

Calming visual spaces  
Learning from Kyoto Zen gardens

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# Aesthetic qualities of Zen gardens

Karesansui - dry landscape gardens

Muromachi era (1336 - 1573)

- naturalness
- asymmetry
- simplicity
- tranquility

Shinichi Hisamatsu

scene elements → aesthetic qualities



# Natural textures





# Hypothesis

Zen gardens are visually calm because they:

- simplify task of scene understanding
- minimize visual pop-out
- reduce load on attentional resources



# Scene perception






# Scene segmentation






# Gestalt principles


proximity


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similarity

continuity

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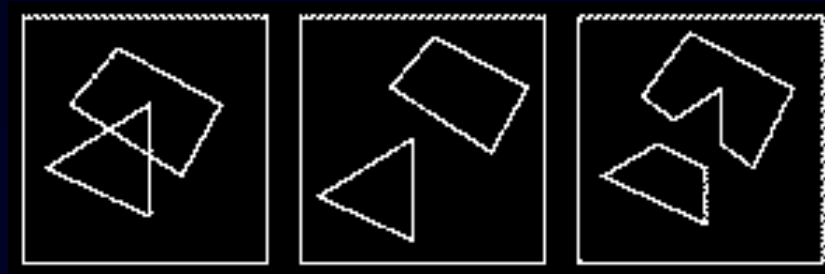
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closure

