














A Case-Based Reasoning Approach to GBM Evolution

Ana Mendonça¹ , Joana Pereira¹ , Rita Reis¹ , Victor Alves² ,
António Abelha² , Filipa Ferraz^{1,2} , João Neves³ ,
Jorge Ribeiro⁴ , Henrique Vicente^{2,5} , and José Neves²  

¹ Departamento de Informática, Escola de Engenharia, Universidade do Minho,
Braga, Portugal

{a70606, a73302, a71983}@alunos.uminho.pt,
filipatferraz@gmail.com

² Centro Algoritmi, Universidade do Minho, Braga, Portugal

{valves, jneves}@di.uminho.pt

³ Mediclinic Arabian Ranches, PO Box 282602, Dubai, United Arab Emirates

joaocpneves@gmail.com

⁴ Escola Superior de Tecnologia e Gestão,

Instituto Politécnico de Viana do Castelo, Viana do Castelo, Portugal

jribeiro@estg.ipv.pt

⁵ Departamento de Química, Escola de Ciências e Tecnologia,

Centro de Química de Évora, Universidade de Évora, Évora, Portugal

hvicente@uevora.pt

Abstract. *Glioblastoma Multiforme (GBM)* is an aggressive primary brain tumor characterized by a heterogeneous cell population that is genetically unstable and resistant to chemotherapy. Indeed, despite advances in medicine, patients diagnosed with *GBM* have a median survival of just one year. *Magnetic Resonance Imaging (MRI)* is the most widely used imaging technique for determining the location and size of brain tumors. Indisputably, this technique plays a major role in the diagnosis, treatment planning, and prognosis of *GBM*. Therefore, this study proposes a new *Case Based Reasoning* approach to problem solving that attempts to predict a patient's *GBM* volume after five months of treatment based on features extracted from MR images and patient attributes such as age, gender, and type of treatment.

Keywords: Artificial Intelligence · Glioblastoma Multiforme
Logic Programming · Knowledge Representation and Reasoning
Case Based Reasoning