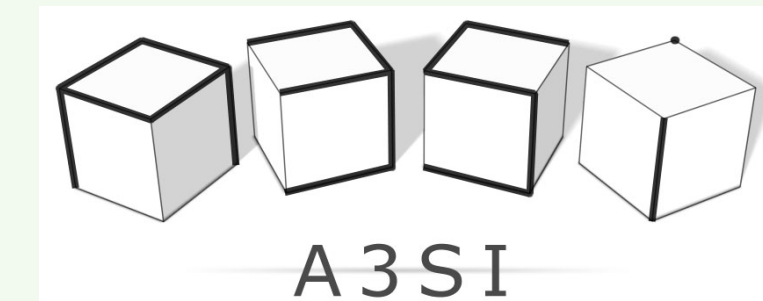




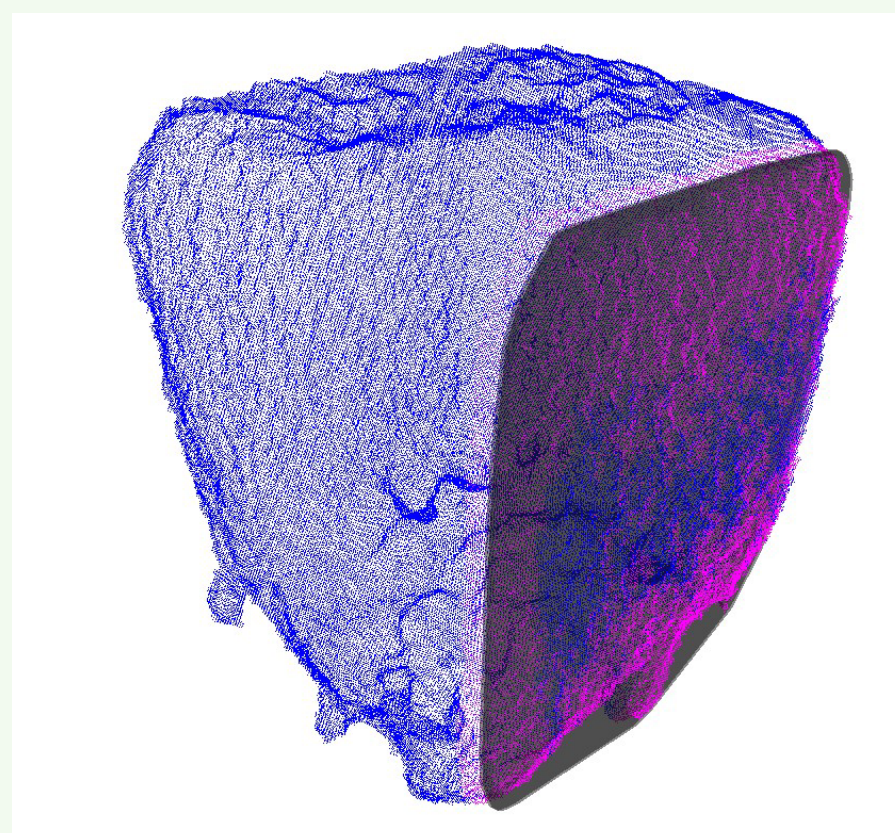
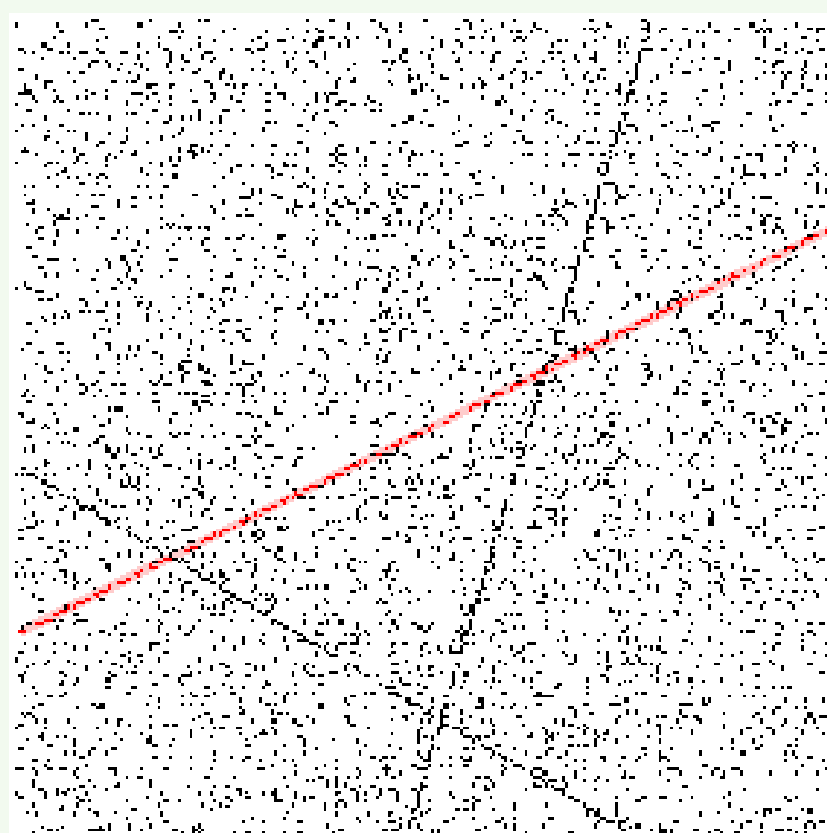
Combinatorial and geometric image computing



