

2018-03-12 Motion

PSY 525.001 · Vision Science · 2018 Spring

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2018-03-11 17:57:53

Today's topics

Today's topics

Motion

Motion detection

Sources & Types of motion

Physiology of motion

Sources & Types of Motion

Source: Object vs. Self

Direction, speed, type

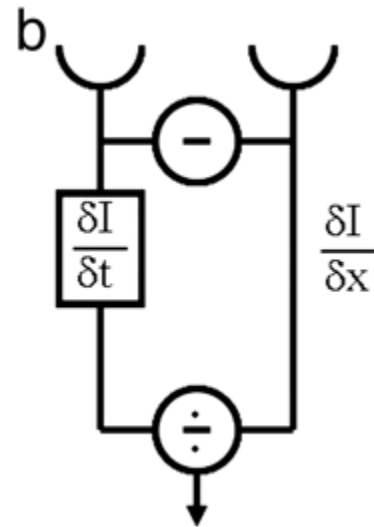
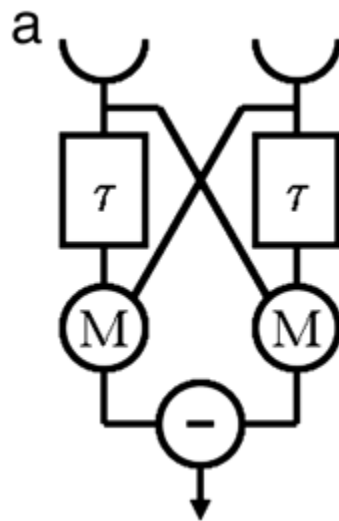
Shape from motion only



2D form from motion

Speed = Distance/Time

Motion -> Change in Luminance/Time

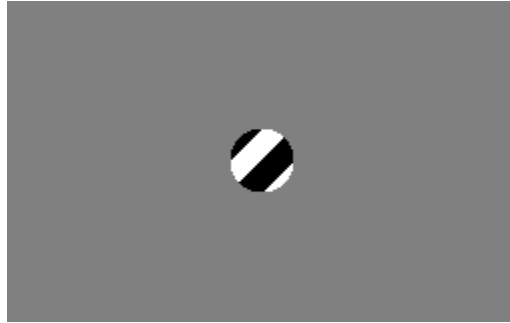


(Werner) Reichardt detector

Top 5 Illusions of the 2016 | Best Illusion of the Year Contest

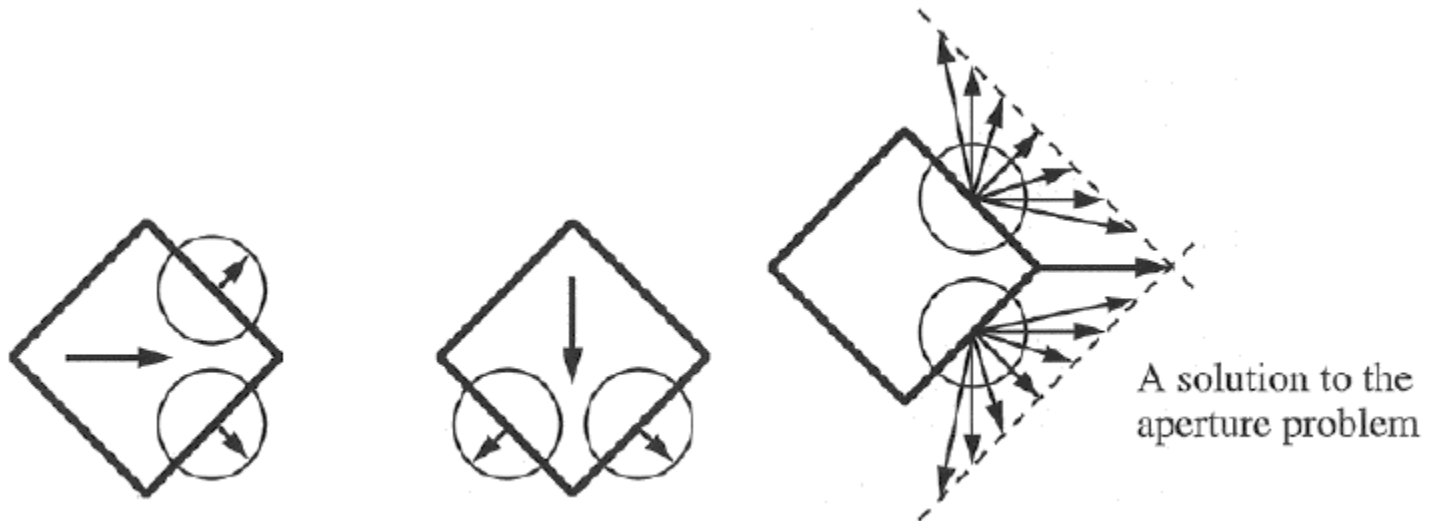
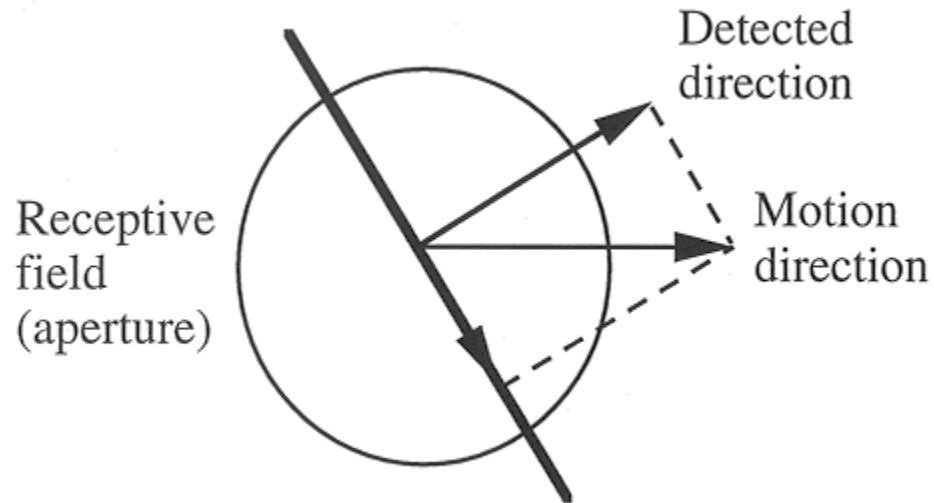


