Visualizing Nodes in a Person Categorizing Deep Network

Stella Yu¹, Karl Zipser²

¹ICSI, Computer Science Department, U.C. Berkeley, (stellayu@berkeley.edu)
²Helen Wills Neuroscience Institute, U.C. Berkeley, CA

How does RF specificity depend on RF position for convolutional nodes? For nodes with small RFs, there is no position-dependence for the vast majority of RF positions, but for nodes with large RFs, position can have a dramatic effect on RF specificity at most positions.

Tiling nodes of a single type reveals large scale structure preferences.

Sample node preference images for each layer of the network (which is based on the GoogleLeNet architecture).

Modifying an image based on specificity of individual person category nodes yields distinct individual characteristics. Modifications can be featural as well as contextual.

Modifying an image based on specificity of a category node adjusts the entire image toward a single subject, for example, woman . . .

. . . or promontory. In this case, the woman is completely overwritten by landscape features.

Modifying an image based on specificity of two categories causes the nodes to automatically compete for zones of influence, thereby allowing for different category representations at appropriate positions in the image.