*There are often combinatorial aspects on geometric problems of digital image computing.
Our goal is to understand such combinatorial structures of the solution spaces of those geometric problems,
so that more efficient algorithms/properties can be proposed.*

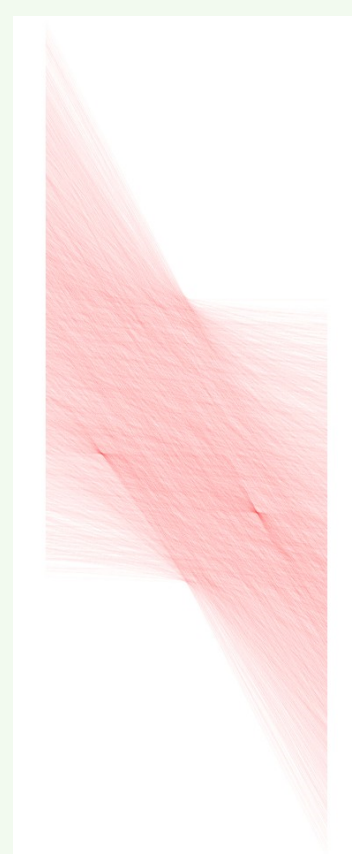
Shape fitting

Find a discrete line or plane in a noisy image.



*Original
problem*

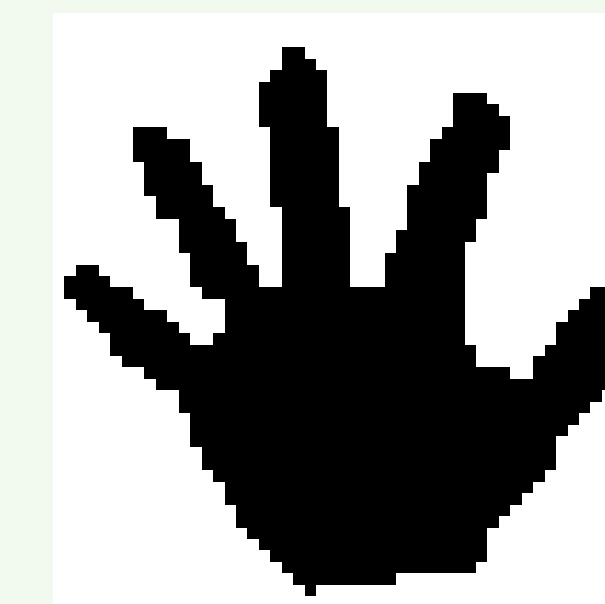
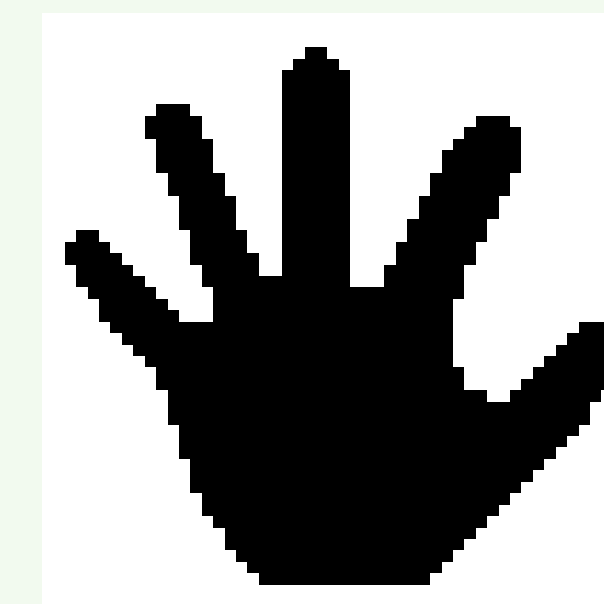
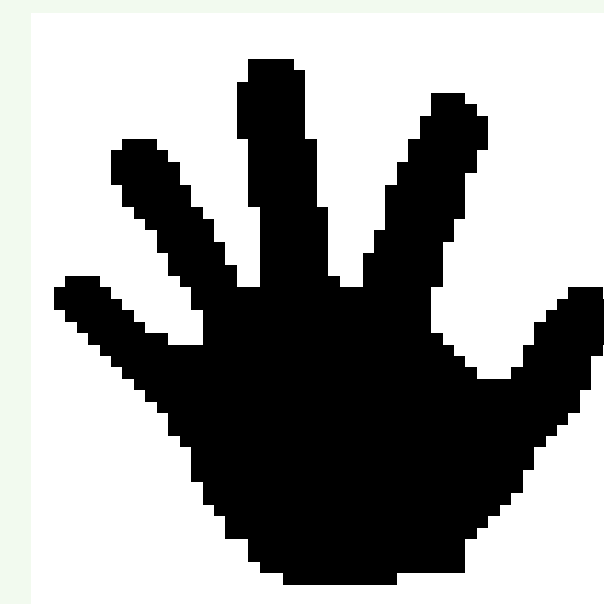
Partition and exploit the discretized parameter space.



*Complexity: $O(N^d)$ where N is the number of points
and d is the dimension.*

Image registration

Find a rigid transformation between reference and target images.