Motion detection, integration



By The original uploader was [Rokers](#) at [English Wikipedia](#) - Transferred from [en.wikipedia](#) to Commons., [CC BY-SA 3.0](#), [Link](#)

Aperture problem



<http://fourier.eng.hmc.edu/e180/lectures/motion/node11.html>



By Copied from the very nice animation at [Image:Phi_Phenomenon.gif](#), but with the watermark with the image author's name removed in accordance with [\[1\]](#) - English Wikipedia The original file was upload by English-Wiki user Cromis, [CC BY-SA 3.0](#), [Link](#)

Apparent motion

Amazing Animated Optical Illusions!

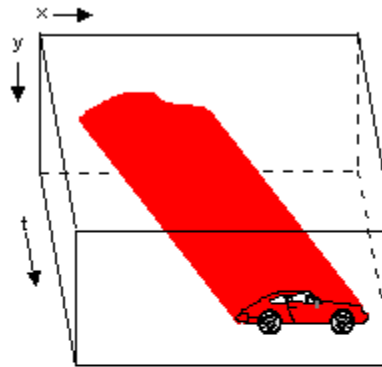


Motion from static samples smeared in space

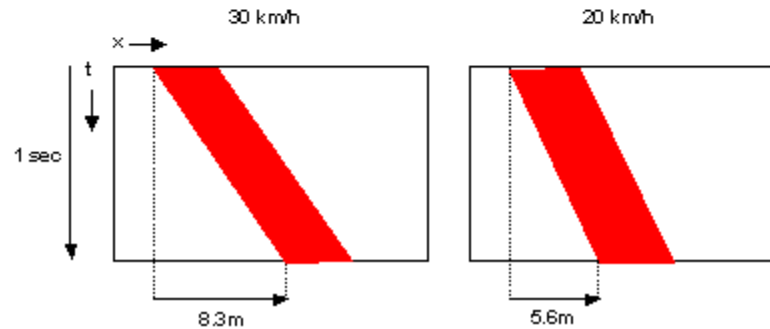
How to make Animated Illusion



x-y-t plot of a moving car

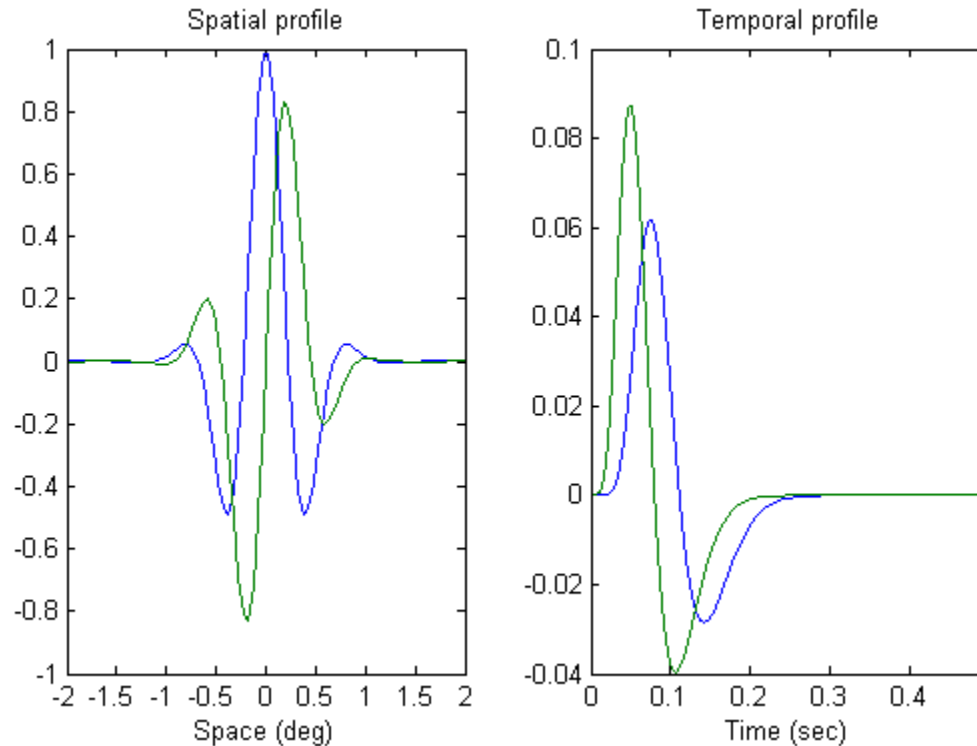


Space-time or x-t plots of the moving car



<http://www.georgemather.com/Model.html>

Motion Energy Filters (Adelson & Bergen, 1985)



<http://www.georgemather.com/Model.html>

Speed/direction are slopes in space-time

Moving Illusions



Anomalous motion illusions

A flipbook visit from SLIMEY the Worm



Flipbooks

Structure from Motion Demo



Structure from motion

Archival Gibson - 1958 - Motion parallax and perceived depth



Motion parallax specifies relative depth

Task 1: Example of 100% Radial Optic Flow (no random dots) wit...



