Abstract

The present thesis embodies a study of the theory of additive cellular automata and its applications in error correcting code and data compression. A brief review of earlier works on CA and its applications have been presented. Subsequently, new characterizations of the state-transition behaviour of group and non group CA are presented. A major contribution of the work is the design of CA based Reed Solomon code. A novel technique for video and image compression based on the basic concept of error correcting code have been also presented. Further, a special class of non group CA has been employed; this tool can be used for solution of switching functions that encode image data files. Finally, a unique structure of non group CA has been utilized for text data compression.

Keywords: Cellular Automata (CA), Reed Solomon (RS code, Error Correcting Codes (ECC), Video Compression, Image Compression, Boolean Functions, Text Compression.