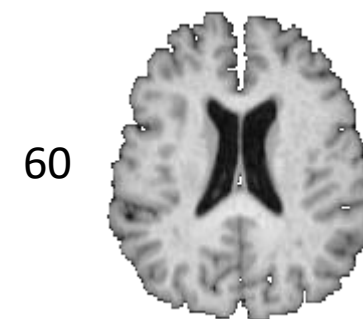
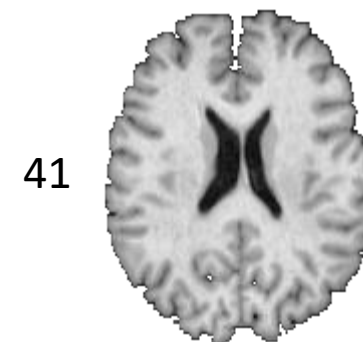
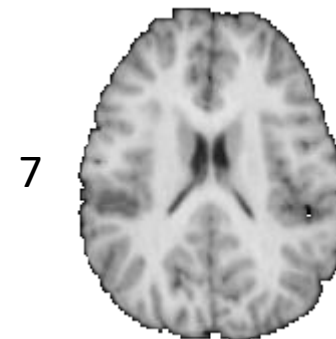
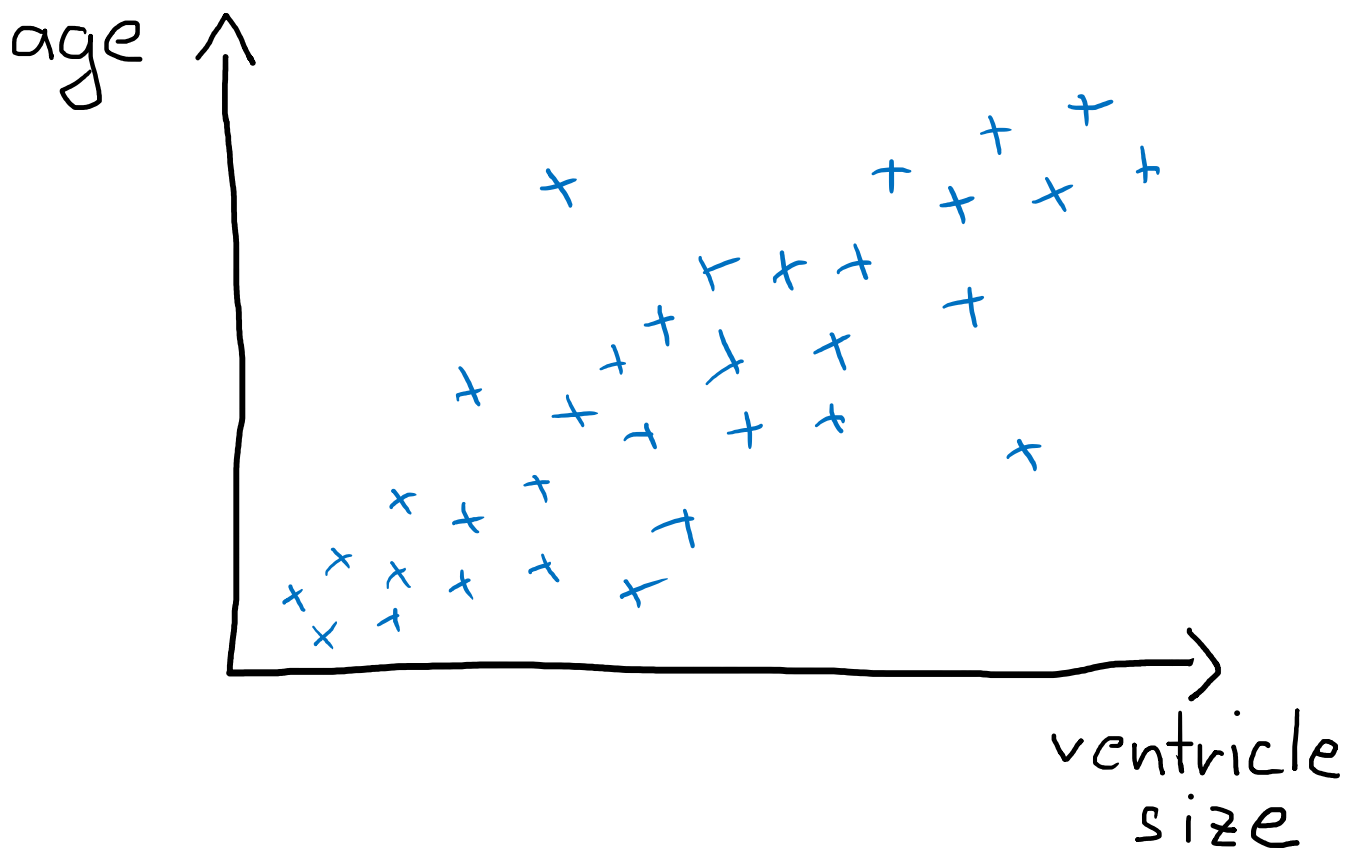


