

# Fuzzy Vault Security Enhancement avoid Statistical Biases

Sara Majbour, Morgan Barbier, Jean-Marie Le Bars

June 10, 2024

## **Abstract**

We assess the fuzzy vault's security against the exploitation of statistical biases, conducting bias examination through features on a sample of biometric set. Our comparative analysis quantifies the scheme's vulnerability to security-compromising attacks, using three bases of feature templates derived from real biometric databases of various modalities, showcasing variable quality levels, and quantifying scheme weaknesses. This study shows a decrease in the scheme's security under such attacks and significantly contributes to understanding the fuzzy vault's limitations regarding biases in the stored set. Moreover, we propose the first solution without requiring additional information, preserving the security of the fuzzy vault against such attacks.