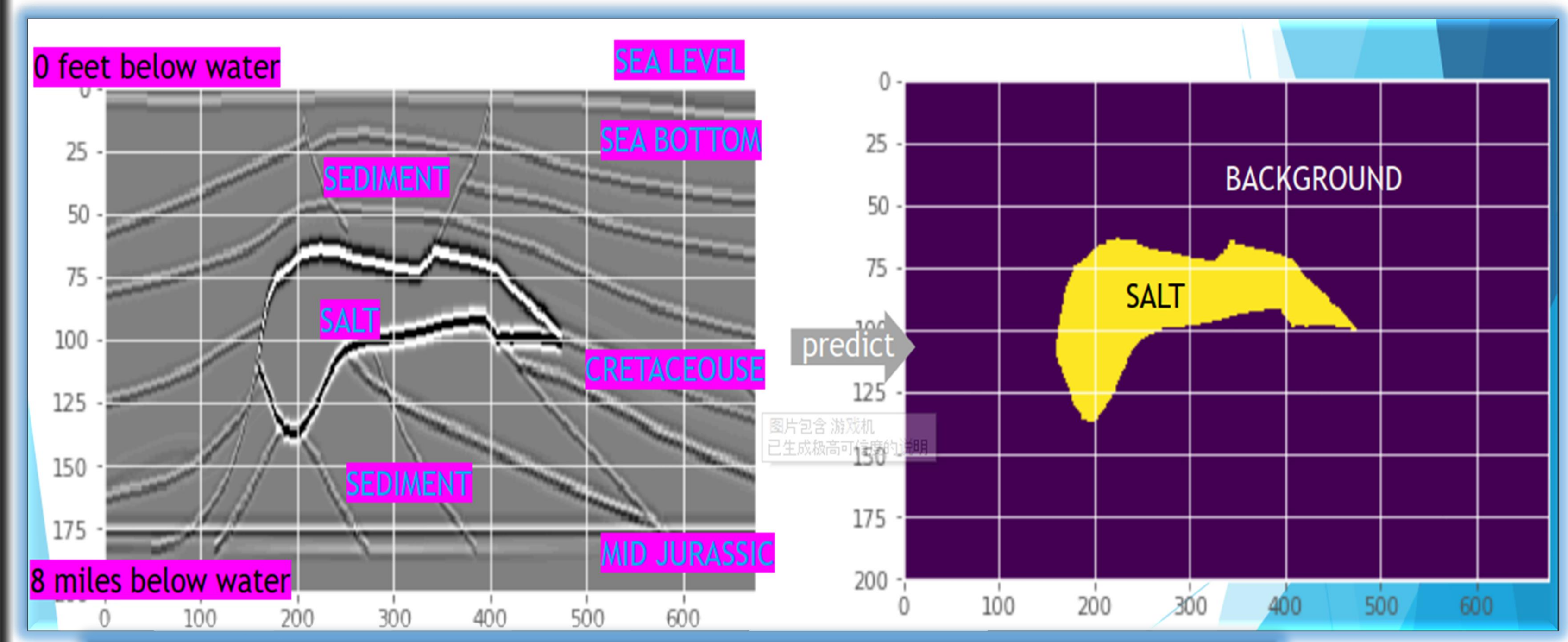
A typical residual net configuration

KEY FINDINGS

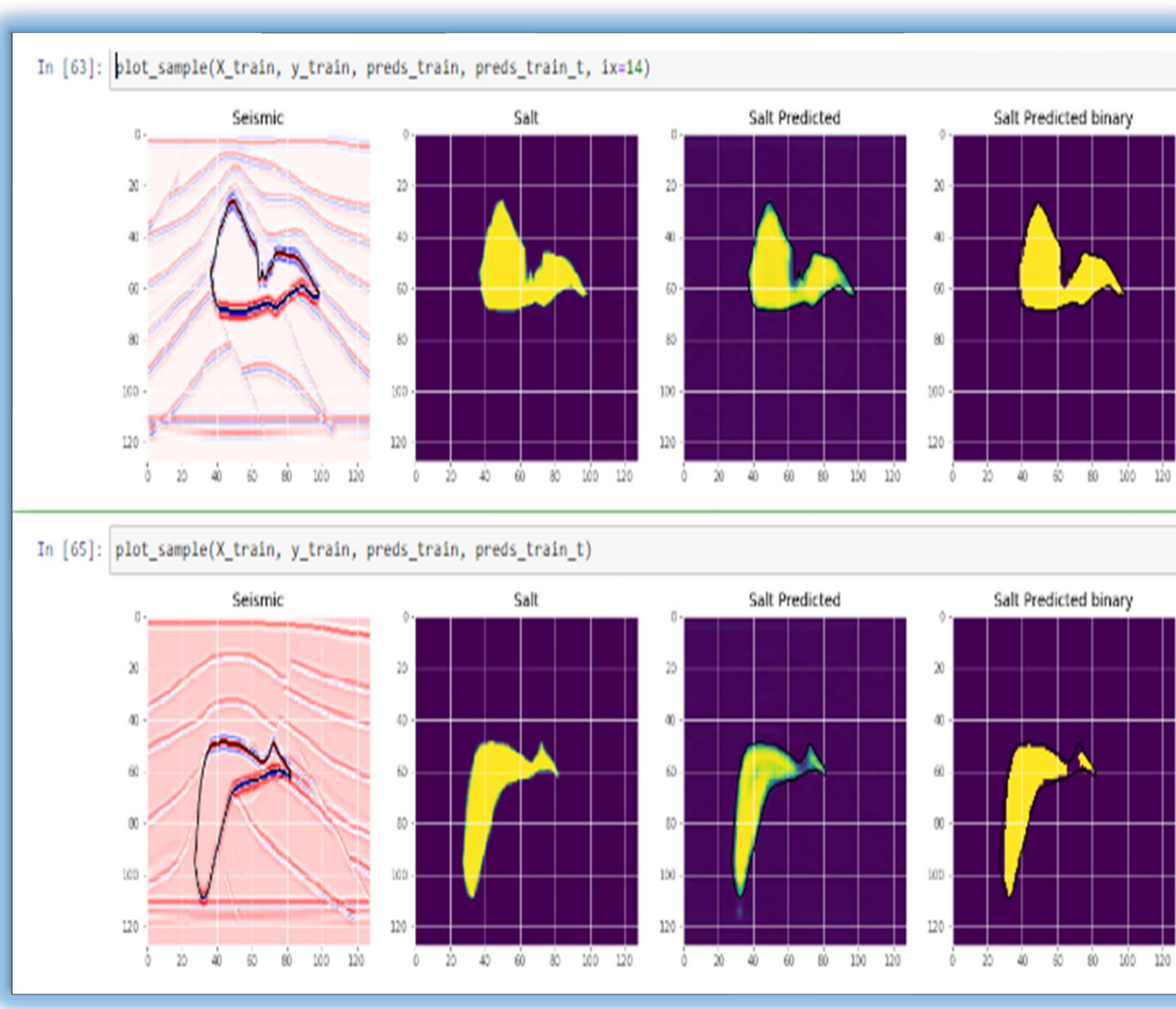
- Successful application of an ensemble CNN approach for salt body segmentation.
- Improved accuracy in identifying salt body in seismic images.
- Effective use of a semi-supervised strategy with unlabeled data.
- Utilization of two U-net models in the ensemble for enhanced performance.
- Standardization of images to 256x256 pixels for consistency.
- Application of innovative techniques for salt segmentation.
- Averaging predictions of the ensemble models for robust results.