Machine Learning for Imaging

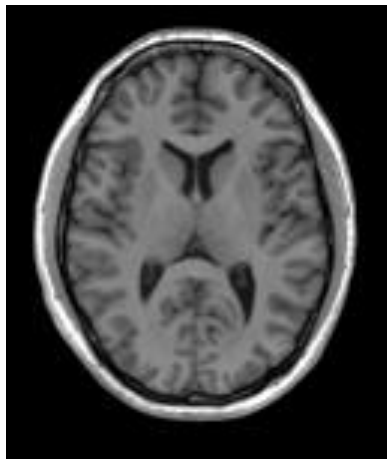
Coursework Introduction

Age Regression from Brain MRI

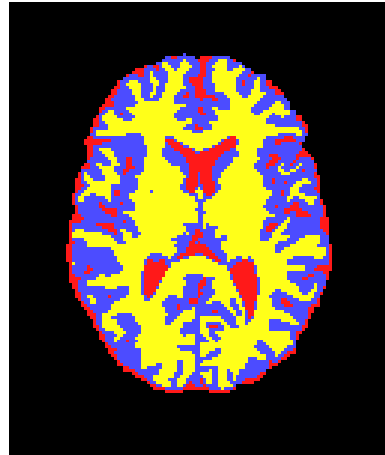
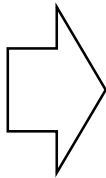


Age Regression from Brain MRI – Part A

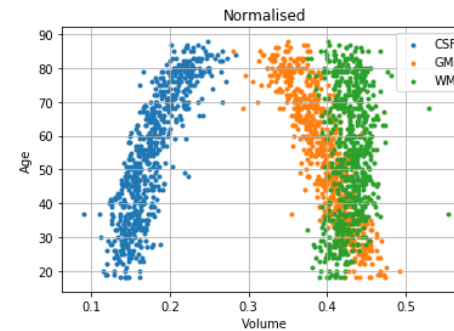
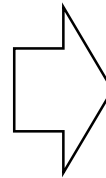
Volume-based regression using brain structure segmentation



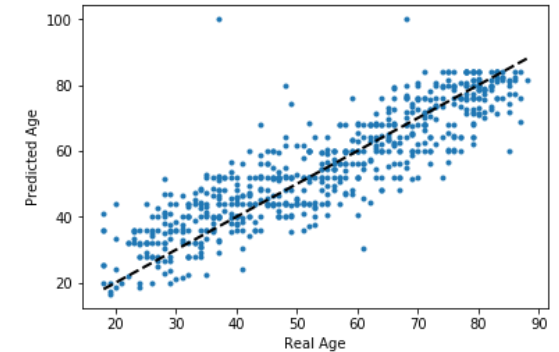
brain MRI



segmentation



volume features



age regression

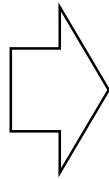
Goal: MAE ~ 7 years

Age Regression from Brain MRI – Part B

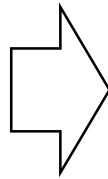
Image-based regression using grey matter maps