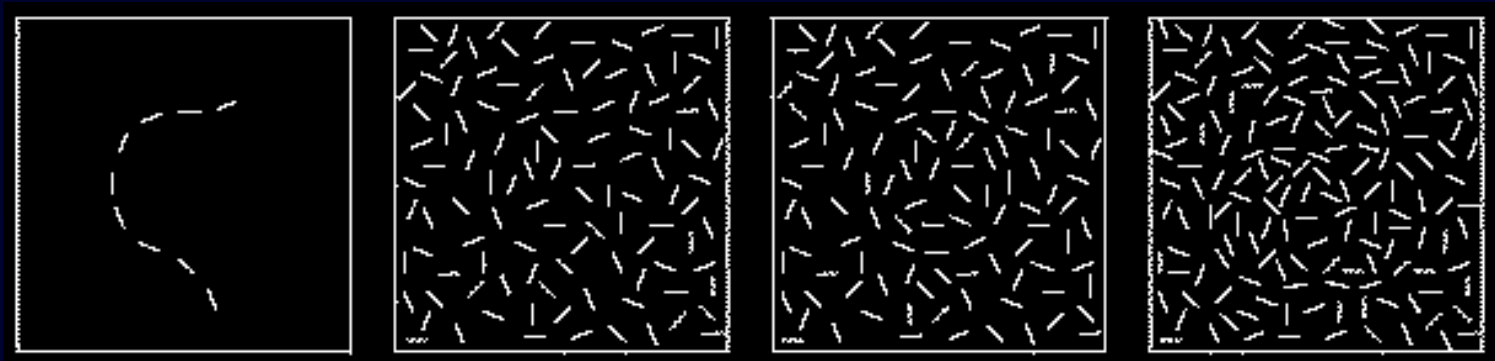


# Gestalt principles

Simplicity



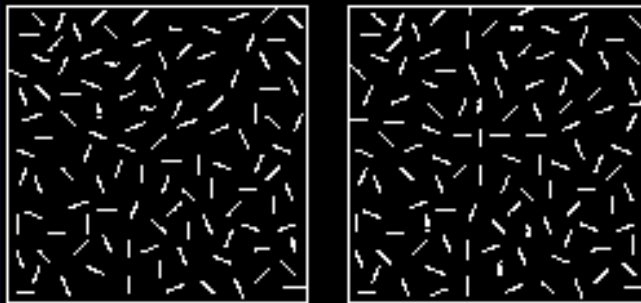
Complex interaction of cues



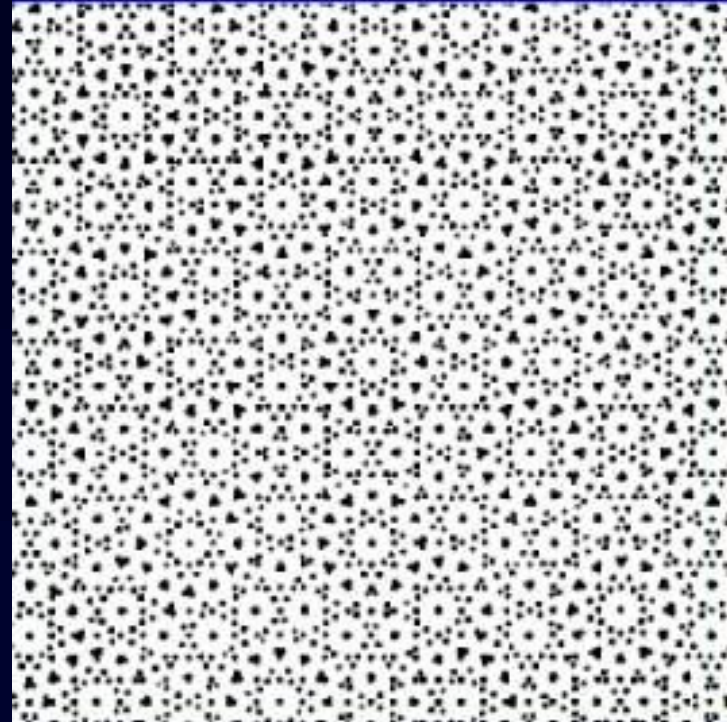


# Contour junctions

Junction type  
odd even



Object arrangement



Aligned even junctions  
cause competing figures



## An observation

- gestalt principles seem to be used to ease segmentation of visually salient objects such as paths, bridges, or buildings
- “pop-out” is scrupulously avoided in other areas of the garden or in object parts
- The garden designers seem to have understood visual Gestalt very well!

# Scene segmentation





# Scene perception





# Perceptual Grouping





# Perceptual Grouping





# Multiscale grouping





# Multiscale grouping



# Zuihouin - Dokuzatei garden



“garden of solitary meditation”



# Zuihouin – baroque version



# Ryoanji dry landscape garden



yohaku no bi - the beauty of empty space



# Landscape painting



Fan Kuan  
990-1030, Sung



Mi Fei  
1051-1107, Sung



Sesshu  
1495, Muromachi

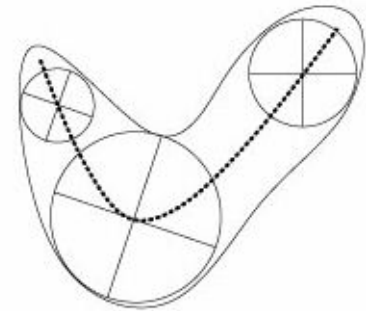
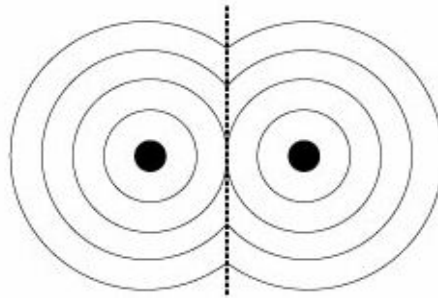
# To members of the Press

- The following material is in the process of publication by a journal which has a "press embargo" policy
- *Please contact me* before reporting the following material

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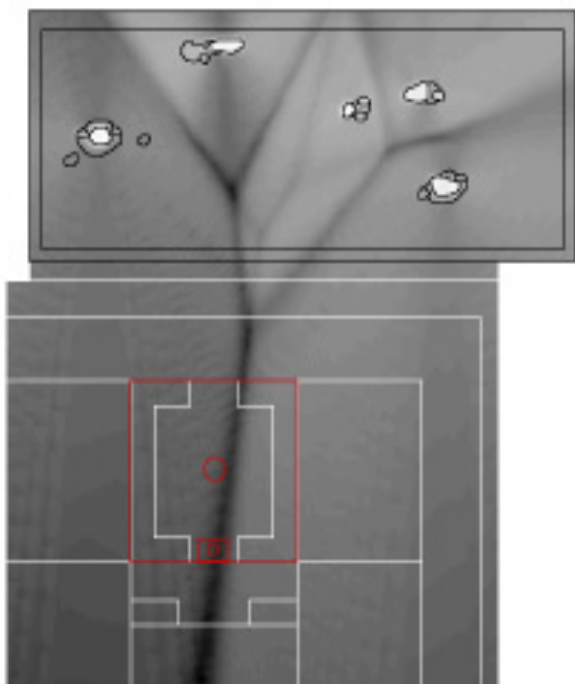


