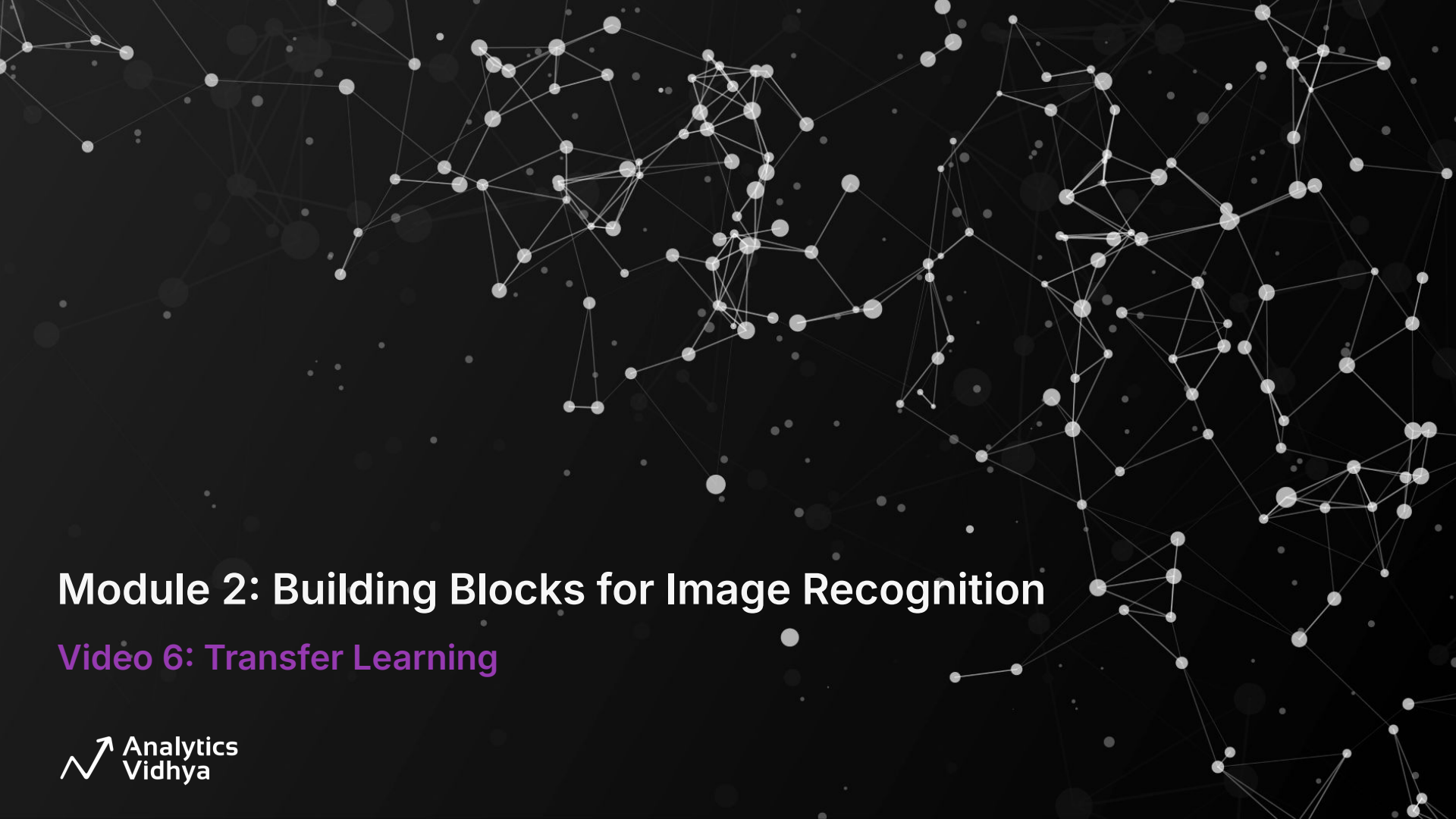
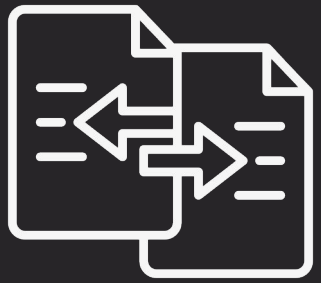


