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Machine Psychology: Autonomous Behavior, Perceptual Categorization and Conditioning in a Brain-based Device

PowerPoint Slide for Teaching

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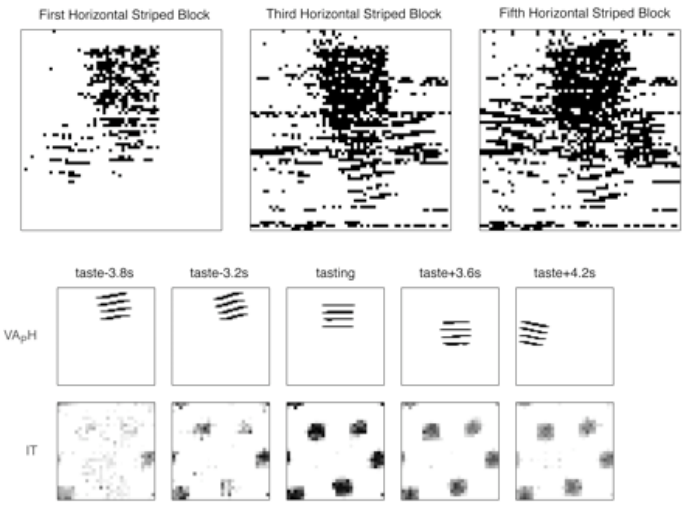

Figure 4.
Invariance with respect to position, scale and rotation emerges from a persistent pattern of activity in area *IT* as the pattern of activity in the VA_P areas moves sequentially across Darwin VII's field of vision. Shown in black (see top row) are the locations of VA_PH neuronal units responding to a horizontal visual pattern, whose synaptic weights, going from VA_PH to area *IT*, increased from their initial value. The VA_PH neuronal units are pictorially organized such that receptive fields near NOMAD's base are at the top of the figure and receptive fields that are further away from NOMAD's base are at the bottom of the figure. After presentation of the first horizontal block, most of the potentiation of synaptic weights occurred in VA_PH neuronal units with receptive fields near the position of Darwin VII's gripper. After each subsequent stimulus presentation with continuous movement, the potentiated receptive fields build up throughout Darwin VII's field of vision. The proportion of potentiated VA_PH neuronal units increased from 10% after the first stimulus presentation to 33% after the fifth stimulus presentation. The bottom two rows show sequential activity in VA_PH and *IT* during a stimulus encounter with one striped block. Activity in neuronal area VA_PH is shown in the middle row and that in neuronal area *IT* is shown in the bottom row as Darwin VII approaches the stimulus, grasps and tastes, and moves away.

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