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Actively Preventing Negative Transfer

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Presenter Information

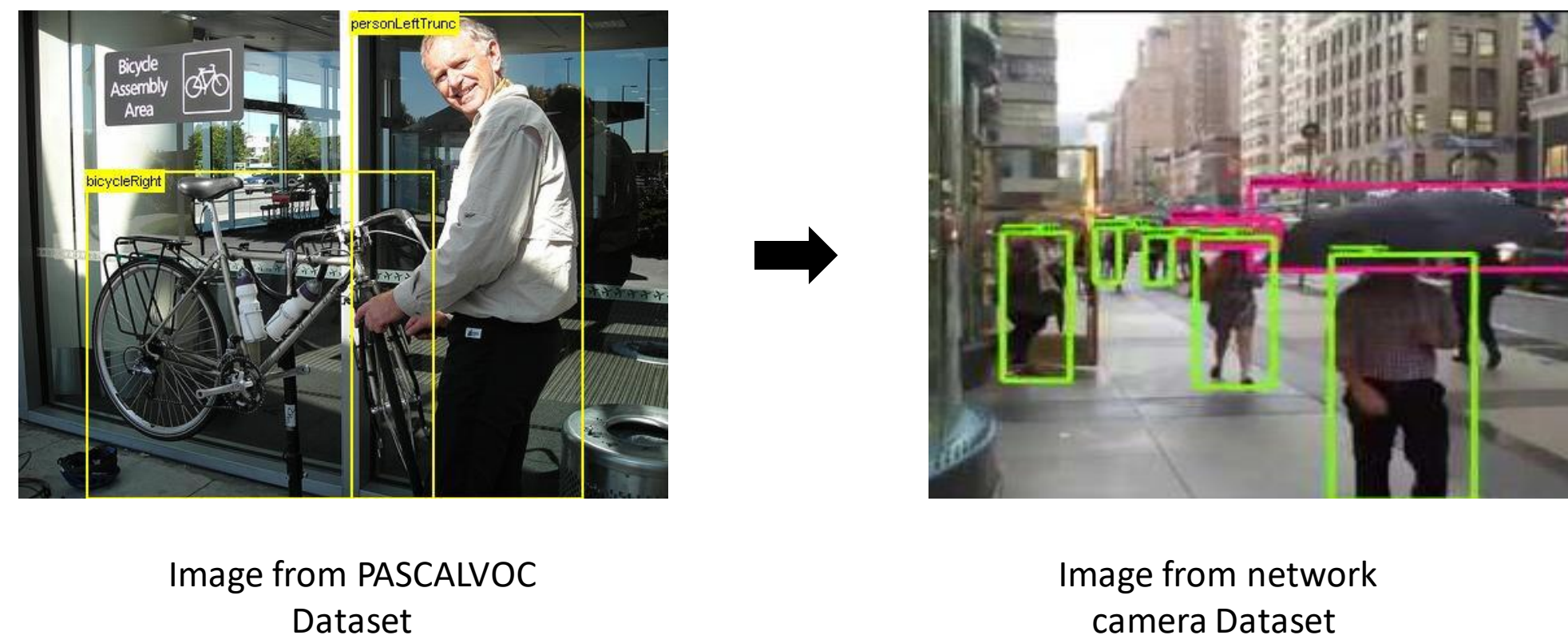
Andrew Ulmer, Zohar Kapach, Daniel Merrick, Karthik Maiya, Abhay Sasidharan, Arshad Alikhan, and David Dang

MODEL PRUNING FOR TRANSFER LEARNING



Problem – Negative Transfer in Computer Vision

- Weights and biases learned by deep learning models in a source domain, may negatively affect its ability to learn effectively in a new domain – think muscle memory.



