



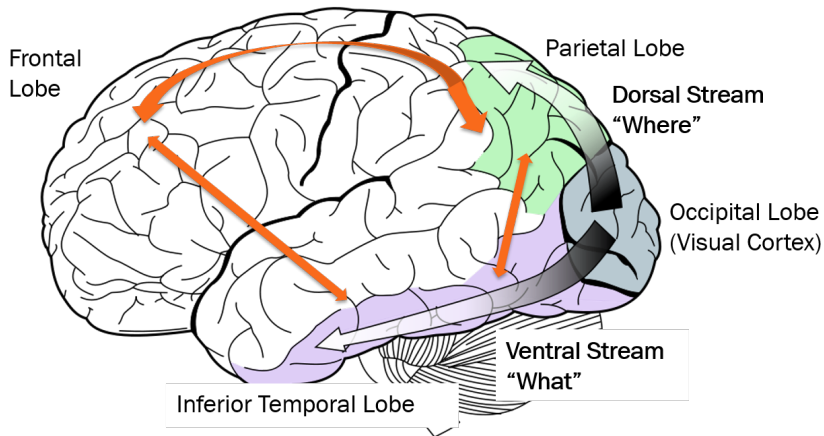
# Ventral-Dorsal Neural Networks: Object Detection via Selective Attention

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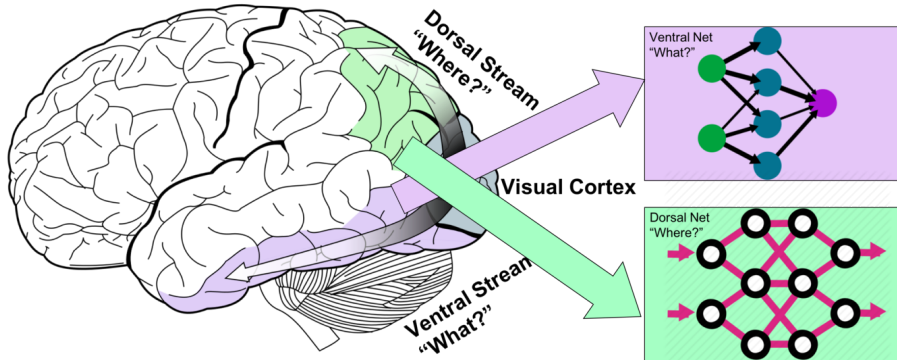
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# Brain Inspiration: How Do Humans Detect Objects?



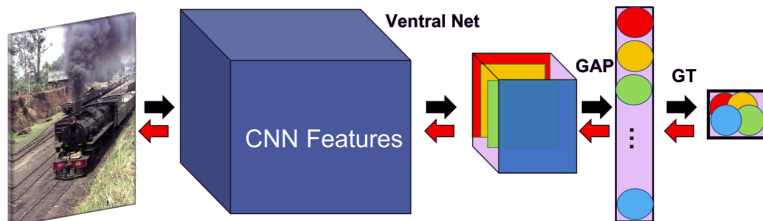
# Dual Neural Networks for Object Detection



# Attention Matters!



# Ventral Net: Guiding Selective Attention



- “Gestalt Total” Activation Over The Most Abstract Features.

$$GT = \sum_k \sum_{x,y} f_k(x, y)$$



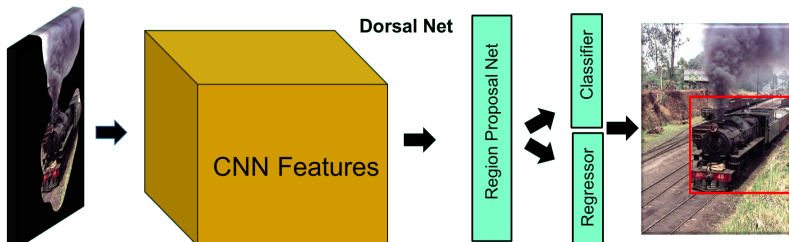
- Perform Sensitivity Analyses to Produce Attention Maps.

$$S = \frac{\partial GT}{\partial X} \Big|_{X=I}$$

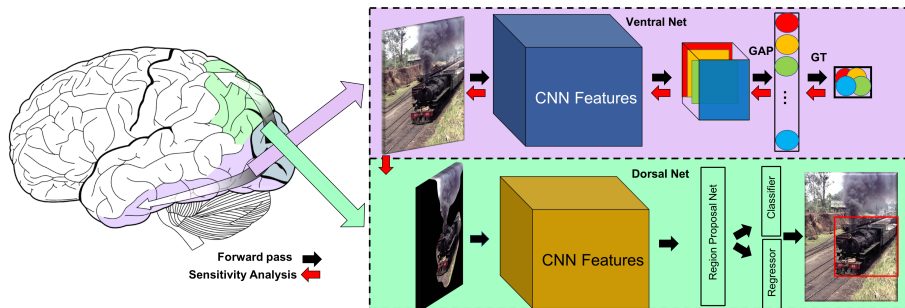


# Dorsal Net: Detecting Objects in Attended Subregions

- Any Object Detection Algorithm that Tolerates Occluded Image Subregions Could be Used as Dorsal Net.



# Ventral-Dorsal Neural Networks



# Results

Ventral-Dorsal Networks outperform state-of-the-art approaches!

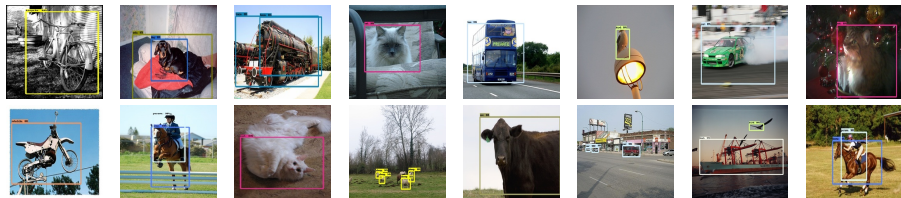


Figure 3. VNet Performance on Some PASCAL VOC 2007 Validation Images

Deeper Dorsal Nets exhibit improved accuracy.

VDNet Component	Deep Network	mAP
Dorsal Net	Inception	63.1
Dorsal Net	ResNet50	71.6
Dorsal Net	ResNet101	86.2

Table 3. PASCAL VOC 2007 Test Results for Different Network Architectures



# Results

# Thanks

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Please visit our Github page for more results and demos!