image analysis
machine learning
artificial intelligence

contextflow

spinoff of the Medical University of Vienna

exploration of large-scale medical imaging data

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Problem

Vast amounts of imaging data

Radiologists have no (clever) way of using it

A lot of time spent on difficult cases

Solution

Image search based on image content

Semantic analysis

Automatically link images, reference cases, articles, ...

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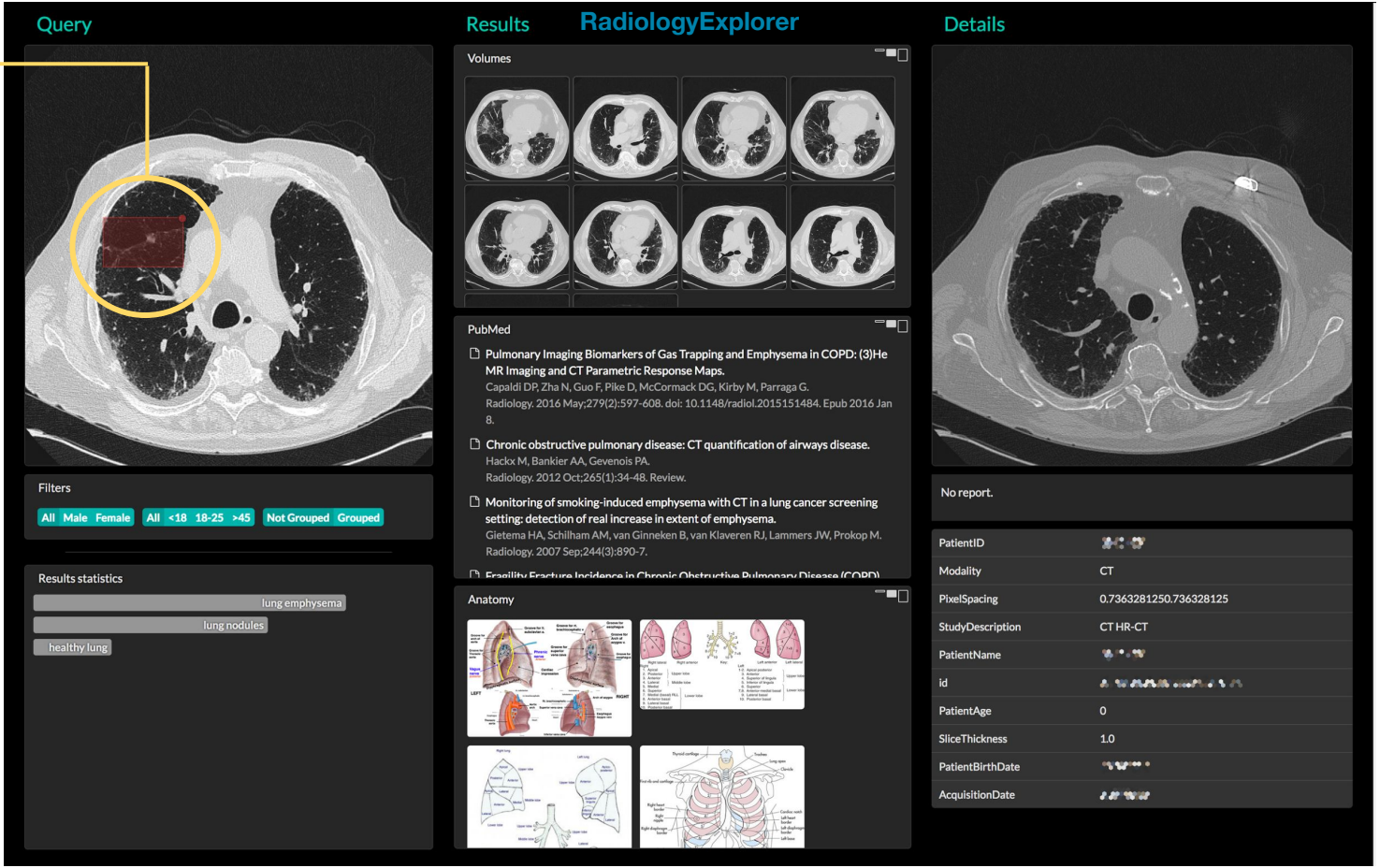
Deep learning based 3D image search

