Cartesian Genetic Programming for Image Segmentation

CGP-Image Segmentation - G1F

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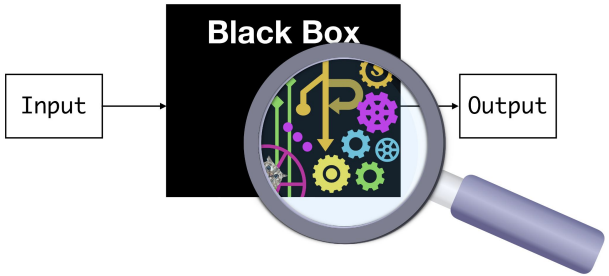
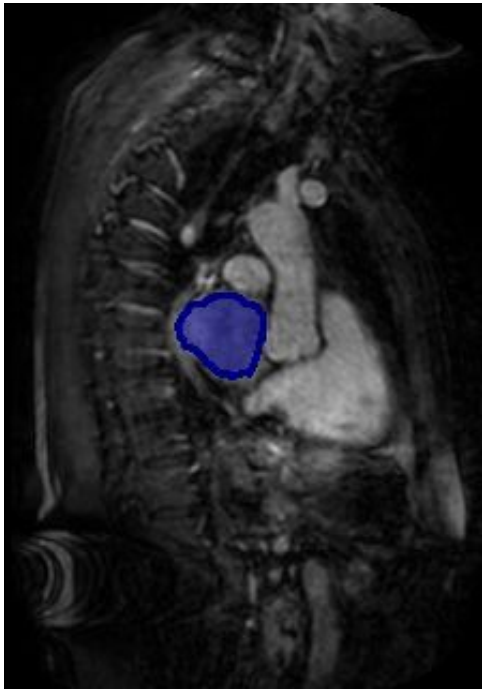
Problem: Image Segmentation

Current Solution: Deep Neural Networks

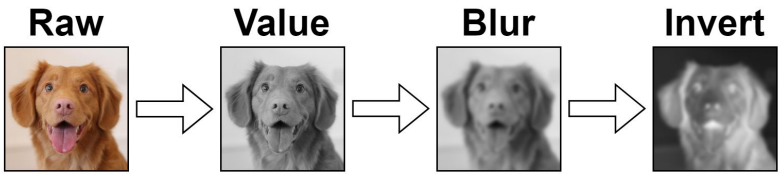
+ performs well
– large dataset required
– not human interpretable

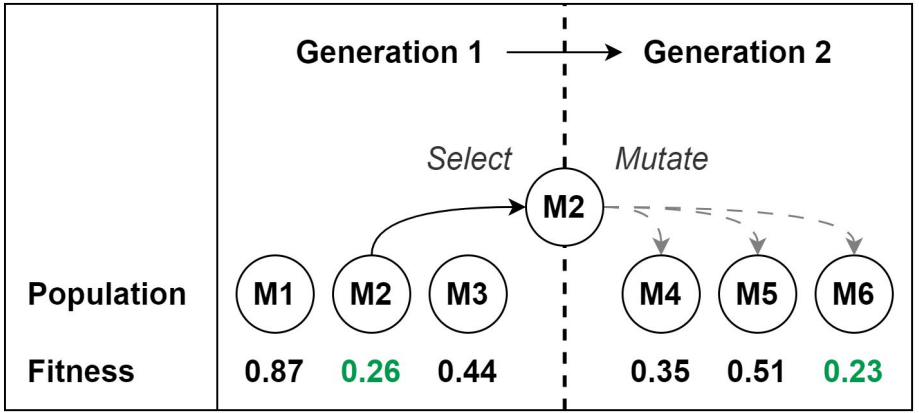




Proposed Solution

Kartezio: a modular Cartesian **Genetic Programming** framework that generates fully transparent and easily interpretable **image processing pipelines**.

