



# Düzce Üniversitesi Bilim ve Teknoloji Dergisi

Research Article

## A Snake Game Steganography Method based on S-Boxes

Esra ŞATIR<sup>a,\*</sup>, Kubilay GÜNER<sup>b</sup>

<sup>a</sup> Department of Computer Engineering, Engineering Faculty, Duzce University, Duzce, TURKEY

<sup>b</sup> Department of Computer Engineering, Engineering Faculty, Duzce University, Duzce, TURKEY

\* Corresponding author's e-mail address: esrasatir@duzce.edu.tr

### ABSTRACT

Steganography is the art and science of concealing the existence of information within seemingly innocuous carriers or it is a communication method in such a way that the presence of a message cannot be detected. There are a variety of digital carriers or places like images, audio files, text, html, etc. where data can be hidden. In this study, we proposed a game steganography method using snake game as the cover medium. We aim to hide the secret data by estimating the each move of the bait called “vitamin”. In other words, we compute coordinates of the vitamin according to the unit components of secret data. Meanwhile, we plan to complicate the game platform and establish a nonlinear relationship between the vitamin location and secret data by employing DES S-boxes. These operations render the proposed scheme more resilient against the possible steganographic attacks and make the extraction procedure more complicated. Therefore, security and imperceptibility have been kept as the focus of interest in the scope of this study. Besides, significant capacity rates have been obtained by each move. The performed experiments offer significant results to support these claims.

**Keywords:** *Steganography, game steganography, game theory, snake game, DES S-Boxes*