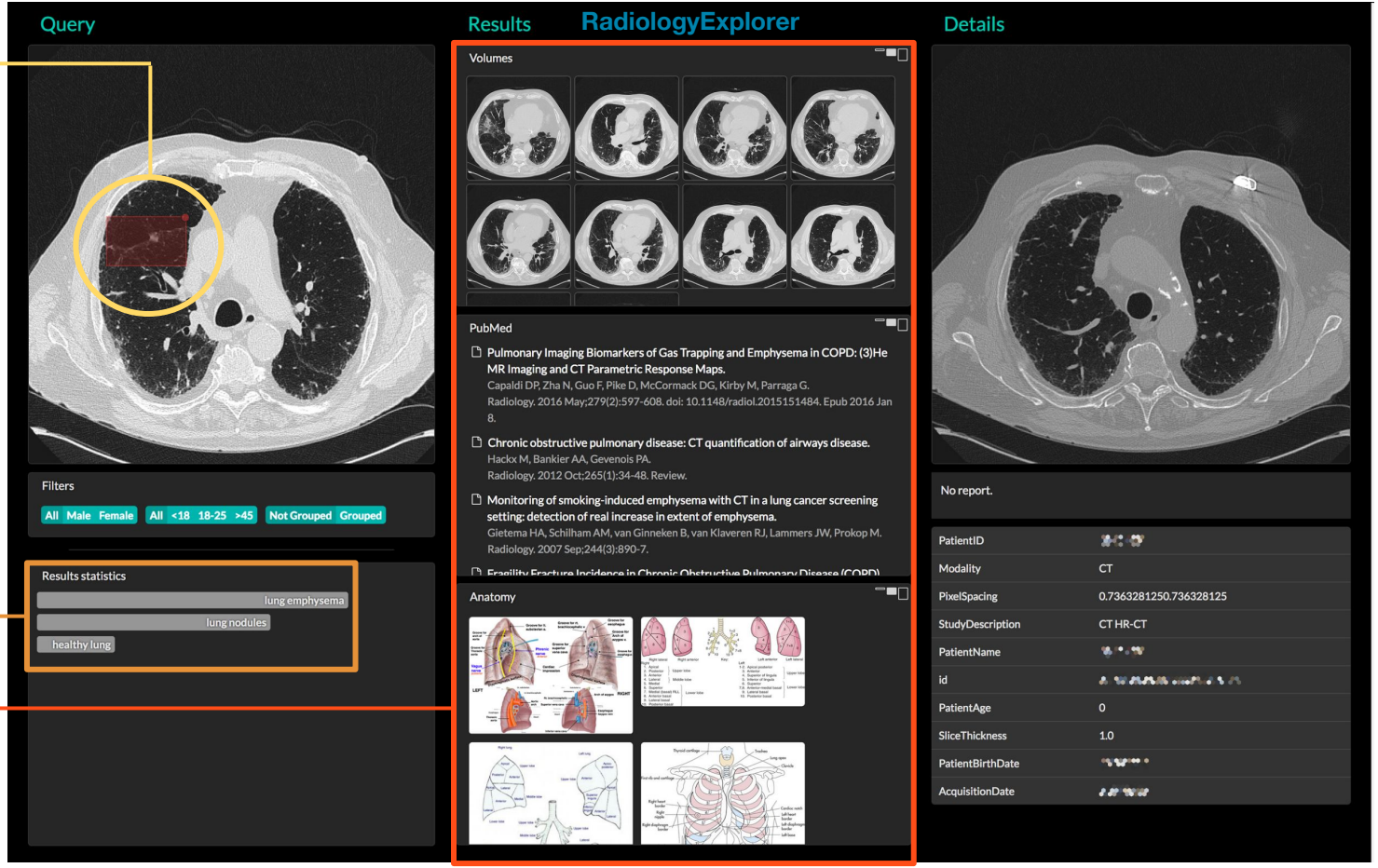
1. Mark region of interest



Deep learning based 3D image search

1. Mark region of interest
2. Instantly get: Distribution of findings in visually similar cases
3. Visually similar cases + relevant findings