RELEVANCE

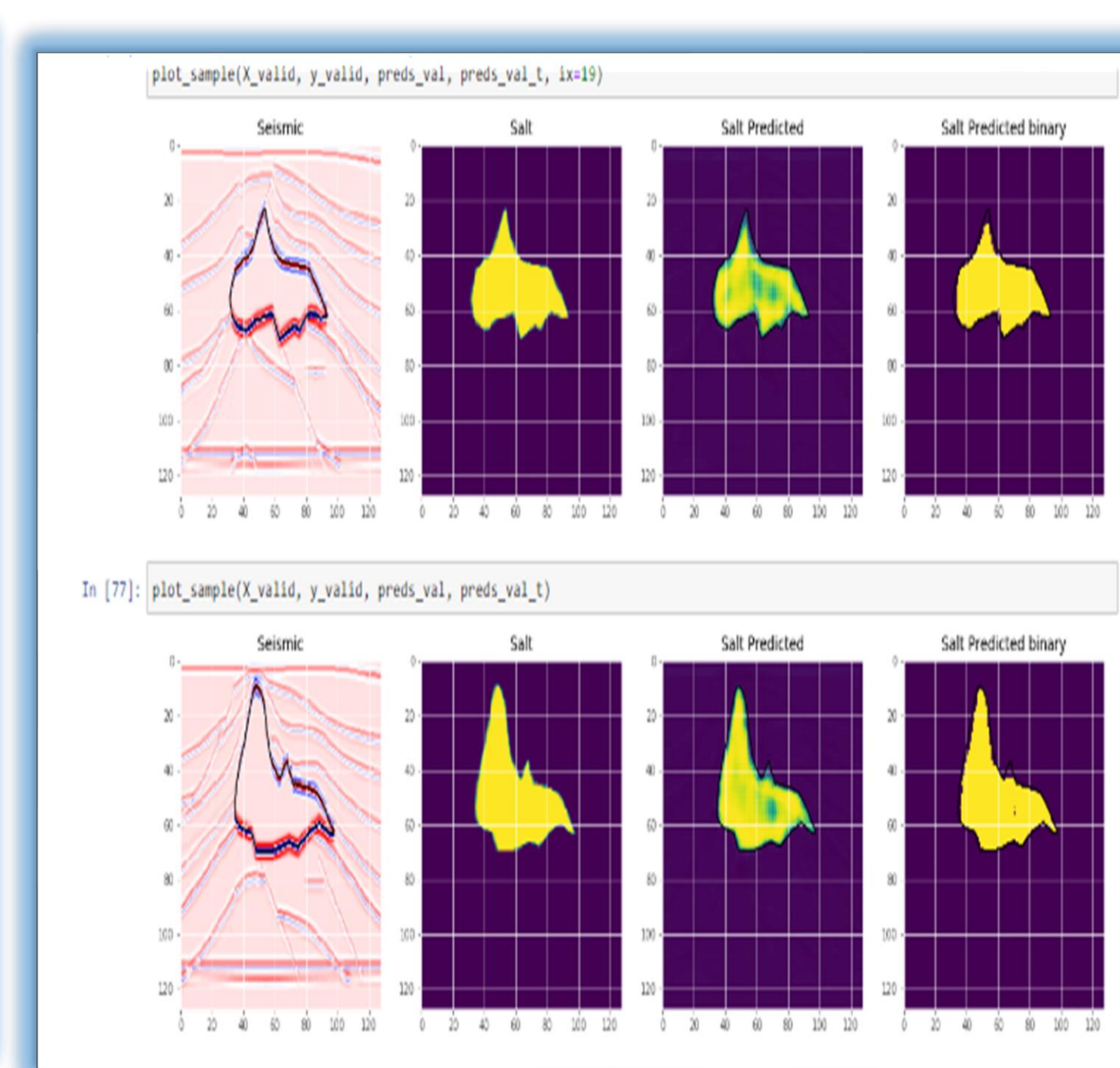
- Advance the field of salt body segmentation in deep-water hydrocarbon exploration.
- Enhance the accuracy and efficiency of identifying salt-related structures.
- Offer a novel approach for geological feature mapping in seismic images.



3D Geological Volume Segmentation



Predictions on Train Dataset



Predictions on Test Dataset

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