

MAXIMUM 2-SATISFIABILITY IN RADIAL BASIS FUNCTION NEURAL NETWORK

(Kebolehpuasan-2 Maksimum dalam Rangkaian Neural Fungsi Asas Jejari)

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ABSTRACT

Maximum k -Satisfiability (MAX- k SAT) is the logic to determine the maximum number of satisfied clauses. Correctly, this logic plays a prominent role in numerous applications as a combinatorial optimization logic. MAX2SAT is a case of MAX- k SAT and is written in Conjunctive Normal Form (CNF) with two variables in each clause. This paper presents a new paradigm in using MAX2SAT by implementing in Radial Basis Function Neural Network (RBFNN). Hence, we restrict the analysis to MAX2SAT clauses. We utilize Dev C++ as the platform of training and testing our proposed algorithm. In this study, the effectiveness of RBFNN-MAX2SAT can be estimated by evaluating the proposed models with testing data sets. The results obtained are analysed using the ratio of satisfied clause (RSC), the root means square error (RMSE), and CPU time. The simulated results suggest that the proposed algorithm is effective in doing MAX2SAT logic programming by analysing the performance by obtaining lower Root Mean Square Error, high ratio of satisfied clauses and lesser CPU time.

Keywords: MAX- k SAT; Conjunctive Normal Form; ratio of satisfied clause; combinatorial optimisation

ABSTRAK

Kebolehpuasan- k maksimum (MAX- k SAT) adalah logik untuk menentukan jumlah maksimum bagi klausa yang dipenuhi. Secara tepatnya, logik ini memainkan peranan penting dalam pelbagai aplikasi sebagai logik pengoptimuman gabungan. MAX2SAT adalah kes yang khusus dengan MAX- k SAT ditulis dalam bentuk normal konjungsi (CNF) dengan dua pemboleh ubah dalam setiap klausa. Dalam makalah ini dibentangkan paradigma penggunaan MAX2SAT dengan pelaksanaannya dalam rangkaian neural fungsi asas jejari (RBFNN). Selain itu, analisis dihadkan sehingga klausa MAX2SAT. Dev C++ digunakan sebagai platform untuk latihan dan ujian al-Khwarizmi yang dicadangkan. Dalam kajian ini, keberkesanan RBFNN-MAX2SAT boleh dianggarkan dengan menilai model data ujian yang dicadangkan menggunakan nisbah klausa yang dipenuhi (RSC), punca min ralat kuasa dua (RMSE) dan masa CPU. Hasil simulasi menunjukkan bahawa al-Khwarizmi yang dicadangkan dapat digunakan untuk melakukan pengaturcaraan logik MAX2SAT dengan analisis ke atas prestasi yang diperolehi berdasarkan punca min ralat kuasa dua yang lebih rendah, nisbah klausa dipenuhi yang lebih tinggi dan masa CPU yang lebih rendah.

Kata kunci: MAX- k SAT; bentuk normal konjungsi; nisbah klausa dipenuhi; pengoptimuman gabungan

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