

Artificial Intelligence in Healthcare

Identifying neuroimaging endophenotypes with AI

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Plan for the day

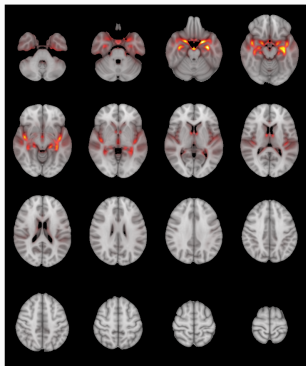
1. Do we need new imaging phenotypes?
2. How can we identify new phenotypes with deep neural networks?
3. Use case: Explainable AI for dementia
4. Use case: Multitask pretraining
5. Use case: Explainable brain age predictions

Activation maximization

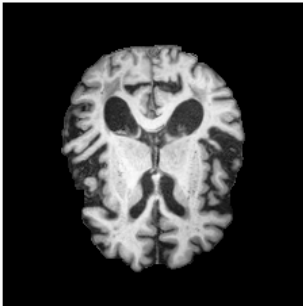


<https://www.tensorflow.org/tutorials/generative/deepdream>

Saliency mapping



Concept discovery



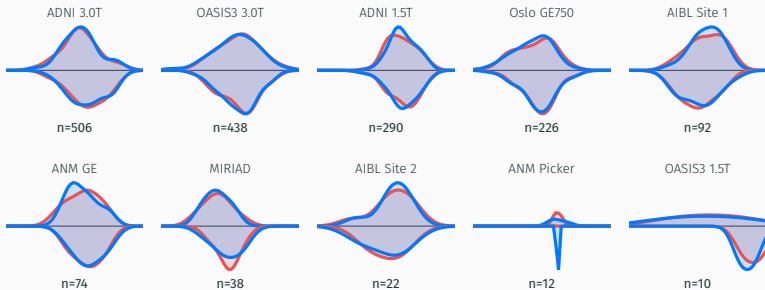
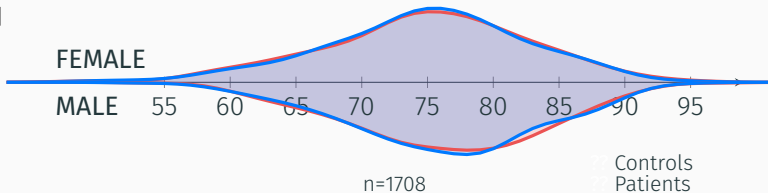
The patient shows widespread **cortical atrophy** and **reduced hippocampal volumes** in addition to **enlarged ventricles** and **cerebral amyloid angiopathy**.

Use cases



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Dementia and explainable AI





CNN

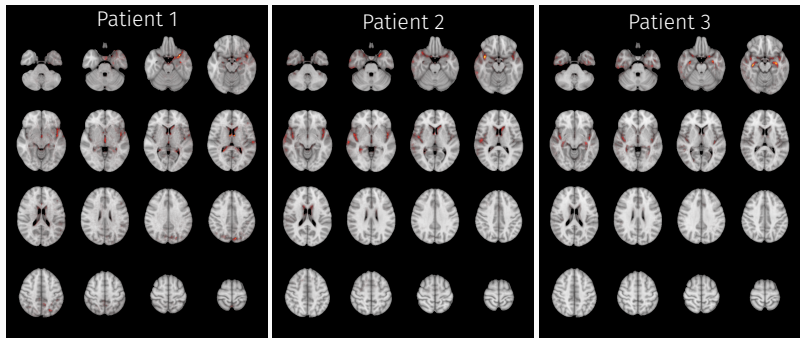




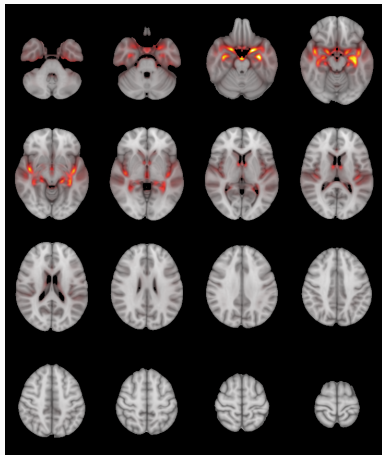
LRP



Dementia and explainable AI



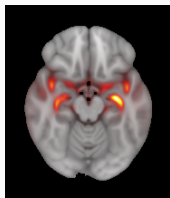
Dementia and explainable AI



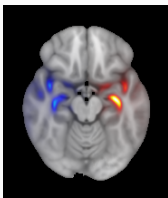
Dementia and explainable AI



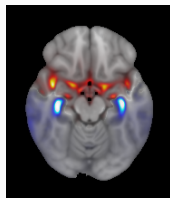
Component 0



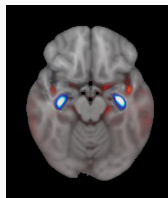
Component 1



Component 2



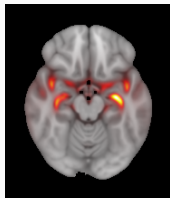
Component 3



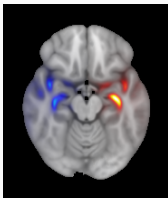
Dementia and explainable AI



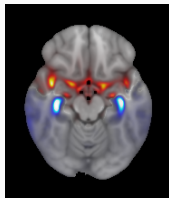
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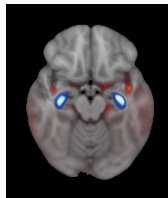
Component 1



Component 2



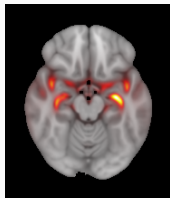
Component 3



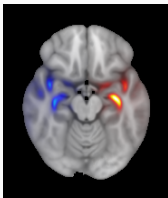
Dementia and explainable AI



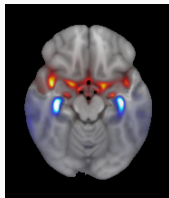
Component 0



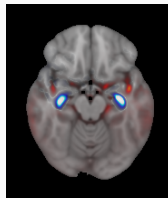
Component 1



Component 2



Component 3



Multitask pretraining



Explainable brain age predictions