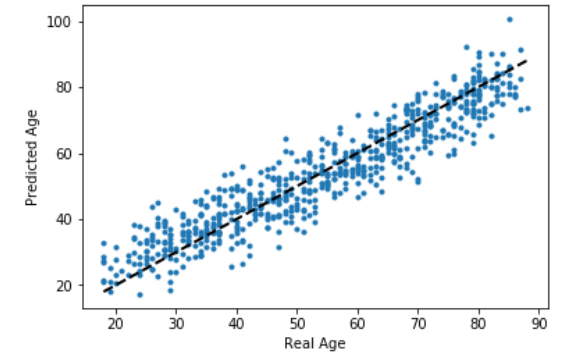
grey matter maps



pre-processing



dimensionality reduction

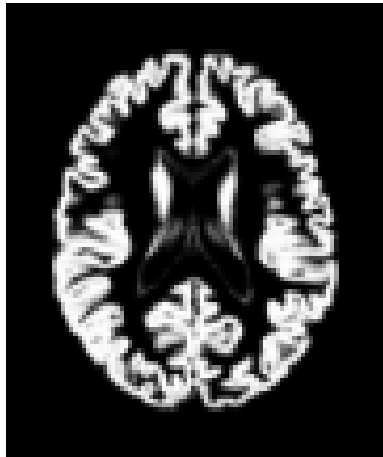


age regression

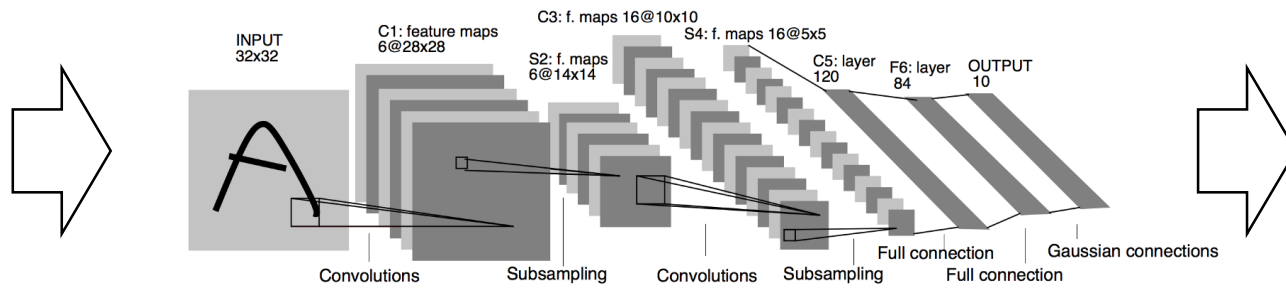
Goal: MAE ~ 5 years

Age Regression from Brain MRI – Part C

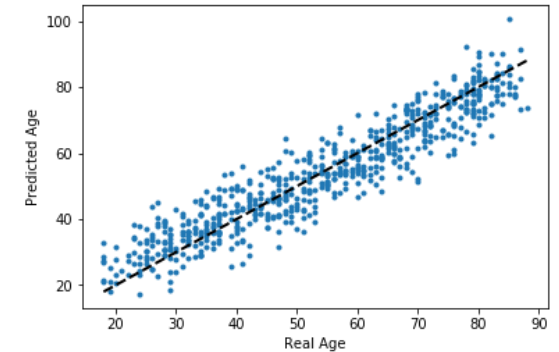
Image-based regression using grey matter maps



grey matter maps



CNN



age regression

Goal: MAE ~ ? years

Age Regression from Brain MRI – Data

MRI data and age from 652 healthy subjects

- 52 for training/validation of segmentation method in part A
- 500 for training/validation of age regression in part A – C
- 100 for final testing of age regression in part A – C
 - The test data will be released on **Monday, 24 February**