# Medial axis transform

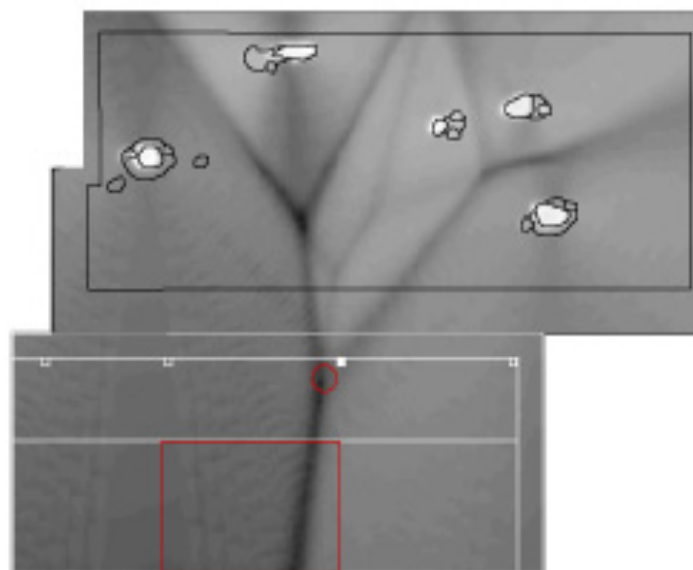


- Proposed by H. Blum in 60's as a natural representation for computer vision
- Kovacs, Julesz et al. found axes of enhanced luminance contrast perception at MAT maxima