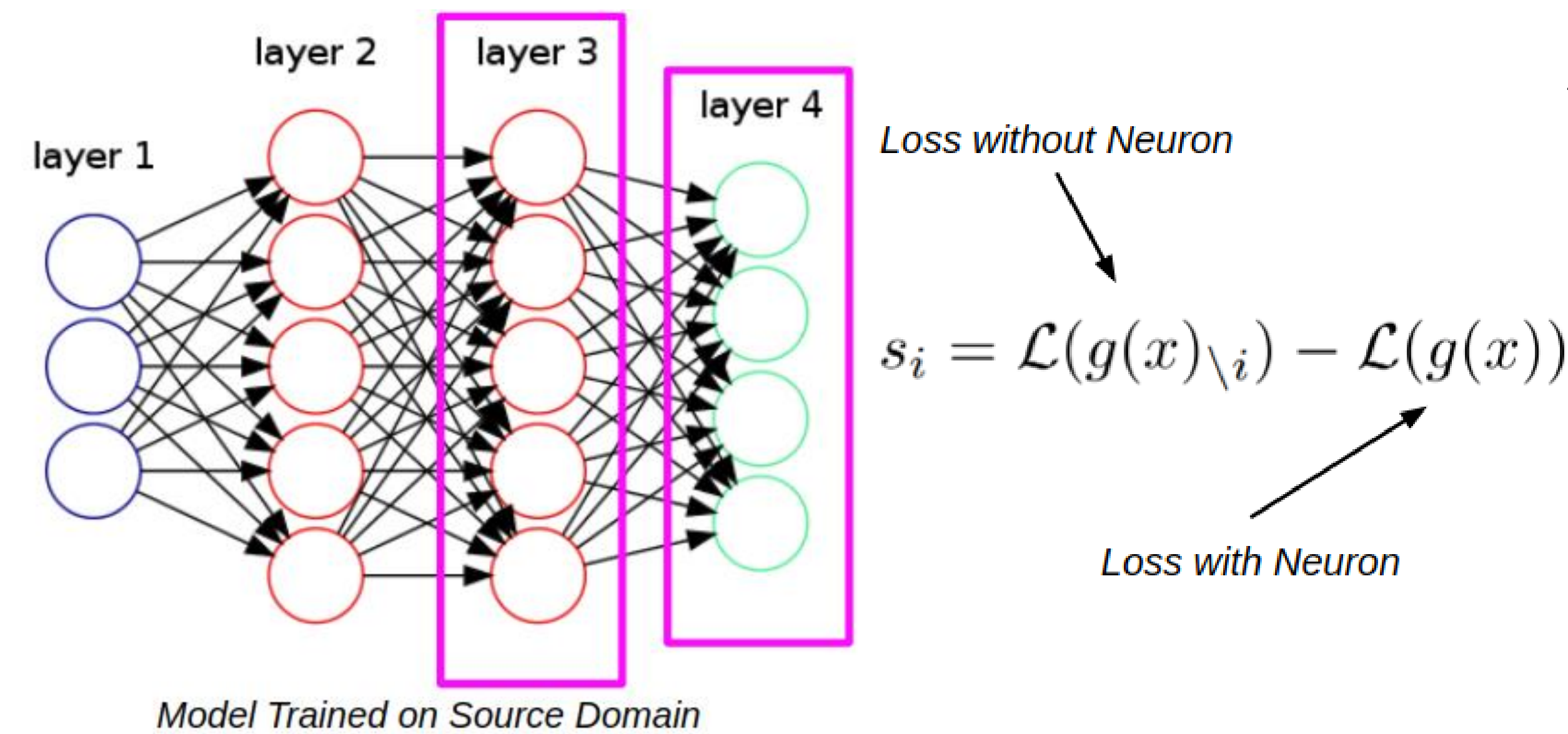
Proposed Solution

- Expand and improve this "impact" analysis and prune method to all layers of the network.

Previous Results

- This analysis should also provide us with insight into our cross-dataset-generalization experiment results from a previous paper.

Training on:	Testing on:	COCO	ImageNet	VOC	Caltech	INRIA	SUN	KITTI	CAM2
COCO		0%	+11%	+47%	-55%	+58%	- 8%	-37%	-37%
ImageNet		-44%	0%	+18%	-68%	+47%	-36%	-44%	-73%
VOC		-46%	-26%	0%	-77%	+14%	-43%	-56%	-71%
Caltech		-37%	-54%	-28%	0%	+145%	-31%	+11%	-53%