Module 2: Building Blocks for Image Recognition

Video 6: Transfer Learning

Analytics Vidhya

Introduction

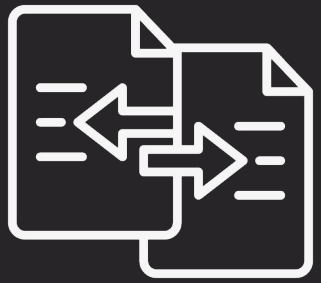


Transfer Learning

Image Augmentation

Analytics Vidhya

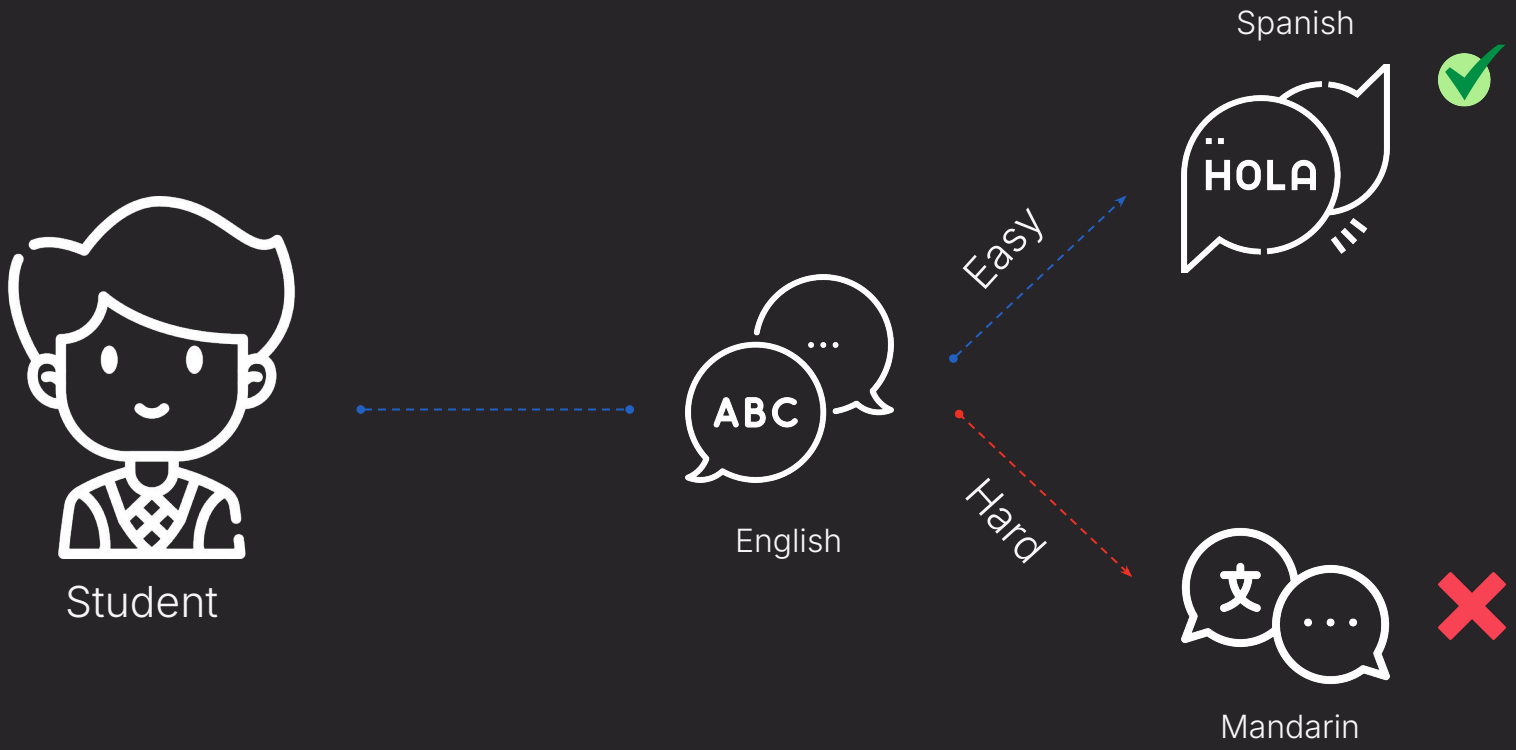
Introduction



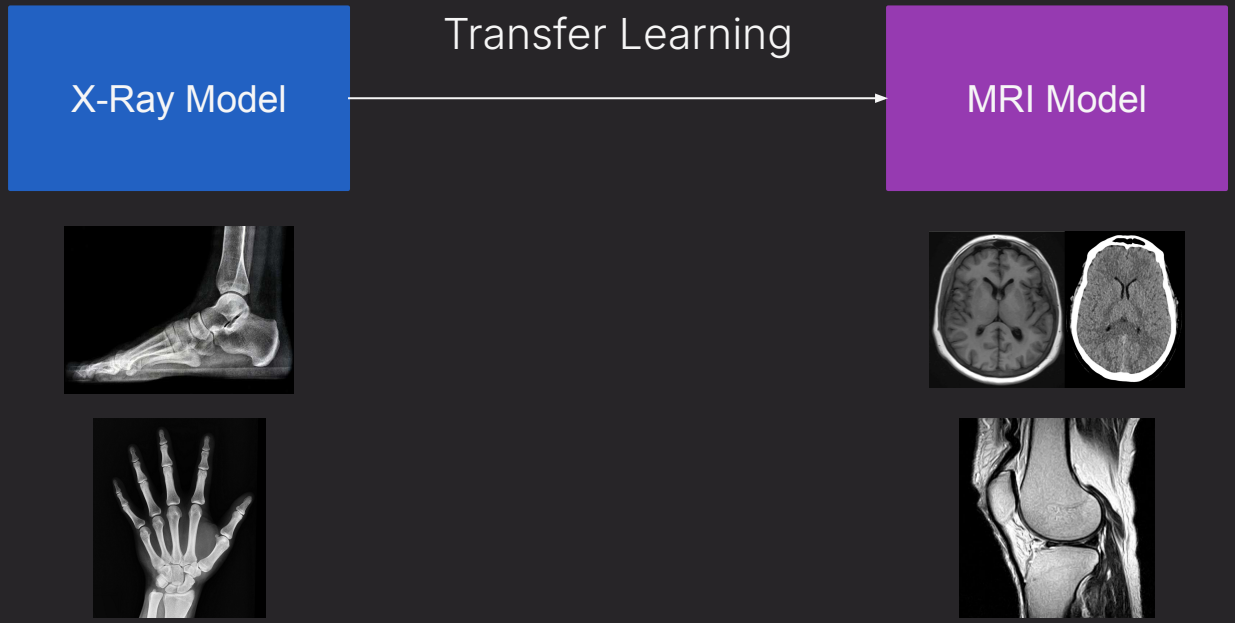
Transfer Learning

Image Augmentation

Transfer Learning



Transfer Learning



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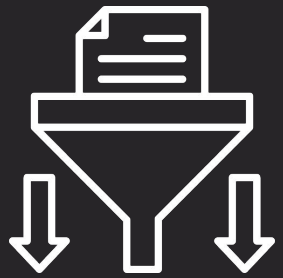
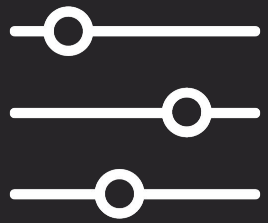
Transfer Learning

Leveraging pre-trained models on one task to adapt to new but related tasks.