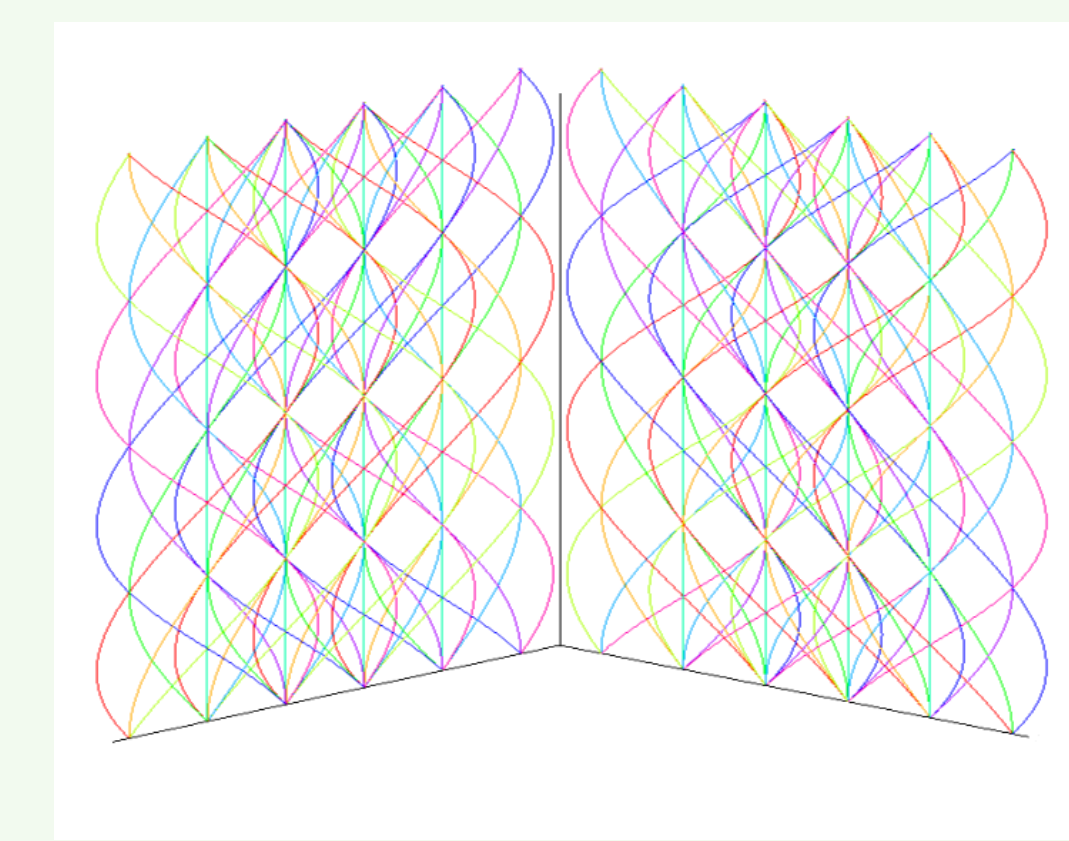
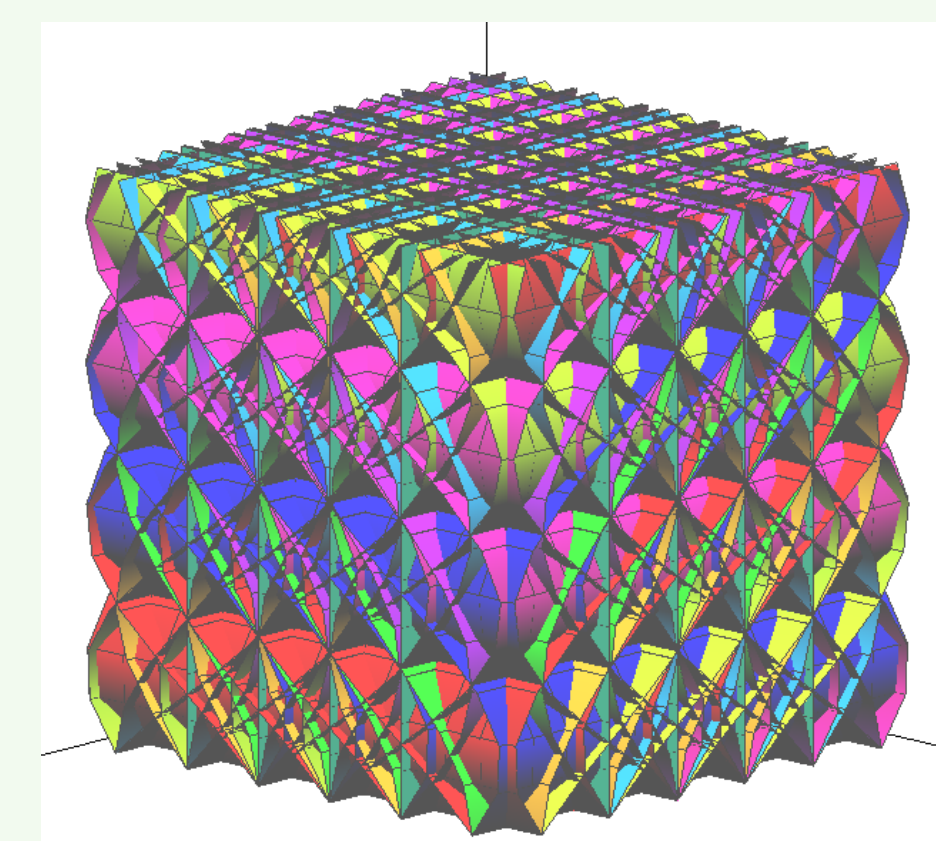


Reference image

Target image

Transformed target image

Partition and exploit the discretized parameter space.



Complexity: $O(N^{4.5})$ where N is the image size.

Solutions can be obtained by using combinatorial optimization techniques.

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