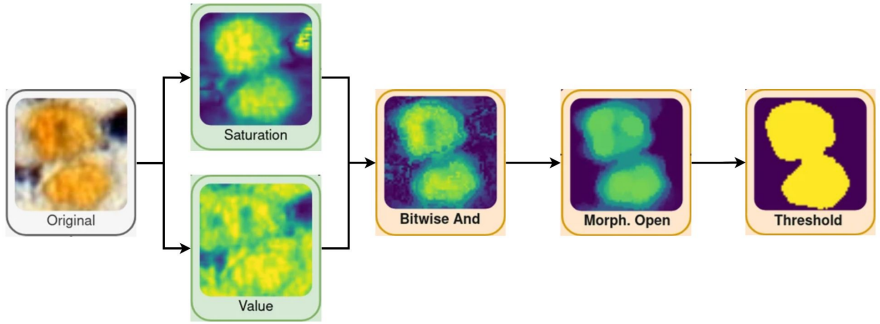


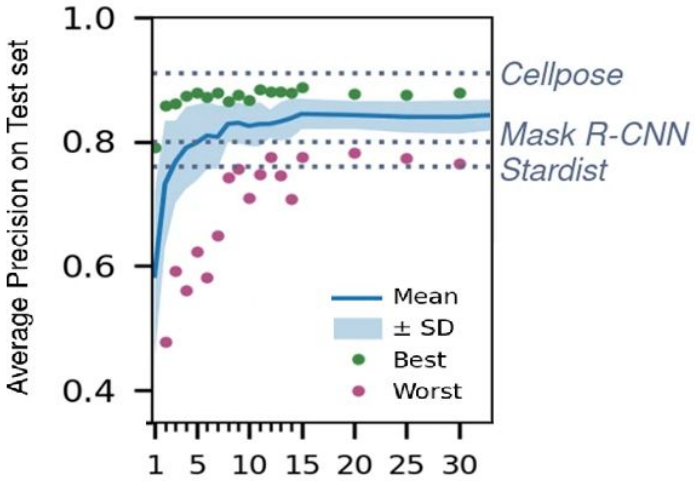


Project Goal

Test Kartezio's claims:

+ trained on small datasets
+ comparable performance
+ transparent and interpretable