# Ryoanji: Symmetry axes



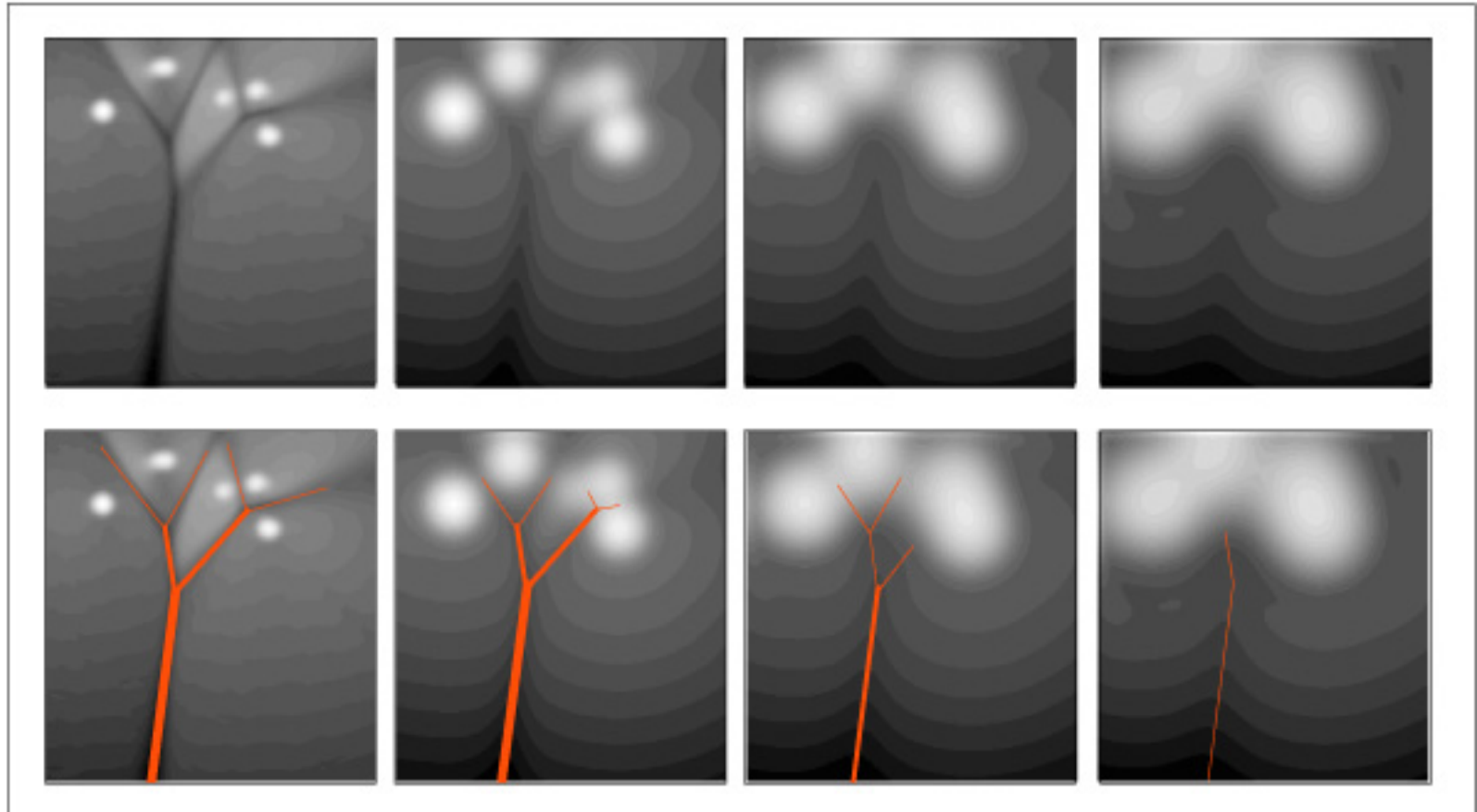
Medial axes in  
the 1681 plan



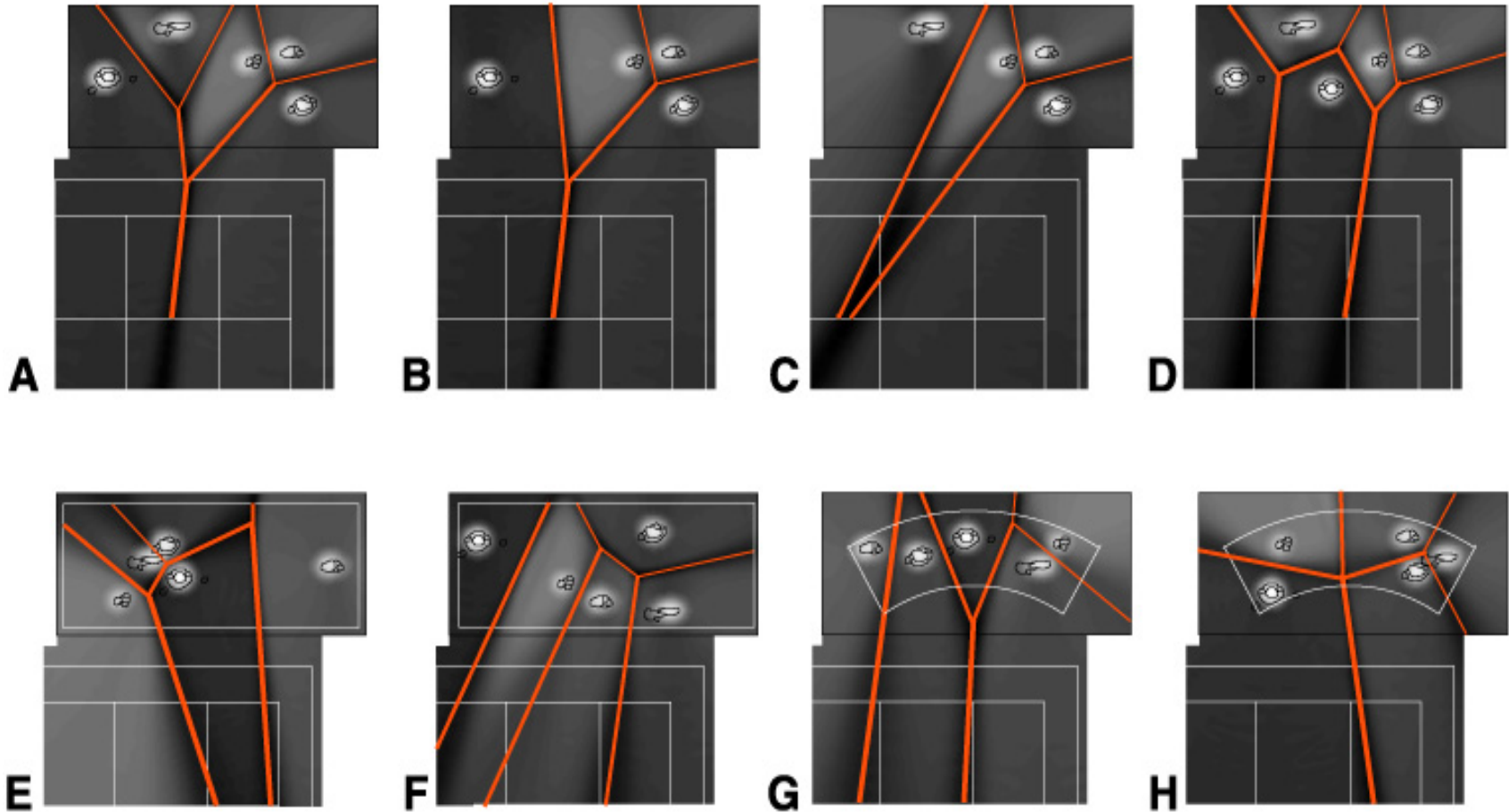
Medial axes in  
the present plan



# Scale space analysis



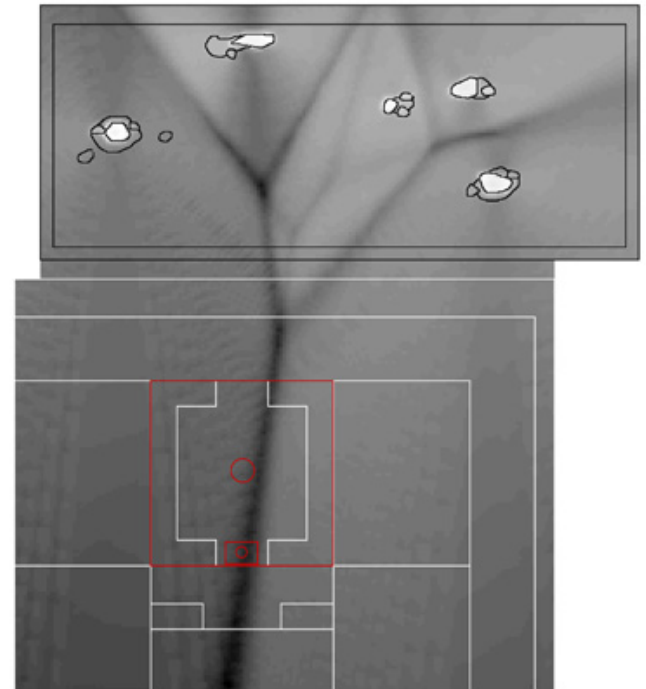
# Simulated design alterations





# Ryoanji: an interpretation

- Implicit structure of visual ground may account for this garden's appeal
- Patterned visual ground lends "wholeness" to the composition



# Summary

- Consideration of perceptual processes in early vision can yield insight into affect-level qualities of visual environments
- Gestalt principles can be helpful in this respect
- The medial axis transform is useful for exploring the structure of both visual figure and visual ground (or "empty space")



# Conclusion

- This work is preliminary but it appears that vision science can help to deepen insight into Japanese dry landscape gardens
- It may be possible for designers to apply this insight in other realms to create visually calm and healing environments