

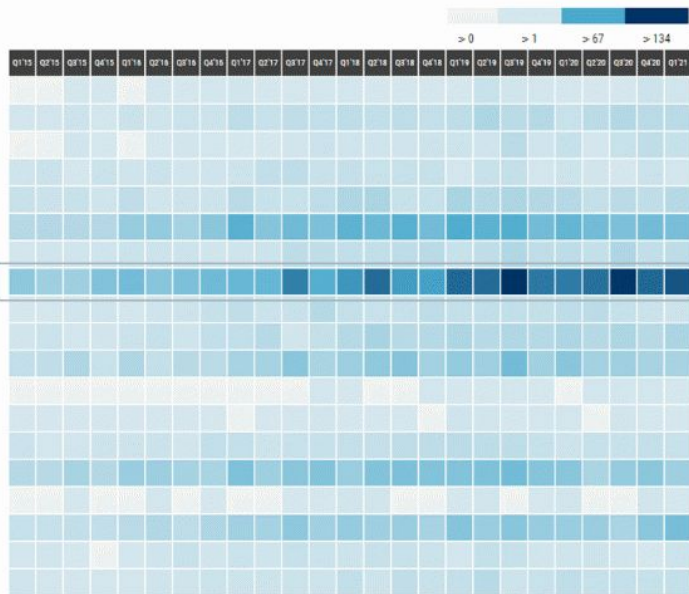
NeuroML2023

Lecture 0. Course intro

AI in medical images. AI in neurology.

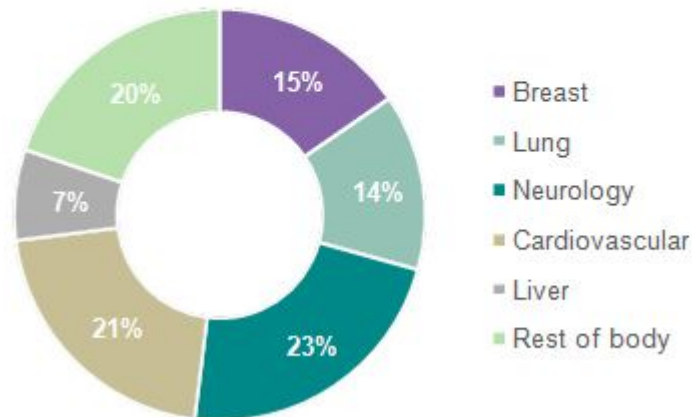
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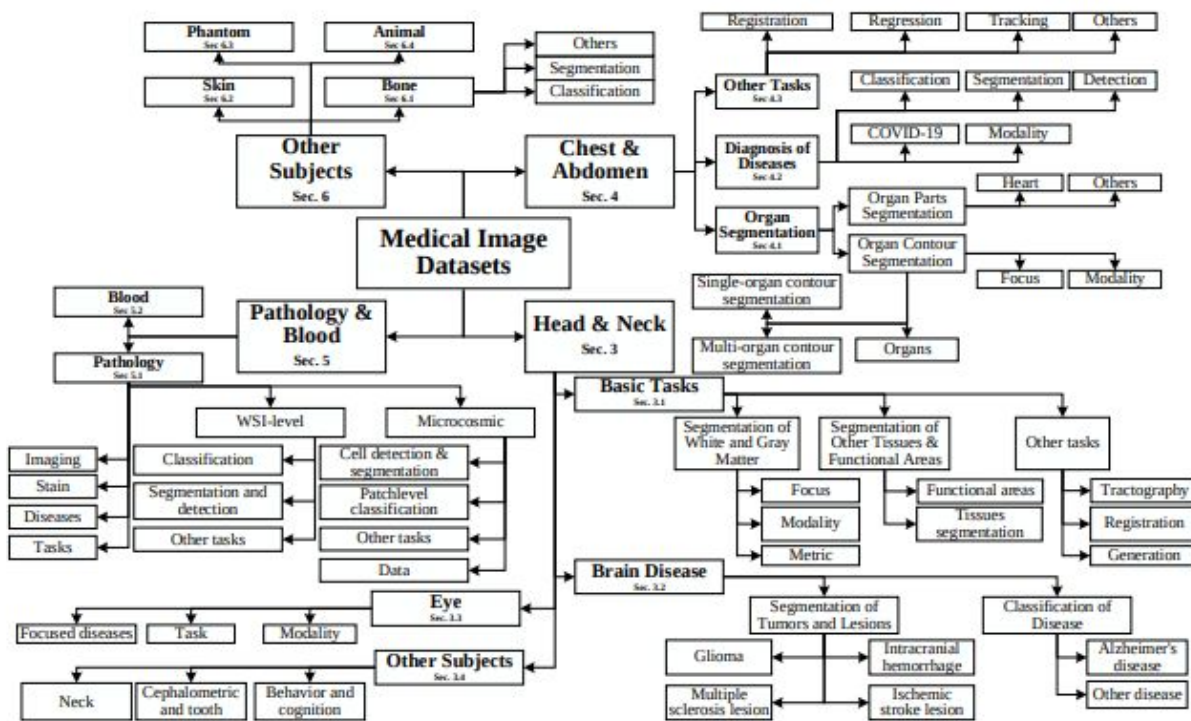
World market for AI-based medical image analysis software by clinical application

