
Methods

- 31,591 Humphrey Visual Fields (SS 24–2) of glaucoma patients or suspects from large clinical glaucoma practice
- 24,412 reliable VFs (Fixation Losses ≤ 33%, False Negatives ≤ 20%)
- no repeated measurements over same eye and patient
  ⇒ 13,231 remaining VFs
- OS locations mirrored to match OD locations
- Total Deviation norms taken from Peridata
- comparison of unsupervised statistical learning procedures
  ⇒ no ophthalmological background knowledge

Purpose of this work:
- numerous classification schemes for glaucomatous VF loss over past decades
- Keltner et al. (2003): OHTS, 2,509 VFs qualitatively inspected
  ⇒ 17 mutually exclusive categories

Results: 16 of 17 computational archetypes match Keltner, and we can additionally quantitatively decompose VFs

Components, Prototypes, and Archetypes

Nerve Fiber Abnormalities

- Altitudinal (3.9%)
  - matching archetypes (TD and TD prob)
- Arcuate (10.8%)
- Partial arcuate (16.8%)

Nonnerve Fiber Abnormalities

- Total loss (6.4%)
- Central (4.1%)
- Hemianopia (4.6%)
- clearly nerve fiber related!
- Widespread (0.6%)

Conclusion

- learning components on convex hull quantifies ophthalmological categorization procedures
- qualitative verbal definitions may miss relevant features (see “Total loss” category)
- our statistical categorization allows quantitative decompositions of arbitrary VF measurements
- potential for progression analysis and structure-function relations