International Journal of
INTELLIGENT SYSTEMS AND APPLICATIONS IN ENGINEERING
ISSN:2147-6799 www.ijisae.org Original Research Paper

Deep Learning and Feature Extraction of Brain Tumour Detection

[1]Zahraa H. Ali, [2]Ali K. Al-Ali, [3]Noor M. Al-Moosawi

Submitted: 15/02/2023 **Revised:** 19/04/2023 **Accepted:** 10/05/2023

Abstract: In medical imaging, automated flaw detection has grown in importance. The ability to forecast tumor (brain) detection on one's own during an MRI scan is essential for preparing patients. Conventional methods of calculating z are developed to facilitate the work of radiologists. The size and variety of molecular structures in brain tumours presents a challenge for MRI diagnosis. This research uses deep learning (DL) techniques including support vector machines (SVM), artificial neural networks (ANN), and convolutional ANN to detect tumours in MRI scans (CNN). Segmentation scanning, feature extraction, and brain tumor classification are steps in the recommended technique. The second step consists of dataset preparation and input picture scanning. The third step involves figuring out how to extract features from a scanned picture. A number of machine learning methods are then utilized to classify the data according on these criteria. One of the most well-known neural networks (CNN) is employed in this article to differentiate between different kinds of MRI tumors.

Keywords: *Brain tumor, Image acquisition, Deep learning algorithm, MRI Imaging*

1. Introduction

Doctors will serve their patients with high-quality medical care in the age of e-healthcare & information technology [1]. This study examines the challenges surrounding the segmentation and treatment of defective normal tissues [2], [3], Grey matter (GM) operations, detection of white matter (WM), or regulation of cerebrospinal fluid (CSF) have been recovered from appropriate MR imaging methods and images using a vector support (SVM) classifier and the suitable feature extraction approaches [4]. Tumors form when cancer cells grow or divide out of control [5]. A brain tumour is an abnormal proliferation of diseased or malignant cells that cannot be controlled or kept in check. Brain tumours may be either benign growths or malignant ones [6]. The structural standardisation of benign brain tumours for patients includes the absence of active (cancerous) cells [6]. Malignant brain tumours in individuals are physically diverse (non-uniform) and include types of active cancer cells. Gliomas and meningiomas are examples of benign tumours, which are low-grade tumours and growths [7].

Malignant tumours, such as glioblastoma and astrocytoma, are characterised by rapid and uncontrolled cell proliferation [8]. The WHO and the American Brain Tumor Speculation Association (ABTA) both agree that the grade I and grade IV measures are the gold standard for distinguishing between benign and malignant tumours [9]. On this scale, grade I (classified) as well as grade II glioma development were reached by benign malignancies, whereas grade III and grade IV glioma development were reached by different types of malignant tumours.

Grade I and II cancers have a sluggish growth rate, but grade II tumours have a high growth rate[10]. Untreated, a low-grade brain tumour will progress to a high-grade tumour, and then to a malignant brain tumour, which is characterised by rapid, erratic development. Grade II glioma patients may be followed with scans such as MRI and CT scans on a regular basis (every six to twelve months) [11]. Brain tumours may afflict anybody at any age, and the consequences on the body differ from person to person. Malignant brain tumours of grades III and IV may be treated with radiation, chemotherapy, or a combination of the two techniques, whereas low-grade glioma (uncontrolled growth) benign tumours of grades I and II are considered curable with a comprehensive surgical surgery [12].

Malignant glioma refers to both type III and type IV gliomas, sometimes referred to as anaplastic astrocytoma. In contrast to most low-grade tumours, anaplastic astrocytomas are tumours of intermediate grade, characterised by a higher growth index and atypical features in their development [13]. Glioblastoma is the highest-grade glioma and the most dangerous kind of astrocytoma seen in patients. Necrosis (dead cells) and an unchecked proliferation of several blood artery types surrounding the tumour segment distinguish glioblastoma from other kinds of tumours [14].

1Collage of science ,Computer department ,University of Basrah ,Iraq
zahraa.ali@uobasrah.edu.iq
2Collage of science ,Geology department ,University of Basrah ,Iraq
ali.abbas@uobasrah.edu.iq
3Collage of Computer science and information technology , University of Basrah ,Iraq
almoosawinoor2@gmail.com