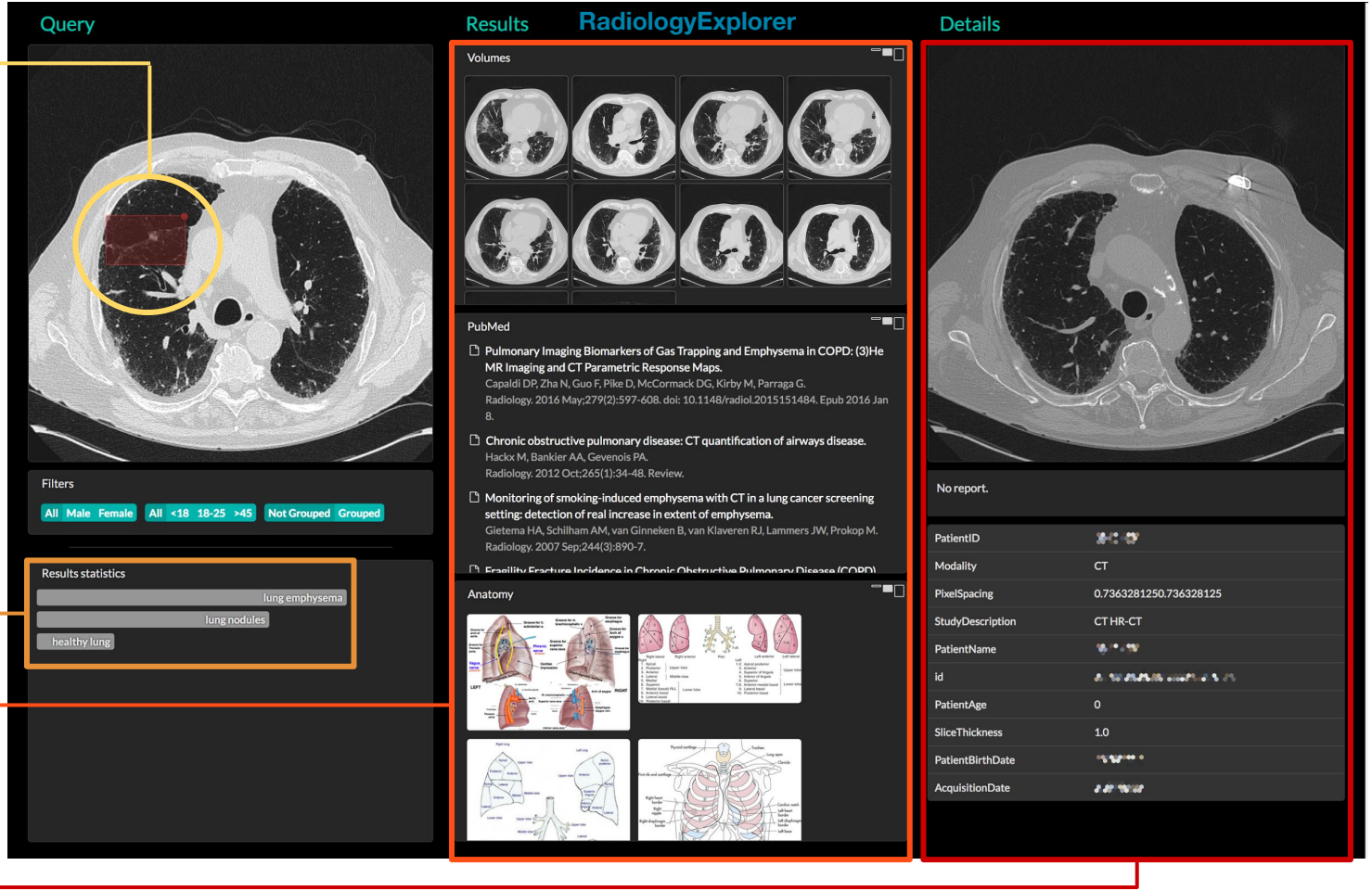
   Case relevant information from reference sites, publications and guidelines