Feature Extraction



Fine Tuning

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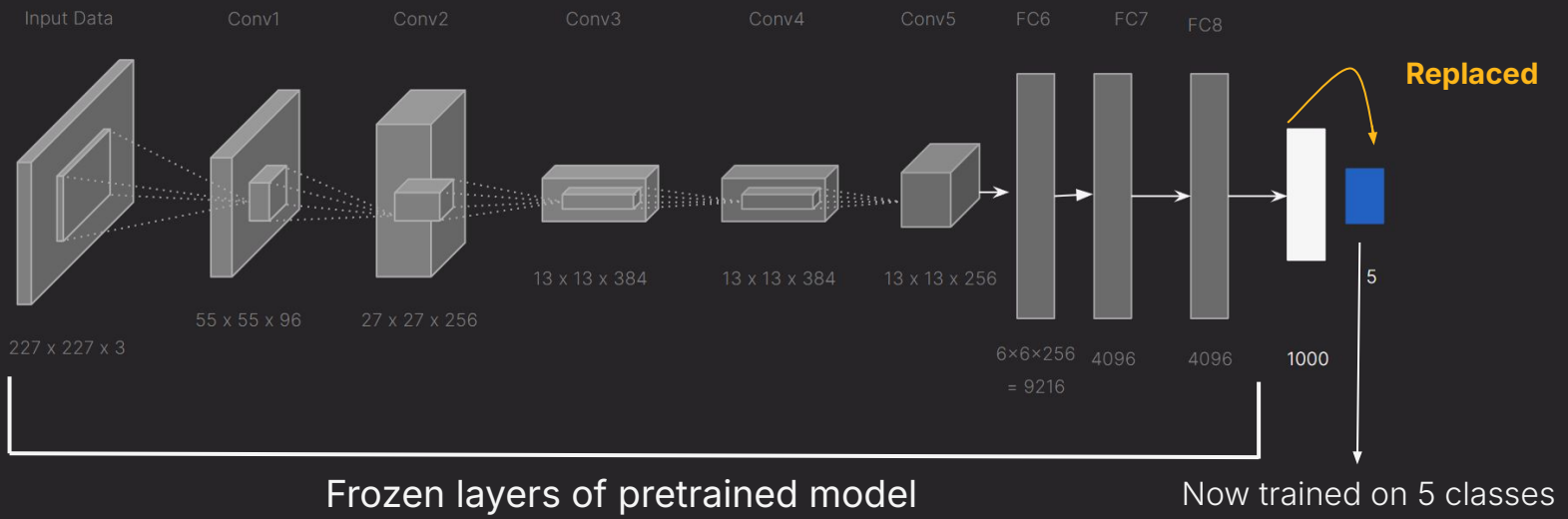
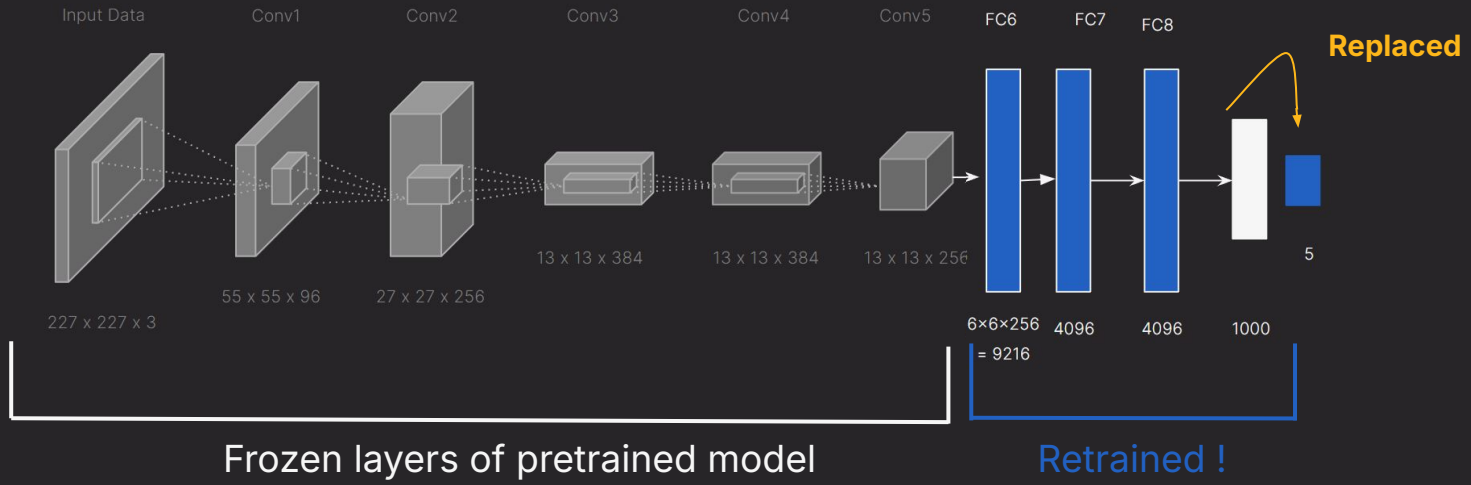
Transfer Learning: Feature Extraction

- Remove and replace the final classification layer.
- Reduces the overall training time and improves performance.
- Pre-compute and save outputs of the frozen layers to avoid re-computation.