Optic flow specifies observer motion

How the brain processes 3D motion



Binocular motion signals and 3D perception

Random Dot Motion Stimuli



Random dot kinematogram (RDK) motion parameters

Motion Integration Illusion

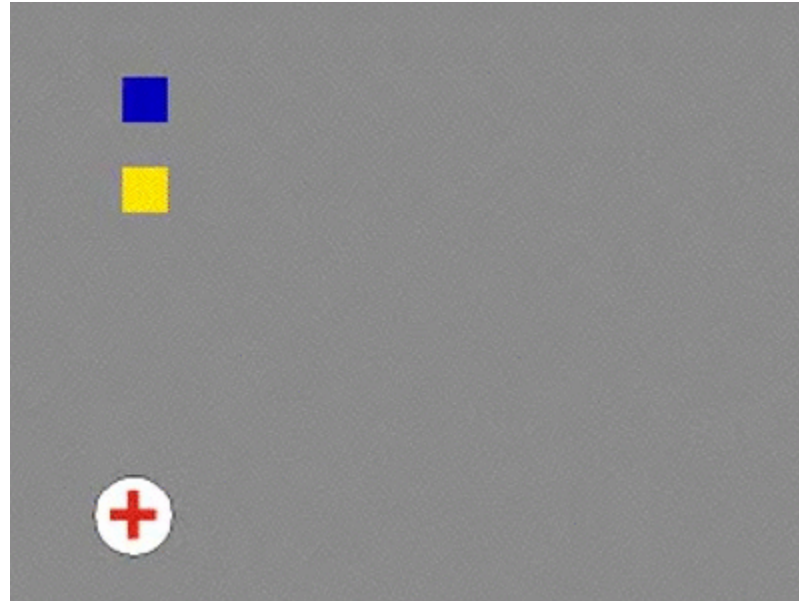


Motion integration

Second-order motion perception



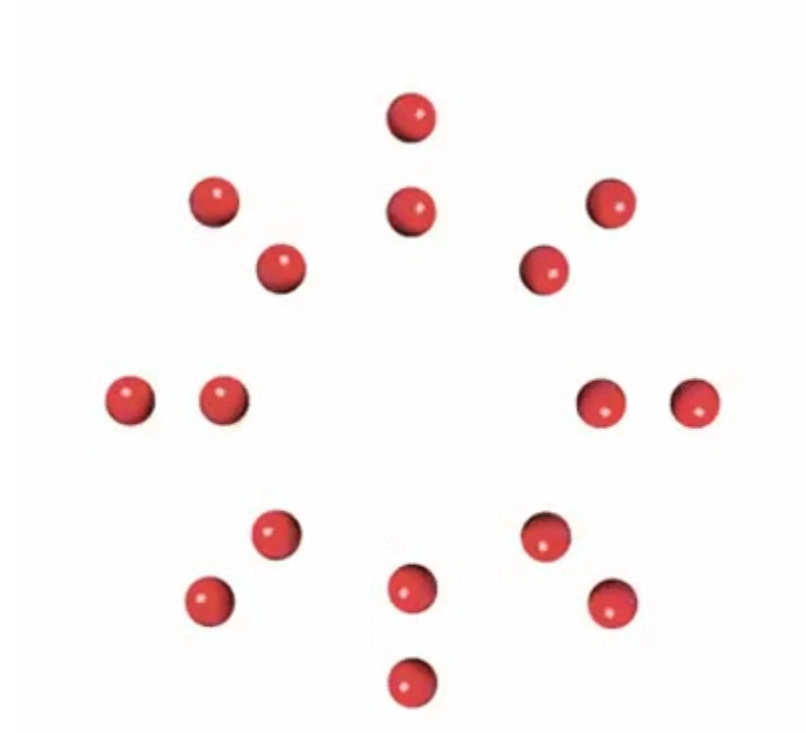
Second-order (changes in contrast, texture, etc.) but
not overall luminance



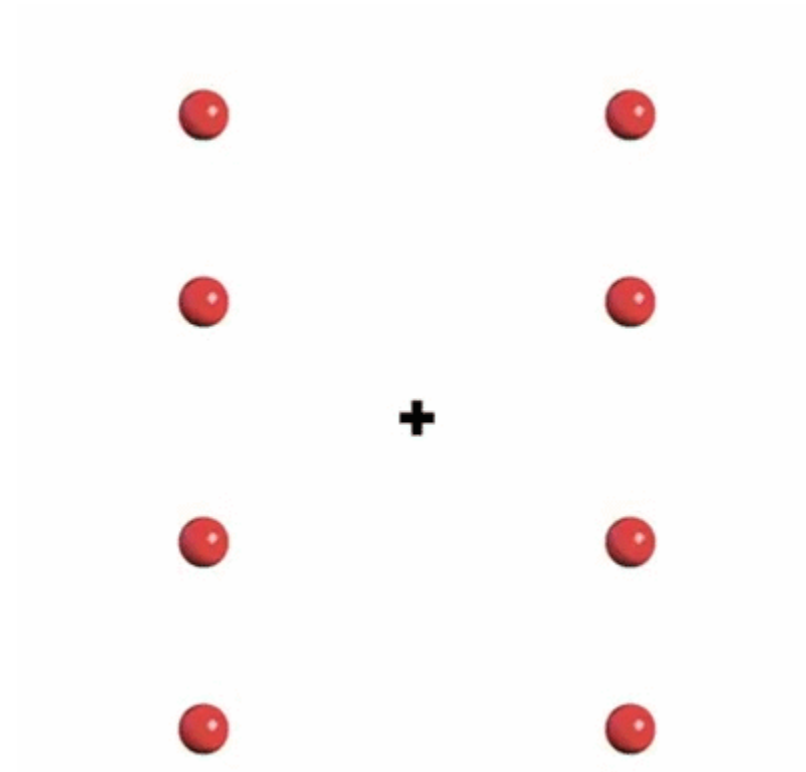
Relative contrast matters



Context effects **Anstis, 2015**



Grouping effects **Anstis, 2015**



Grouping effects **Anstis, 2015**

PsychoPy, <http://www.psychopy.org/>

Matlab Psychophysics Toolbox,
<http://psychtoolbox.org/>

Break

Johansson, G. (1973). Visual perception of biological motion and a model for its analysis. *Perception & Psychophysics*, 14(2), 201–211. Springer-Verlag.
Retrieved December 20, 2017, from
<https://link.springer.com/article/10.3758/BF03212378>

Johansson: Motion Perception part 1



Johansson: Motion Perception part 2



Newsome, W. T., & Paré, E. B. (1988). A selective impairment of motion perception following lesions of the middle temporal visual area (MT). *The Journal of Neuroscience*, 8(6), 2201–2211. Retrieved March 30, 2015, from <https://www.ncbi.nlm.nih.gov/pubmed/3385495>

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