(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :03/04/2023

(21) Application No.202341025190 A
(43) Publication Date : 05/05/2023

(54) Title of the invention : Efficient and Enhancing Hardware Security Systems using Quantum-dot Cellular Automata-based Substitution Boxes (S-boxes)

(51) International classification :B82Y 100000, H01L 291200, H01S 053400, H04L 090000, H04L 090600
(86) International Application No :PCT// /
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

(71)**Name of Applicant :**
1)Dr. Vasudeva Bevara
Address of Applicant :Assistant Professor, ECE Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda ---------- ----------
2)Malla Reddy Engineering College
Name of Applicant : NA
Address of Applicant : NA
(72)**Name of Inventor :**
1)Dr. Vasudeva Bevara
Address of Applicant :Assistant Professor, ECE Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda ---------- ----------
2)Mr. Chiluka Sagar
Address of Applicant :Assistant Professor, ECE Dept., Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda ---------- ----------
3)Mr. Srinu Bevara
Address of Applicant :Assistant Professor, IT Dept., Gayatri Vidya Parishad College of Engineering (Autonomous), Gandhi Nagar, Madhurawada, Visakhapatnam, Andhra Pradesh 530048 Madhurawada ---------- ----------
4)Dr. RVV Murali Krishna
Address of Applicant :Professor & HOD, IT Dept., Gayatri Vidya Parishad College of Engineering (Autonomous), Gandhi Nagar, Madhurawada, Visakhapatnam, Andhra Pradesh 530048 Madhurawada ---------- ----------
5)Dr. Nalini Bodasingi
Address of Applicant :Assistant Professor & HOD, Department of ECE, jntugvVizianagaram, Village :, Dwarapudi, Andhra Pradesh 535003 Dwarapudi ---------- ----------

(57) Abstract :
Substitution Boxes (S-boxes) are an important component of many cryptographic systems, as they provide non-linear transformations that increase the security of data. Quantum-dot Cellular Automata (QCA) is an emerging nanotechnology that has shown potential for use in the design of digital circuits due to its high speed, low power consumption, and non-volatility. This paper explores the use of QCA technology in the implementation of S-boxes. We discuss the design and implementation of QCA-based S-boxes and compare their performance to conventional S-boxes. Our results show that QCA-based S-boxes offer faster performance, lower power consumption, and greater resistance to environmental noise than conventional S-boxes. Additionally, QCA-based S-boxes can be designed with a smaller size and footprint, making them suitable for use in embedded systems. We conclude that QCA technology has the potential to provide significant benefits for the design and implementation of S-boxes in cryptographic systems.

No. of Pages : 7 No. of Claims : 4