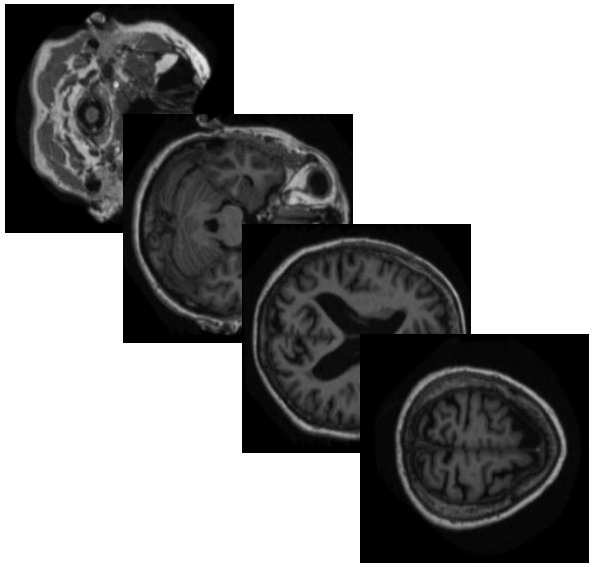
Decoding Alzheimer's: Advanced MRI Analysis Through Computer Vision Techniques

Data:
Atlas registered MRI scans sliced into 176 images, masked and not masked.
Scans from 412 individuals age 18 to 96 of which 100 are dignosed with mild to moderate AD



Challenges:
- High number of images (~150,000) (demanding computational recources)
- Low number of actually different samples (412)
- Data imbalence

Roadmap:
1. Exploratory Data Analysis
   - Discover further potential challenges
2. Preprocessing
   - Goal: reduce computational load during training
   - Evaluation of which slices contain relevant data. E.g. train 176 simple models on the respective slices, then only keep top n slices where the accuracy was the highest.

See next slide

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Roadmap:

Must have

1. Exploratory Data Analysis
2. Data Preprocessing
3. Implement Baseline Model: Use the average prediction from 10 EfficientNets on the 10 most relevant slices.
4. Weighted Prediction Aggregation
5. Replace EfficientNets with Transformer-based model

Nice to have

6. Remove the Classification Head from the model, concatenate the feature representations, and use a new Classification Head for prediction based on these feature representations.

Let's see

7. Implement Attention into the Classification Head
8. Self Distillation of Training Labels
9. Implement other state-of-the-art methodologies