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Fast Symmetry Detection with Deep Learning and GeConv

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GeConv

Image filters and clustering (DBSCAN):

[1088x600x3]	[1088x600x1]	[1088x600x1] +Otsu	[1088x600x1] + Cluster

Sort and rotate points:

$$\mathbf{P}_{\theta hull} = sort(\mathbf{P}, sort(\boldsymbol{\theta}_{cp_k})); \ \mathbf{R} = \begin{bmatrix} \cos(\theta_k) & -sin(\theta_k) \\ \sin(\theta_k) & cos(\theta_k) \end{bmatrix}$$

Geometric convolution and symmetry score:

$$\mathbf{P}_{\theta_k} = (\mathbf{R} \cdot (\boldsymbol{\theta_{k-1}} - \boldsymbol{\theta}_{cp})^T)^T + \boldsymbol{\theta}_{cp}$$

 $\theta_{Vsymm} = min(|mean(|\sin(|\boldsymbol{\theta}_{k_{cp}}|)|), \theta_{Vsymm})$ $\theta_{Hsymm} = min(|mean(|\cos(|\boldsymbol{\theta}_{k_{cp}}|)|), \theta_{Hsymm})$









