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Mark Blumstein* (mark.blumstein@gmail.com), **Louis Scharf**, **Edwin Chong** and **Chris Peterson**. *Irreducible Representations of Groups in Image Processing*.

Fundamental problems in image processing include: *Detection* of an object from a sample image, *classification* of images into different object classes, and *estimation* of transformation parameters between sightings of an object. Here we consider cases where the variability in an image set can be parameterized by a group G of deformations, and so the fundamental mathematical object is an orbit of images. We consider examples where orbits are approximated in (linear) G -representation spaces. A given covariant rule allows for *estimation* of transformation parameters, while invariants, in the sense of Classical Invariant Theory, provide statistics which may be used for *detection* and *classification*. (Received September 17, 2019)