**Data Science Project 7PAM2002-0509-2023**

**Semester C 2023**

**Logbook (Activities and GitHub submissions)**

**Student Name and ID: Sivaaneesh Bharathala (21076427)**

**Project Title: Exploring transfer learning approaches in brain MRI classification: A Comparative Analysis of CNN architectures**

**Supervisor: Sunina Sharvy**

**Student GitHub URL:**

**The number of versions of the code submitted on GitHub:**

**User documentation has been submitted on GitHub: Yes**

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| **Week** | **Date** | **Activity**  **incl. lectures & supervisions** | **Reason if not attend lecture or supervision** | **Weekly project progress.**  **How lecture/supervision was helpful to your project.** |
| 1 | 28/05/24 | Lecture 1 |  | Started the initial literature review, informed by foundational research process knowledge from the lecture. |
| 2 | 03/06/24 | Lecture 2 |  | Continued literature review and formulated research questions, incorporating insights from the lecture on question development and deciding to explore GANs for data augmentation. |
| 3 |  |  |  |  |
| 4 | 13/06/24 | Lecture 3 |  | Expanded literature review and began dataset exploration, guided by the lecture’s focus on data handling techniques. |
| 5 |  |  |  |  |
| 6 | 26/06/24 | Lecture 4 |  | Completed data preprocessing and initiated the custom VGG-16 model, realizing through the lecture that GAN-generated data might not be reliable, prompting a shift to traditional augmentation. |
| 7 |  |  |  |  |
| 8 | 09/07/24 | Lecture 5 |  | Finalized VGG-16 model implementation and began testing, supported by lecture insights on model evaluation and performance metrics. |
| 9 |  |  |  |  |
| 10 | 19/07/24 | Lecture 6 |  | Implemented pretrained models (DenseNet and EfficientNet) alongside traditional augmentation, with guidance from the lecture on advanced CNN architectures and effective augmentation techniques. |
| 11 |  |  |  |  |
| 12 | 02/08/24 | Lecture 7 |  | Completed model testing and began comparative analysis, applying comparative analysis techniques discussed in the lecture. |
| 13 |  |  |  |  |
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**Student GitHub URL has been shared with markers: YES / NO**

**Log of Activities**

**Must record attendance at lectures and supervisions**

**Log of GitHub Submissions**

**Record the versions of code and user documentation submitted on GitHub**

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| **Date** | **Filename and version submitted to GitHub** | **Description of code and/or documentation submitted (what has been added since the previous version).** |
| Jun 10, 2024 | README.md | Created a repository with name “Brain\_Tumor\_Classification”, and a README file |
| Jul 7, 2024 | mri\_preprocessing.ipynb | This file contains work for browsing the dataset, viewing samples, analysing distributions for Training/Testing, traditional augmentation, and prepared GAN model (not trained). |
| Jul 8, 2024 | MRI\_Classification.ipynb  MRI\_Classification\_with\_VGG.ipynb  (Duplicate for above, later removed) | This file contains the work of preprocessing, GAN training and results, prepared custom model for VGG-16 (Not trained). |
| Jul 8, 2024 | MRI\_Classification.ipynb | Updated code to be able to download the dataset from Kaggle directly. |
| Jul 8, 2024 | Project Logbook Sem C Data Science 2023.pages | Uploaded LogBook file to the repository to maintain it alongside the code. |
| Jul 8, 2024 | [Deleted] MRI\_Classification\_with\_VGG.ipynb  [Deleted] mri\_preprocessing.ipynb  MRI\_Classification.ipynb | Deleted duplicates notebooks, then updated the logic of downloading dataset in the main notebook. |
| Jul 18, 2024 | MRI\_Classification.ipynb | Added the training logic for VGG-16 model and trained it. Noted the remaining tasks. |
| Aug 4, 2024 | MRI\_Classification.ipynb  MRI\_Classification.ipynb (duplicate file, later removed) | (Removed mistakenly uploaded duplicate notebook). Finished the project, including pretrained models, trainings, viewing results, and a final comparative analysis |
| Aug 4, 2024 | Gan-output/  DenseNet\_metrics.json  EfficientNet.pth  EfficientNet\_metrics.json  VGG\_16\_metrics.json | Uploaded corresponding weights and results-metrics JSON files. The weights for EfficientNet and VGG-16 are skipped as they above 25 MB and are uploaded later using Git-LFS. |
| Aug 18, 2024 | MRI\_Classification.ipynb  comparison.jpg  gan.gif  README.md | Uploaded the complete verified code for one last time (No changes). Also uploaded Comparison charts, GAN progress GIF. Updated README to include a brief summary for the entire project. |
| Aug 25, 2024 | DenseNet.pth  VGG\_16.pth | Uploaded the large weight files for DenseNet and VGG\_16 using Git-LFS |