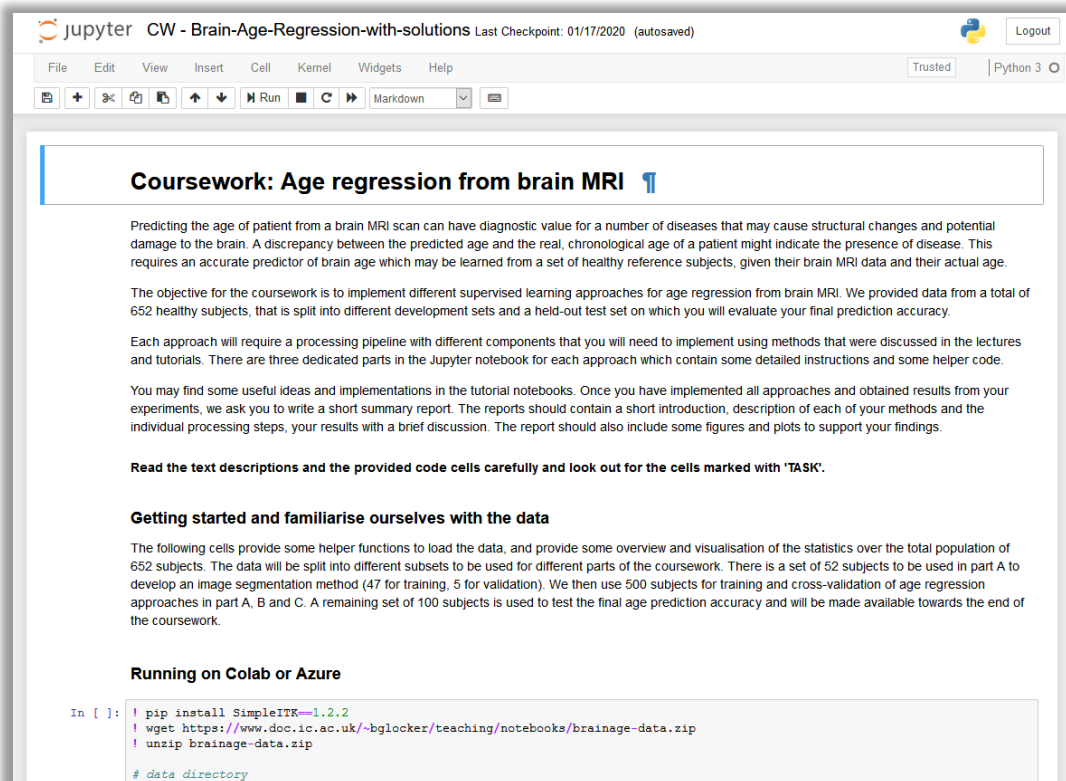
Azure

- Each group will get a **budget of \$200**
- We provide instructions for setting up a VM on Piazza
- We recommend a single GPU VM (costs \$0.90/h, ~9 days)
- **Make sure to 'pause' your VM when not needed**
- **Create only one VM per group!**