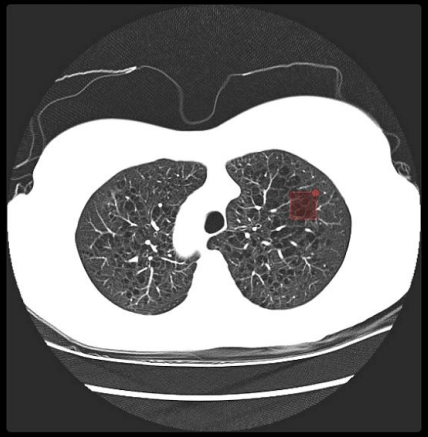
Deep learning based 3D image search

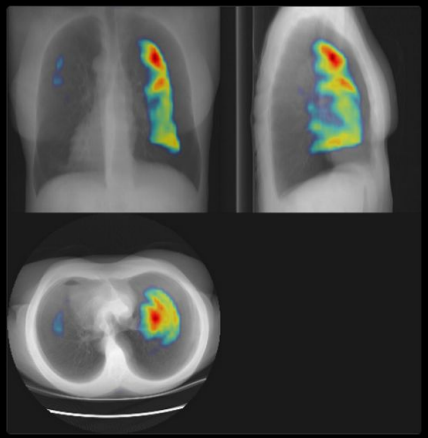
1. Mark region of interest
2. Instantly get: Distribution of findings in visually similar cases
3. Visually similar cases + relevant findings

   Case relevant information from reference sites, publications and guidelines
4. Detailed information on selection



