**Final Year Project Proposal**

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| Sr# | Student Name | Roll Number | Signature |
| 1 | Asjid Tahir | P19-0085 |  |
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**Suggested Supervisor**:

Faculty Member’s Name: \_Dr. Hafeez-Ur-Rehman Signature: \_\_\_\_\_\_\_\_\_\_\_\_

Date (07 Sep 2022)

**Project Details**

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| **Project Title** | Genetic Subtype of MGMT Prediction using MRI Scans. | | |
| **Project Area of Specialization** | Medical | | |
| **Project Start Date** | 2022-09-07 | **Project End Date** | 2023-05-15 |
| **Project Summary (less than 2500 characters)** | Glioblastoma, also known as a rapidly growing and devastating grade 4 brain tumor, can be fatal within six months if left untreated. It can occur at any age but tends to occur more often in older adults. It can cause worsening headaches, nausea, vomiting and seizures. The conventional method to detect brain tumor is biopsy which takes several rounds of analysis and physical examining of a tissue of a human under a microscope. A low contrast variation of tumor region detection may lead the formation of false edge fragments. The algorithm pertains to design a deep learning algorithm to predict the extent of cancer tumor region in early stage through MRI images. The algorithm will predict the low contrast variation of brain tumor detection accurately. We want to achieve the maximum possible accuracy for the detection of this problem using MRI scans. | | |
| **Project Objectives (less than 2500 characters)** | Our aim is to design a model that can efficiently and accurately predict the MGMT status of a gene that is either methylated or unmethylated. | | |
| **Project Implementation Method (less than 2500 characters)** | We are going to propose a framework that will take MRI images as an input in a sequence of T1/T2 flair.  The input will be converted into Grayscale image for analyzing the tumor region, afterwards noise will be removed from images and will crop the edges with amount of information. We will extract the features from images and classification method will be applied on it, ultimately the MGMT gene will be detected. | | |
| **Benefits of the Project (less than 2500 characters)** | The algorithm would potentially minimize the brain tumor diagnosis time which is taken by radiologist and clinical experts.  It can simply reduce the time cost to detect brain tumor as compared to conventional method i.e., Biopsy.  It will reduce the no. of surgeries required to diagnose this deadly disease. | | |
| **Technical Details of Final Deliverable (less than 2500 characters)** | We will develop a web-based GUI using HTML, CSS, and JavaScript, allowing for the uploading of an MRI image. This image will be sent over to our backend API which, in turn will send this data over to our Convolutional Neural Network (CNN) model to predict MGMT promotor status gene. This network will identify whether the MRI image contains a brain tumor or not, by first converting the image to grayscale, then reducing the noise and applying the classification algorithms to produce an output. Afterwards, the result will be handed over back to the API which will send it over to the front-end, displaying the result for the user to see. | | |
| **Final Deliverable of the Project** | This algorithm is going to predict Glioblastoma using MRI images. | | |
| **Type of Industry** | Medical. | | |
| **Technologies** | Python, TensorFlow, MRI scans, Digital image processing, Deep learning. | | |
| **Sustainable Development Goals** | The main goal is to detect MGMT status using MRI scans and contribute to medical field. | | |

**Project Key Milestones**

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| **Elapsed time in (days or weeks or month or quarter) since start of the project** | **Milestone** | **Deliverable** |
| Month 1 | 1st 6 Months | We will complete the working prototype for the T1 type image. |
| Month 2 | 2nd 6 Months | We will complete the working prototype for larger datasets (i.e., all 4 types of images). |