Revenue market share in 2023



CRINSIGHTS, The AI Deals Tracker. <https://www.cbinsights.com/research/artificial-intelligence-deals-tracker-heatmap/>

AI in medical images. AI in neuro.



Datasets used (please get a personal account and complete data use agreement):

- Human Connectome Project
https://db.humanconnectome.org/data/projects/HCP_1200
- UCLA Consortium for Neuropsychiatric Phenomics LA5c Study
<https://openneuro.org/datasets/ds000030/versions/1.0.0>
- Autism Brain Imaging Data Exchange http://fcon_1000.projects.nitrc.org/indi/abide/
- EEG Motor Movement/Imagery Dataset
<https://www.physionet.org/content/eegmmidb/1.0.0/>
- ADNI Alzheimer Disease Neuroimaging Initiative
<https://ida.loni.usc.edu/services/NewUser.jsp>

Software used (please get a personal account and complete usage agreement):

- FreeSurfer <https://surfer.nmr.mgh.harvard.edu/>
- FmriPrep <https://fmriprep.org/en/stable/>
- Docker <https://www.docker.com/>
- MNE python library <https://mne.tools/stable/index.html>

MRI Deep Learning Tools

<https://github.com/kondratevakate/mri-deep-learning-tools>

- **nibabel**
- **Nipy**
- Machine Learning:
 - **Nilearn**
- Deep Learning:
 - **Monai**
 - TorchIO
 - PyTorch Lightning
 - Weights&Bias

Top Docker command

```
docker run hello-world #test
```

```
docker pull miykael/nipype_tutorial:latest # pulling images
```

```
docker images # to check available images on your system
```

```
docker run -it --rm -v /path/to/nipype_tutorial:/home/neuro/nipype_tutorial -v /path/to/data:/data -v /path/to/output:/output -p 8888:8888 miykael/nipype_tutorial jupyter notebook
```

```
docker run --rm kaczmarij/neurodocker:v0.4.0 generate [docker|singularity] \
    --base neurodebian:stretch --pkg-manager apt \
    --install afni ants git vim
```

```
docker rmi -f IMAGE_ID # To delete a specific docker image
```

```
docker exec -it IMAGE_ID /bin/bash # runs a new command in a running container.
```

```
docker save -o nipype_tutorial.tar miykael/nipype_tutorial # Export docker image miykael/nipype_tutorial
```

```
docker load --input nipype_tutorial.tar # Import docker image on another PC
```

Link with docker tutorials

https://miykael.github.io/nipytype_tutorial/notebooks/introduction_neurodocker.html

https://miykael.github.io/nipytype_tutorial/notebooks/introduction_docker.html

<https://docs.docker.com/engine/install/> - installation

if you haven't worked with python before and don't understand what's going on

https://miykael.github.io/nipytype_tutorial/notebooks/introduction_python.html