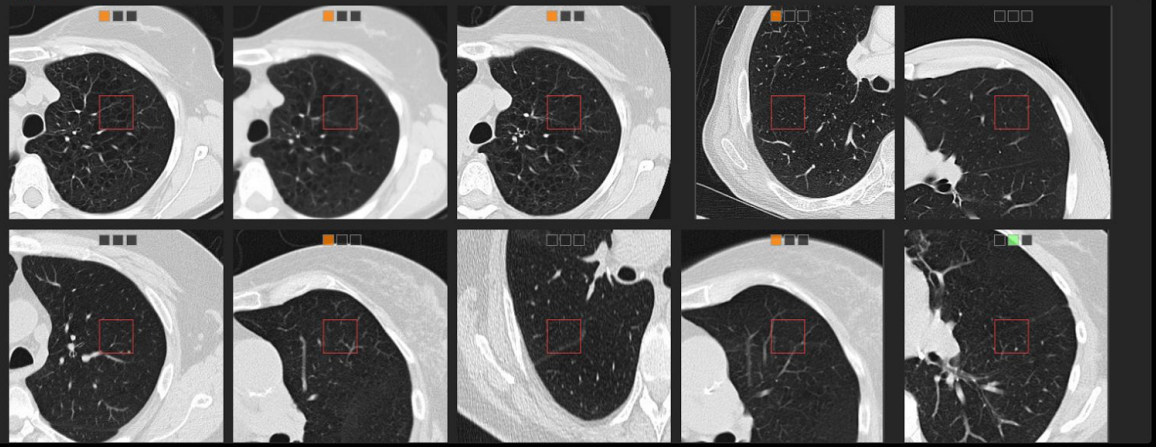
Patient



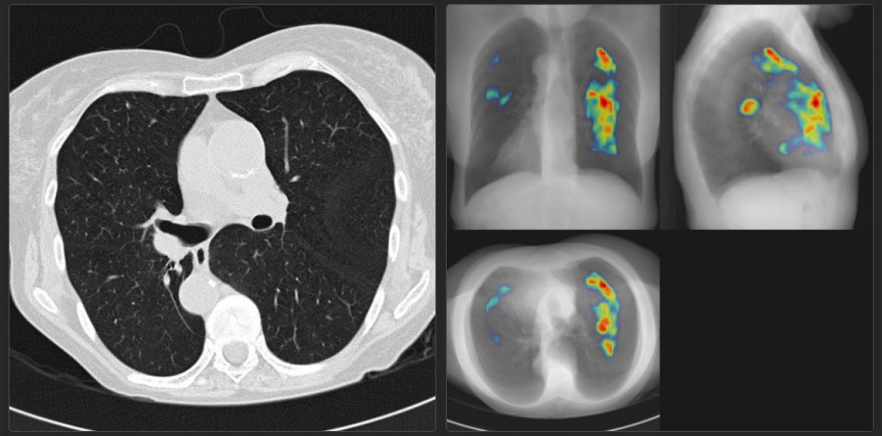


Matching Cases

Volumes

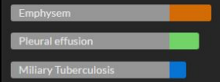


Details



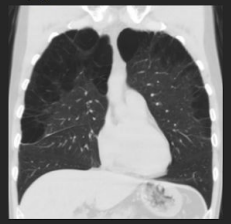
References

Statistic



Reference Cases (Radiopaedia)

Emphysem



Pleural effusion

Web & Literature

Pleural effusion

Pleural effusion (Radiopaedia)

Pleural effusion tends to be used as a catch-all term denoting a collection of fluid within the pleural space. This can be further divided into exudates and transudates depending on the biochemical analysis of aspirated pleural fluid (see below). Essentially it represents any pathological process which overwhelms the pleura's ability to reabsorb fluid.

Diagnostic Tools of Pleural Effusion (PubMed Central)

Moon Jun Na

2014 , Tuberculosis & Respiratory Diseases

Miliary Tuberculosis

Miliary tuberculosis (Radiopaedia)

Miliary tuberculosis is an uncommon pulmonary manifestation of tuberculosis. It represents haematogeneous dissemination of uncontrolled tuberculous infection and carries a relatively poor prognosis.

Tuberculosis: pulmonary manifestations (Radiopaedia)

Anatomy

INVESTIGATIONAL - NOT AVAILABLE FOR COMMERCIAL SALE

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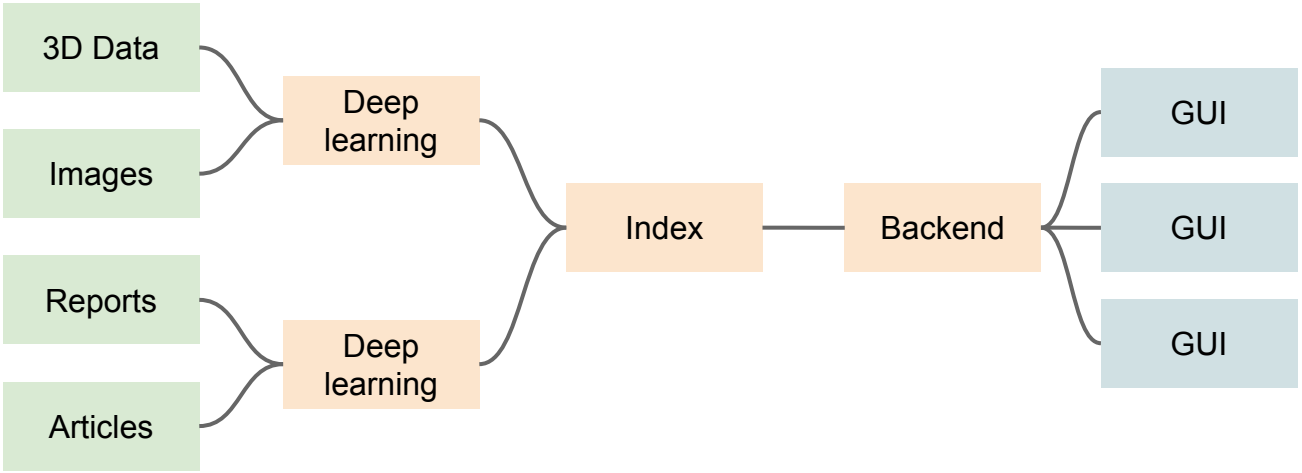
Challenges

