

Vital Role of 2D CNN in Brain Malignancy



Y. Vijayalata, Susmitha Valli Gogula, Vandana Yalla, M. Ananya Varma, Salunke Savitha, and Sudarsi Namrata Ravindra

Abstract Malignancy is abnormal cell proliferation in body tissues. In brain, if proliferation happens uncontrollably, then it is brain malignancy. It has to be detected at an early stage to improve the patients' scope for survival. Carcinomas tumors are to be treated and removed surgically whereas benign ones do not cause much damage to the brain tissues. A cancerous tumor grows aggressively or recursively damaging the entire structure. An magnetic resonance image (MRI) is the most prevalent way of detecting them. Manual tumor identification procedure is time-consuming and is more prone to human mistakes. Computer technologies assist more than humans in identifying micro-changes in brain tissues. Now-a-days, machine learning algorithms are playing an important role in evaluating medical images and data. Segmentation and classification of tumor region identified from MRIs assist professionals by extracting and detecting specific locations of infected regions in the brain. Convolution neural networks (CNNs) are the best source to identify tumors from MRIs which will be observed in this work. Our findings are based on rectified linear unit (ReLU), hyperbolic tangent (TanH), Sigmoid added with ELU (Exponential linear unit) functions resulting in mean and f-score accuracy of 99.44%.

Keywords Brain · Carcinoma · Convolution neural network · Malignancy · Proliferation · Tumor

1 Introduction

Image processing is the manipulation of the images using digital computers. It has point operations where each pixel value is replaced by some other value that is

S. V. Gogula · V. Yalla (✉) · M. A. Varma · S. Savitha · S. N. Ravindra
Department of CSE, GRIET, Hyderabad, Telangana, India
e-mail: vandanayalla321@gmail.com

Y. Vijayalata
Department of Computer Science and Engineering, KG Reddy College of Engineering & Technology, Hyderabad, India