Transfer Learning: Fine Tuning

- Some pre-trained layers are ‘unfrozen’ and retrained on the new data.
- Higher computational cost compared to feature extraction.



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Transfer Learning: Fine Tuning

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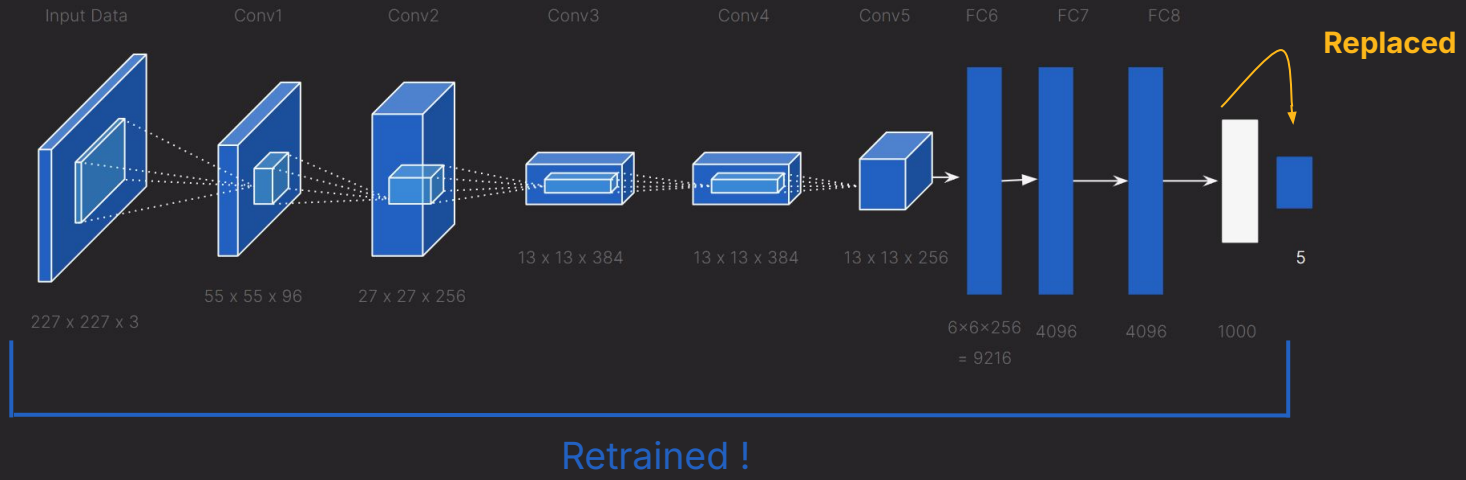

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UpNext: Hands-on: Transfer Learning on VGG

What if we do not have a pre-trained model and less data to train a new model from scratch?

Transfer Learning

Challenge: Training VGG16 from scratch requires a large amount of data

Image Augmentation

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Image Augmentation

Manipulates available training images artificially through techniques like cropping, flipping, color jittering, and rotation.