Templates

Notebook: <https://gitlab.doc.ic.ac.uk/bglocker/mli-coursework>

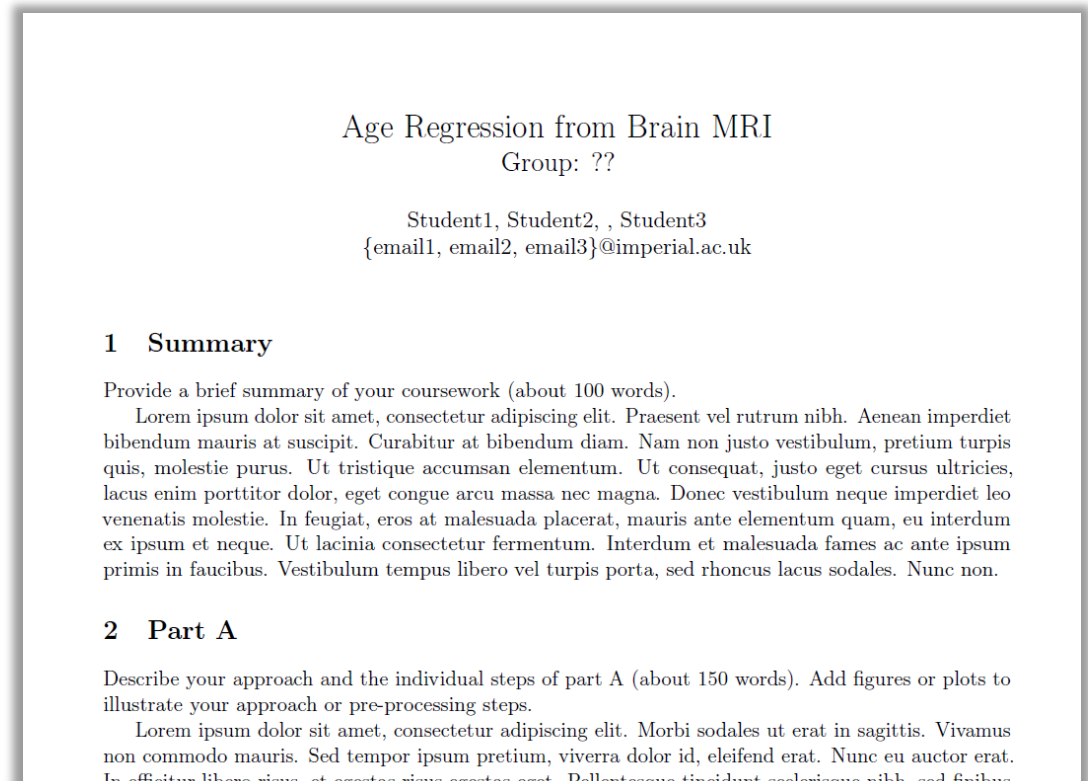
Report: <https://www.overleaf.com/read/kjmygdqkqkxc>



The screenshot shows a Jupyter Notebook window titled "jupyter CW - Brain-Age-Regression-with-solutions". The interface includes a top menu bar with options like File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. Below the menu is a toolbar with icons for file operations, running, and saving. The main content area displays a document titled "Coursework: Age regression from brain MRI". The document text describes the task of predicting patient age from brain MRI scans, mentions 652 healthy subjects, and provides instructions for getting started and running the code on Colab or Azure. At the bottom, there is a code cell with the following content:

```
In [ ]: | pip install SimpleITK==1.2.2
| wget https://www.doc.ic.ac.uk/~bglocker/teaching/notebooks/brainage-data.zip
| unzip brainage-data.zip

# data directory
```



The screenshot shows a report template in Overleaf. The title is "Age Regression from Brain MRI" with a subtitle "Group: ??". Below the title, it lists the authors: "Student1, Student2, , Student3" and their email addresses: "{email1, email2, email3}@imperial.ac.uk". The report is divided into sections: "1 Summary" and "2 Part A". The "1 Summary" section contains a paragraph of placeholder text: "Provide a brief summary of your coursework (about 100 words). Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent vel rutrum nibh. Aenean imperdiet bibendum mauris at suscipit. Curabitur at bibendum diam. Nam non justo vestibulum, pretium turpis quis, molestie purus. Ut tristique accumsan elementum. Ut consequat, justo eget cursus ultricies, lacus enim porttitor dolor, eget congue arcu massa nec magna. Donec vestibulum neque imperdiet leo venenatis molestie. In feugiat, eros at malesuada placerat, mauris ante elementum quam, eu interdum ex ipsum et neque. Ut lacinia consectetur fermentum. Interdum et malesuada fames ac ante ipsum primis in faucibus. Vestibulum tempus libero vel turpis porta, sed rhoncus lacus sodales. Nunc non." The "2 Part A" section contains another paragraph of placeholder text: "Describe your approach and the individual steps of part A (about 150 words). Add figures or plots to illustrate your approach or pre-processing steps. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Morbi sodales ut erat in sagittis. Vivamus non commodo mauris. Sed tempor ipsum pretium, viverra dolor id, eleifend erat. Nunc eu auctor erat. In efficitur libero risus. et acortea risus acortea erat. Pellentesque tincidunt acortea nibh. sed fribus

Coursework Submission

Two files

1. A zip file with your **Jupyter notebook**
2. The **report** as a PDF

Deadline
Friday, 28 February, 23:59