

1096-20-2223

Yanxi Liu* (yanxi@cse.psu.edu). *Computational Symmetry for Automatic Pattern Discovery.*

Symmetry is an essential mathematical concept, as well as a ubiquitous observable phenomenon in nature, science and art. Either by evolution or by design, symmetry imparts an efficient coding that makes it universally appealing. Recognition of symmetry and regularity is the first step towards capturing the essential structure of a real world problem while minimizing computational redundancy. Automatic symmetry detection from real world (digital) data turns out to be a surprisingly challenging problem that has puzzled researchers in machine intelligence, computer vision, robotics, and computer graphics for the past four decades. Recognizing the fundamental relevance and potential power due its principled root that computational symmetry affords, we explore a formal and computational characterization of real world symmetry using a group theoretical model. In this talk, I summarize the theoretical background on crystallographic groups, and illustrate few recent results of applications of computational symmetry in computer vision. (Received September 17, 2013)