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Topic of Research: Development of a cryptographic model for cyber security applications

Keywords: Encryption, Decryption, Diffusion, Confusion, Shuffling, Correlation.

### **Finding**

**General Features of Thesis:** The main aim of the thesis is to take care of security issues with a proposed solution using confusion and diffusion models based on different chaotic systems like intertwining logistic map, coupled map lattice and Brownian motion.

First finding: Discussing the background and related works of various chaotic systems. In this chapter an Image Encryption technique was implemented using Two Dimensional Sine Logistic Map to address the issues related to use of logistic maps. The chapter is also having the literature review according to objectives.

In second finding: The aim of the proposed model i.e intertwining logistic map based on a diffusion model is discussed to overcome the blank window noticed in the bifurcation diagram of the logistic map and for better random number distribution. The proposed model ensures that all the communication is secure. In the proposed model, a single round of shuffling, correlation coefficient among adjacent pixels reduced to zero, mixing used in the model changes the original pixel values that help in shuffling each pixel of the image.

In third finding: A coupled map lattice based on a diffusion model is proposed. The objective of this chapter is to develop a new cryptographic system that proposes an encryption mechanism. The entire proposed work is about the investigation of coupled map lattice as a diffusion model for image encryption. The Key Generation Process, Encryption Process and Decryption Process are the main contributions of this phase.