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IJCA Proceedings on National Conference
cum Workshop on Bioinformatics and Computational Biology

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NCWBCB - Number 1

Year of Publication: 2014

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{bibtex}ncwbc1405.bib{/bibtex}

Abstract

In this article, a noble approach is presented to classify n-variable Boolean functions in logical way such that each function belonging to a particular class can be traced with respect to a single base function. In the present study, two different methods have been proposed for this classification. The first one is done through the Hamming distance with regards to base 0 (2^n bits of zeros) Boolean function. In the second method, the classification is done to generate all Boolean functions from n variable to n+1 variable through the concatenation methodology. The presented paper also contains two unique and different methodologies for finding the cardinality of different classes. In this classification all the basis Boolean functions were captured into a

single class. All the linear and corresponding affine Boolean functions belong to a single class along with other nonlinear Boolean functions except two classes of single cardinality. It has been also observed symmetrical class distribution with equal cardinality and functions belonging to the symmetrical classes are complement of each other. Special Boolean functions like Nested Canalyzing Functions (NCFs) [1, 2, 3, 4, and 5] are considered biologically important. So they are specially viewed in our classification among different classes.

Refer

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Index Terms

Computer Science

Applied Mathematics

Keywords

Classification Methodology; Boolean Function; Hamming Distance; Nested Canalyzing Function; Interaction Graph.