Many TBs of images, quick indexing, instant retrieval

“Know” what it is the image

“Know” what an article / report talks about

Overview

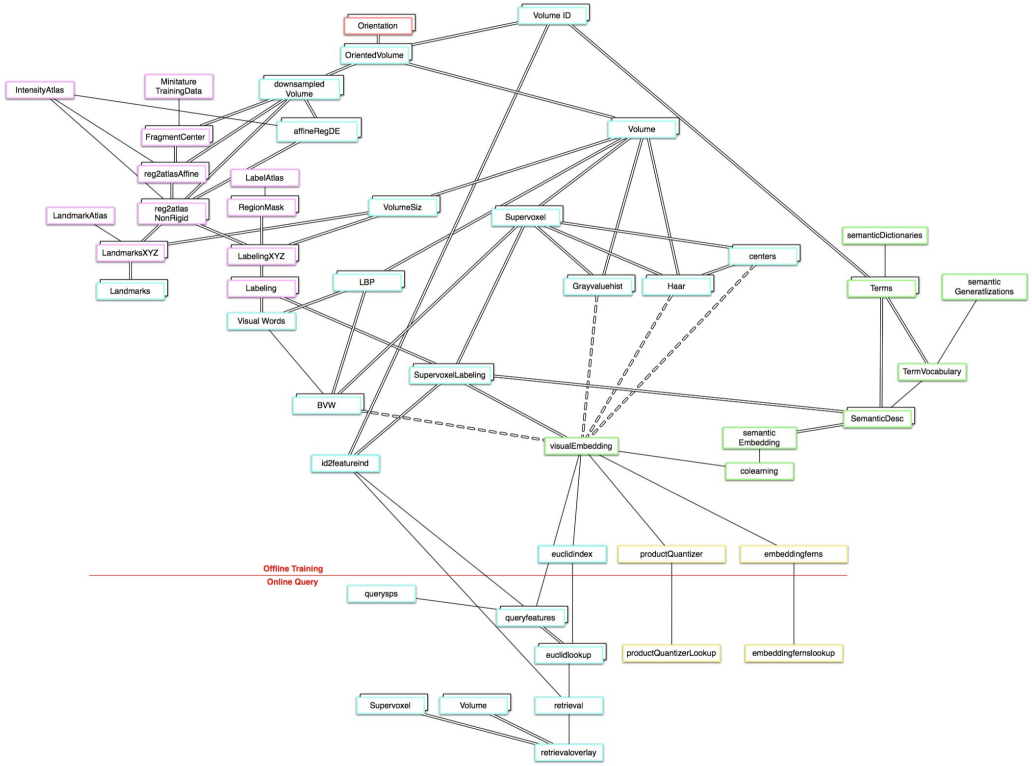

3D Data
Images
Reports
Articles
Deep learning
Deep learning
Index
Backend
GUI
GUI
GUI

Data Flow Framework

Scheduling
dependencies drive computation

Storage
no explicit state

Focus on algorithms



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Julia Programming Language

Easy to code

Like Python / Matlab

Focus on numerical computing and HPC

Fast

Like C. JIT compiled.