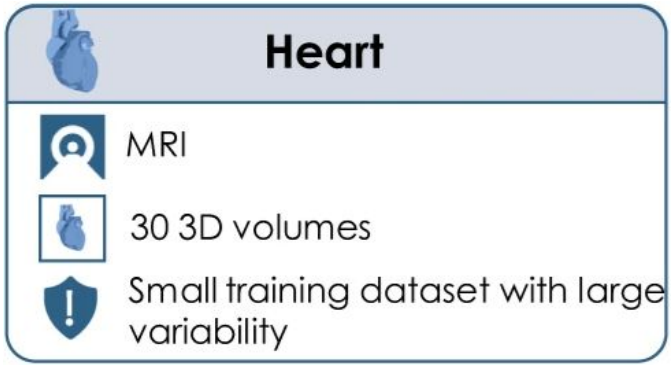


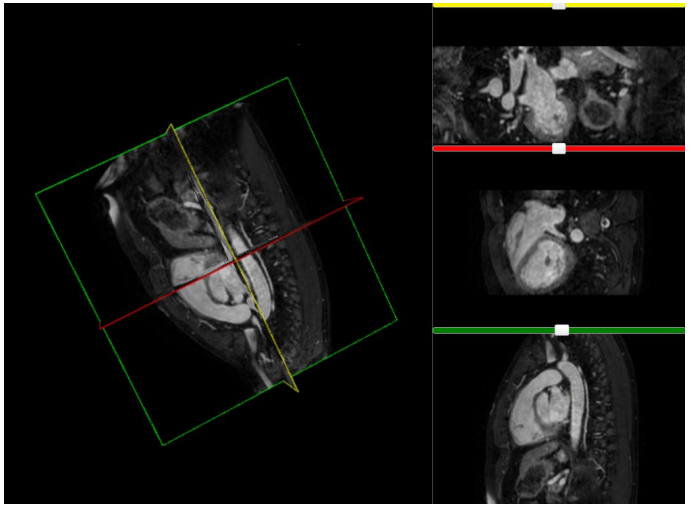


Dataset

Medical Segmentation Decathlon

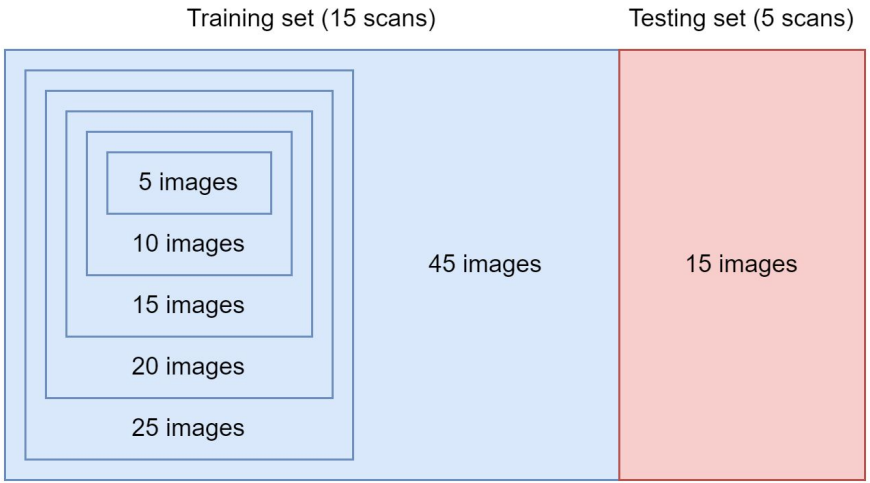
20 MRI scan of heart





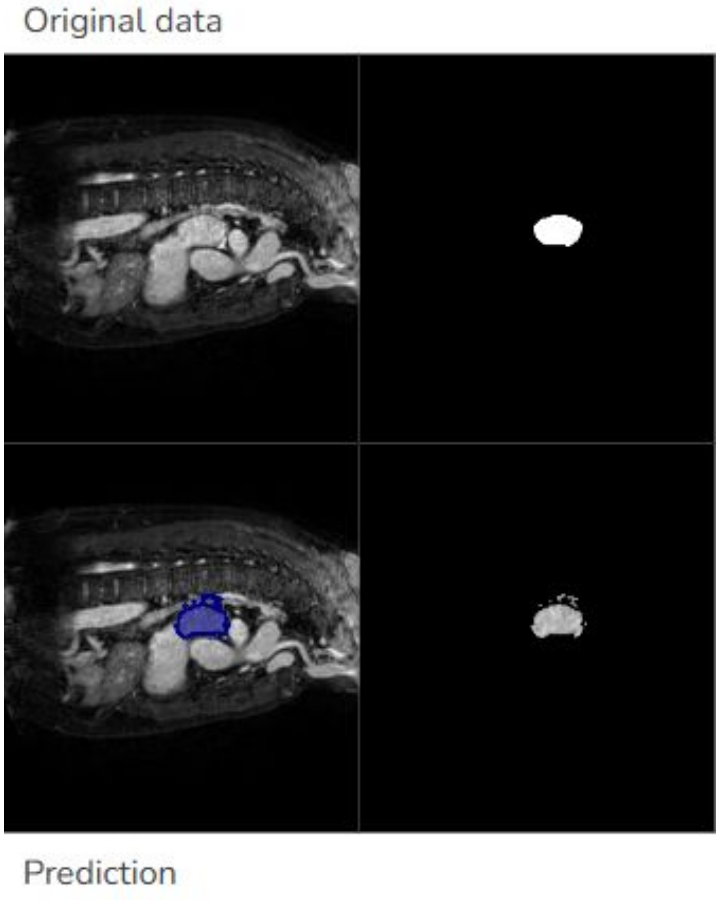
Experiment

- multiple models
- different train set sizes
- evaluate on same test set



Results

- good performance with small sizes
- stable after 10 images

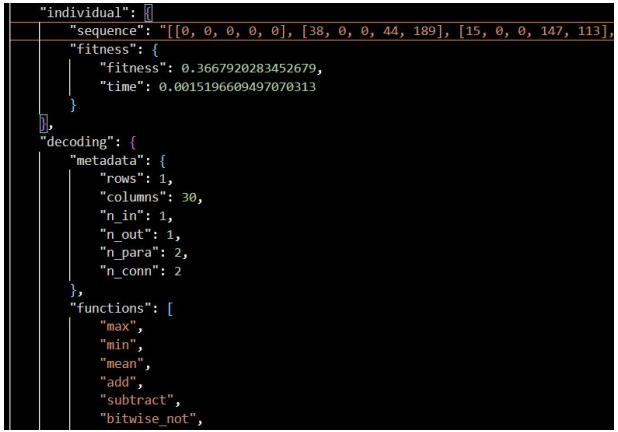


Conclusion & Discussion

✓ optimal performance on small dataset

~ moderate performance compared to others

~ semi-humanly interpretable representation



Questions?