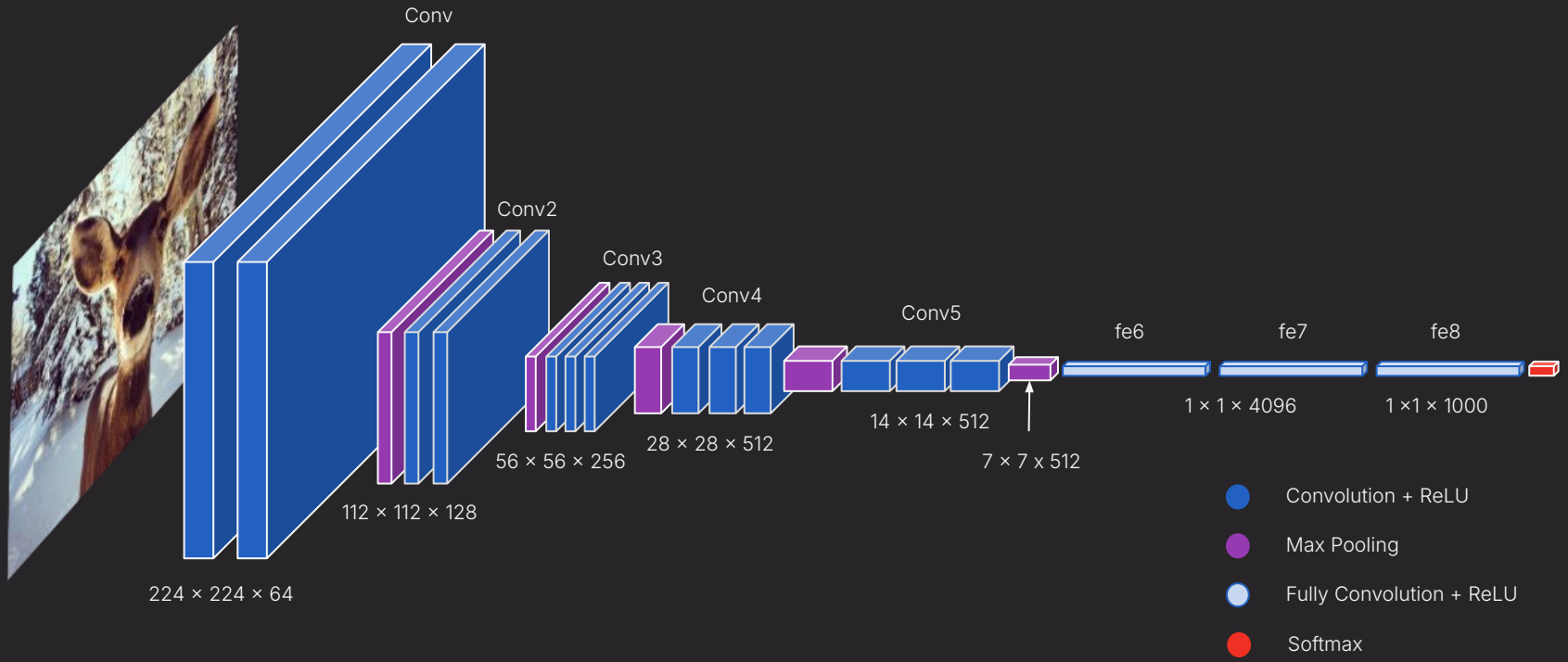
Creates variations of original images, simulating a broader range of real-world scenarios.

Boosts model robustness, improving its performance on new, unseen data.

Note: Significant task differences may require 'unfreezing' layers for specific retraining.