Easy parallelization, control over memory layout

Deep learning

Tensorflow, MXNet, Knet

CUDA, CuDNN

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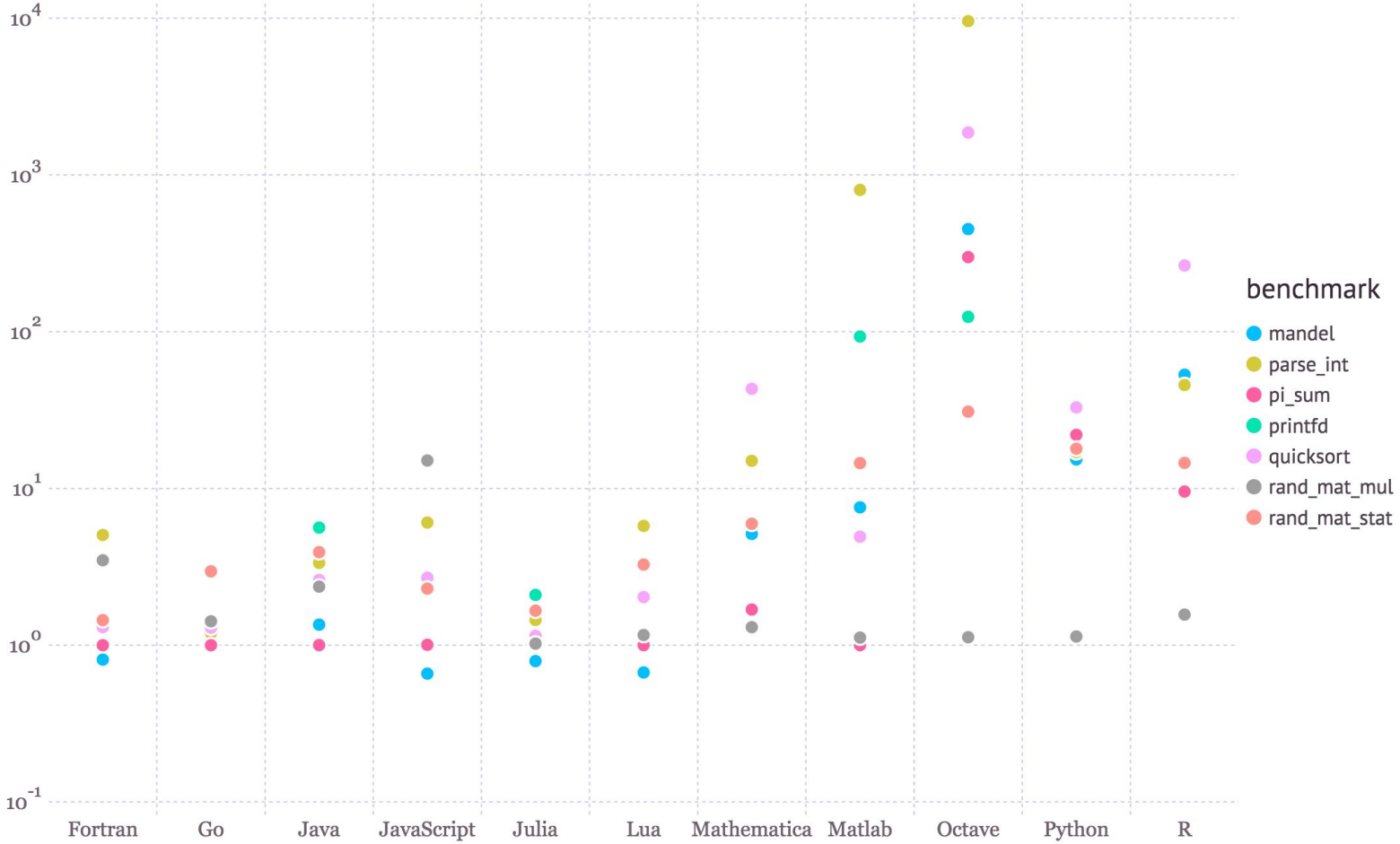
Julia



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