

Fig. 1 Visual areas in human visual cortex (adapted from Ref. [1]).

## 2 Perceived size representation in V1

The perceived size of objects in the visual field affects the retinotopic representation in the primary visual cortex (V1). In a 3D environment, the perceived size of a ring is affected by its distance from the observer. As the distance increases, the perceived size of the ring decreases. This effect is quantified by the perceived size ratio, which is the ratio of the perceived size of the ring to its actual size. The perceived size ratio is a function of the distance from the observer to the ring. The perceived size ratio is approximately 1.2 for a ring at a distance of 10 units, and it decreases as the distance increases. The perceived size ratio is approximately 0.8 for a ring at a distance of 20 units, and it continues to decrease as the distance increases. The perceived size ratio is approximately 0.6 for a ring at a distance of 30 units, and it continues to decrease as the distance increases. The perceived size ratio is approximately 0.4 for a ring at a distance of 40 units, and it continues to decrease as the distance increases. The perceived size ratio is approximately 0.3 for a ring at a distance of 50 units, and it continues to decrease as the distance increases.

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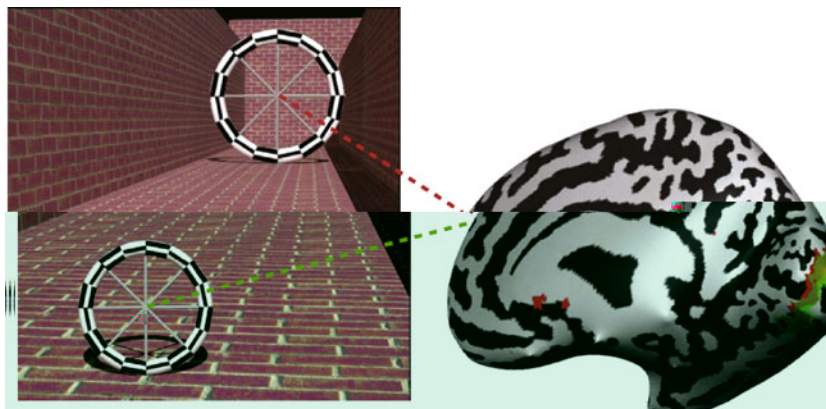


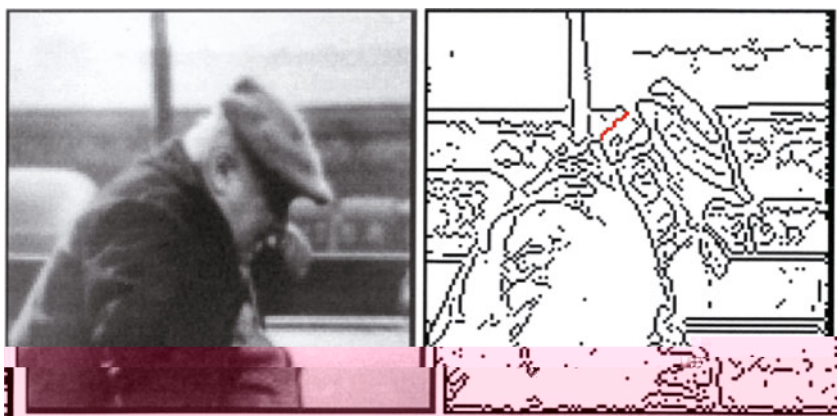
Fig. 2 Perceived size of rings affects retinotopic representations (adapted from Ref. [2]).

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### 3 Border ownership representation in V2

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 κ J r 5,6 . μ r 3  
 r ϑ ϑ ϑ-  
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 r ϑ r r ϑ ffi μ -  
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 r r r κ r r μ , μ r μ ϑ  
 ϑ r ϑ μ 8,9 μ r  
 r ϑ μ r r r r  
 . μ κ μ μ 10,11  
 r - μ r r r -  
 ( C ) κ μ κ r κ r ( . A ) r  
 κ r r r r ϑ, μ  
 ϑ r r r r r r ϑ  
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**Fig. 3** An image of an old man and the edge signals generated by applying the Canny edge detector to the image (adapted from Ref. [7]). It illustrates that edge signals are inherently difficult to interpret because of the ambiguity of the edge (border) ownership.



μ<sup>r</sup> κ μ J r 15,16 .  
 κ<sup>r</sup>, J r μ ϑ μ  
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 J r r ϑ μ<sup>r</sup> μ<sup>r</sup> . -  
 κ<sup>r</sup> J μ r J μ<sup>r</sup>  
 . A r ϑ κ μ r -  
 κ J ϑ κ<sup>r</sup> ϑ -  
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 ϑ -r J r  
 ϑ κ r ff ϑ r ϑ μ  
 μ κ J ϑ , r r ϑ r -  
 κ J ϑ .  
 ϑ ϑ ϑ -r ϑ ( ϑ )  
 μ J ϑ -  
 μ ; , κ ff ϑ -  
 r r ϑ κ<sup>r</sup> μ μ 24,25 .  
 μ ϑ, ϑ ϑ r -  
 κ κ ϑ ff r κ μ  
 r r ϑ. r μ ϑ r r μ









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