VGG16

- Developed by **Visual Geometry Group (VGG)** by Oxford University in **2014.**



VGG16

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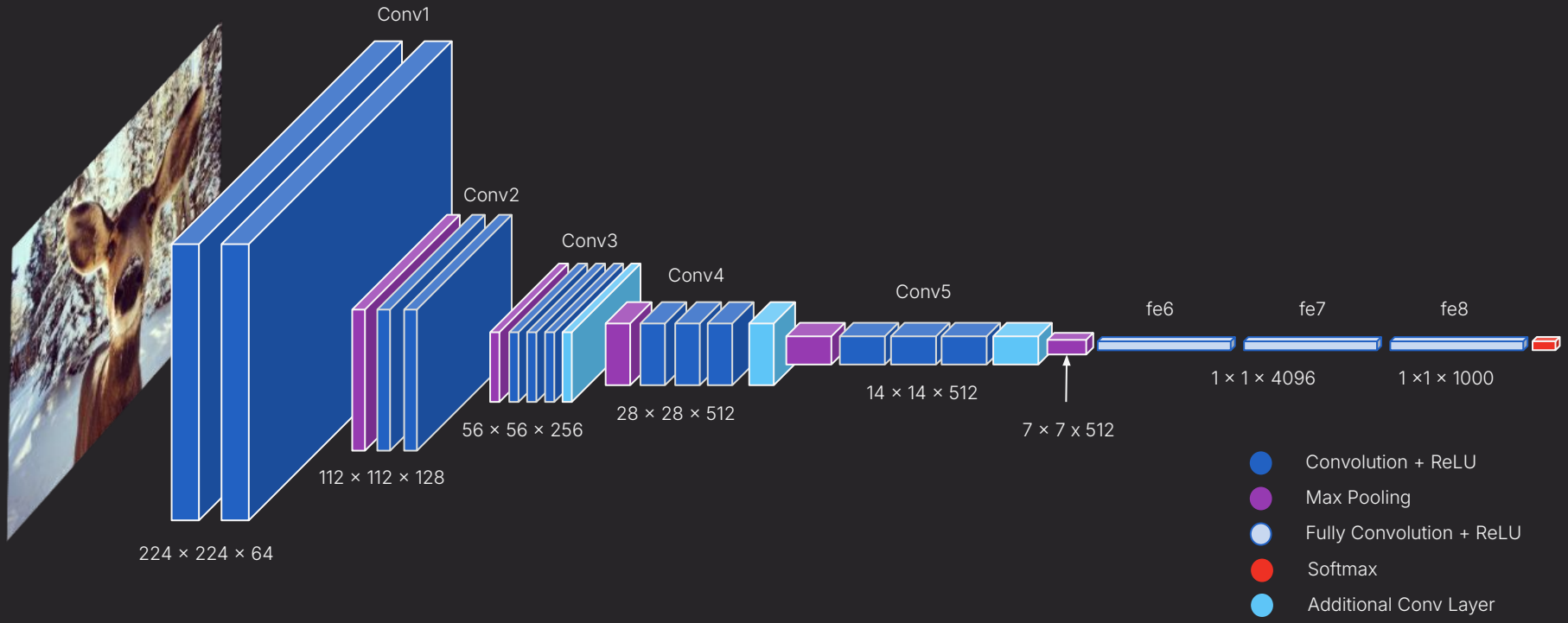
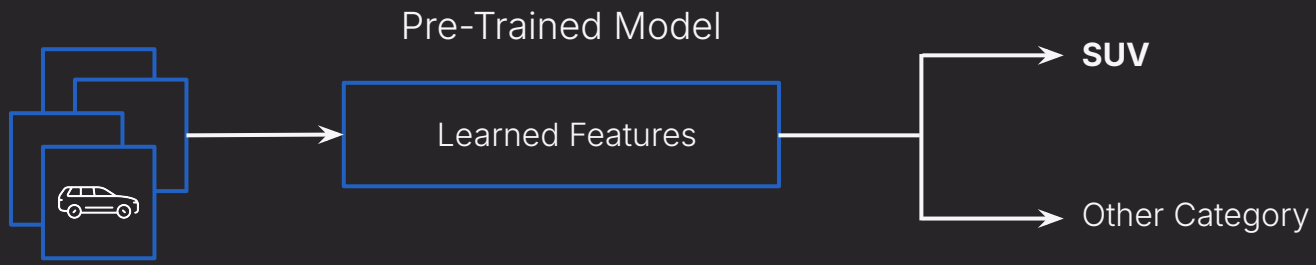
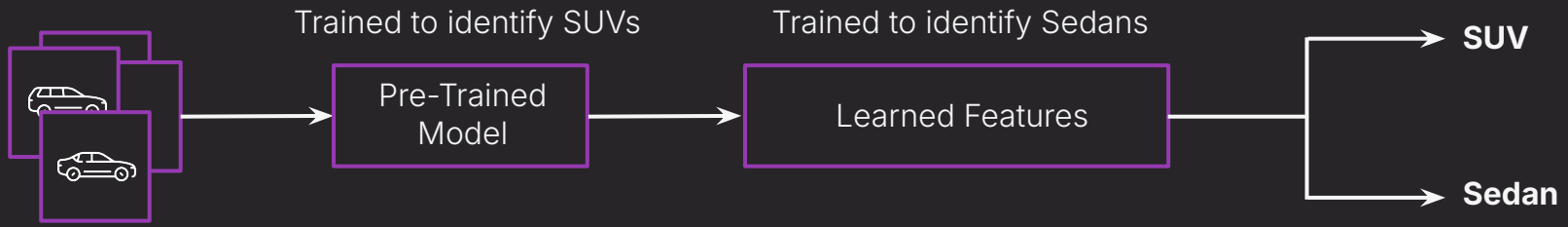


Transfer Learning

- **Training From Scratch**



- **Training using Transfer Learning**



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VGG16 & VGG19

AlexNet VGG

- Convolutional and pooling layers effective for various image recognition tasks.
- VGG models were ideal for applying **Transfer Learning.**

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Conclusion

Showcases depth and simplicity in CNN design with VGG16.

Validates well-crafted architecture in image recognition success.

Fosters use of transfer learning and data augmentation in image analysis.

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Transfer Learning: Fixed Feature Extraction