

Preface

Special Issue on Shape Perception: Recent Results and Models

In 2008, we organized the First International Workshop on Shape Perception in Human and Computer Vision in Marseille, France (<http://viper.psych.purdue.edu/workshops/iwspshcv08/>). At that workshop, we brought together researchers from human vision and computer vision to engage in an interdisciplinary dialog on shape perception. We were inspired by similar such efforts by our PhD advisor, Azriel Rosenfeld, widely considered one of the founders of the field of digital image analysis, who understood how much the two vision communities could learn from each other. The tremendous success of the workshop motivated us to follow it up with a special issue in this journal, which at that time was in the process of changing its name from ‘*Spatial Vision*’ to ‘*Seeing and Perceiving*’.

Research on human shape perception has a long and complex history. It goes back at least as far as the year 1083, which is the year of publication of Alhazen’s book on vision, in which the phenomenon of shape constancy, together with other perceptual constancies, was defined and analyzed. The importance and primacy of shape in vision was the underlying theme of Gestalt Psychology, whose formal beginning is associated with Wertheimer’s publication of his paper on motion in 1912. So, it is a fortunate coincidence that this special issue comes out at the 100th anniversary of the launching the Gestalt Revolution.

The history of research on machine shape perception is considerably shorter. It started as a branch of Artificial Intelligence and acquired its independence in 1965, when Roberts published his chapter on ‘machine perception of three-dimensional solids’. For the next 30 years, shape perception dominated the object recognition community before appearance-based techniques shifted the focus from category to exemplar recognition. After a 10-year hiatus, the computer vision community is slowly returning to shape perception as it recognizes what early object categorization researchers knew all along: that shape is a far more powerful and invariant feature for defining categories than appearance. The timing is therefore ideal to try and reconnect the two communities on this critical topic.

This special issue offers the reader several papers covering a range of interdisciplinary topics on shape perception: shape similarity and categorization, the role of depth and pictorial cues in shape perception, tactile and haptic shape perception, mathematical treatment of shading as a local shape descriptor, the relationship between shape and figure-ground organization, as well as a proposal to consider vision as an interface rather than a way to infer stable and veridical descriptions of the environment. We'd like to express our sincere thanks to the authors for their contributions, and to the editorial staff for their support in making this issue possible. It's an exciting collection of papers on a very important topic in vision, and we hope the reader will enjoy reading these papers as much as we did.

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