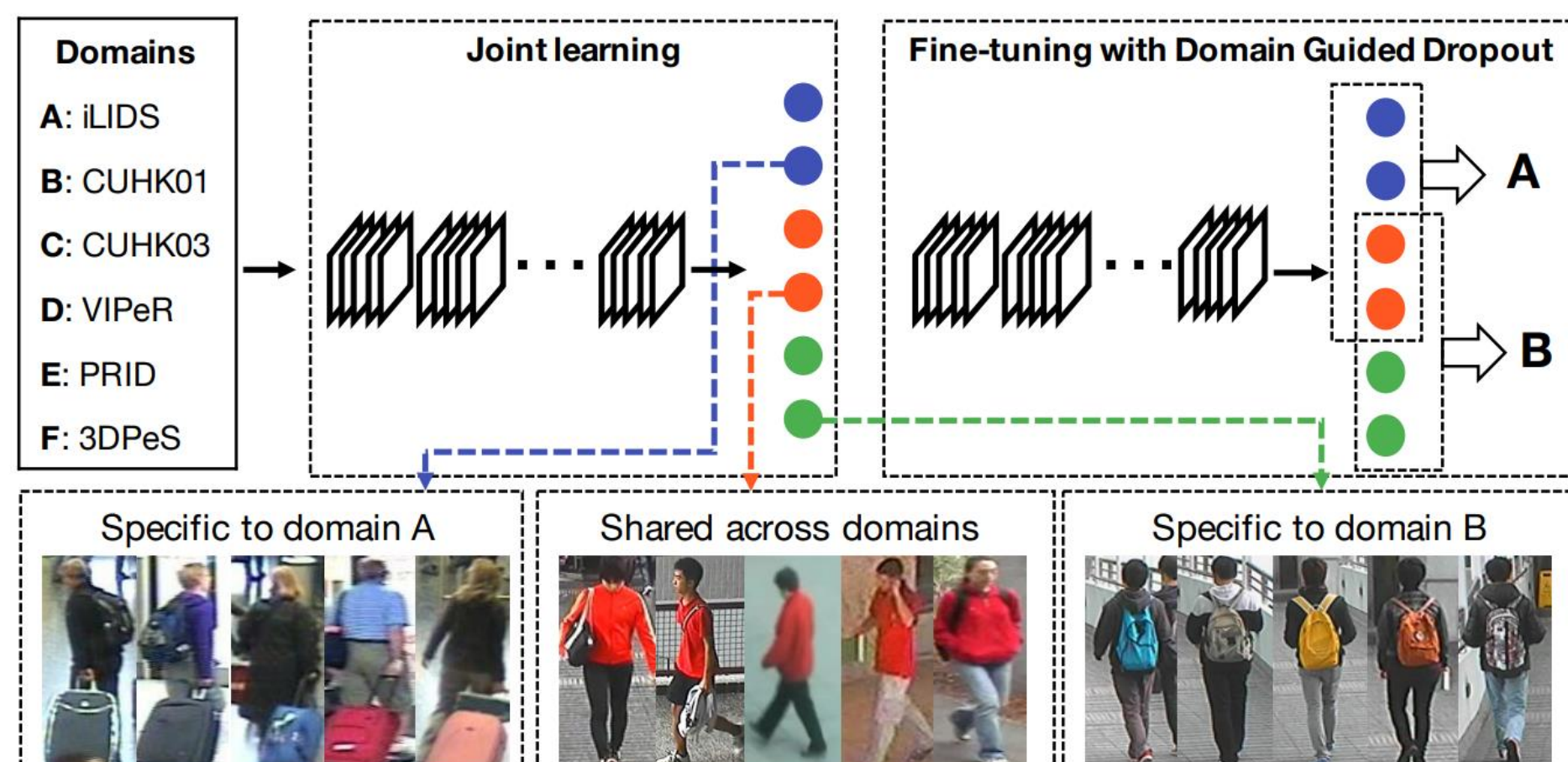


Further Analysis

- Developing plans to use MIT's *Network Dissection* tool to determine what low-level features were retained by the network when the cut is made before retraining.

Related Works – Domain Guided Dropout

- Analyze "impact" of neurons in a target domain, drop them and retrain if they negatively impact the model's ability in the target domain.



Goals

- Eliminate "knowledge" gained in the source domain that is harmful in a target domain.
- Retain the "knowledge" that is helpful in the target domain.
- Identify a "cutting point" at which to begin the retraining process for best knowledge transfer.

Accuracy on target domain

