Human Cognition and AI in Decision Making for Facial Image Manipulation Detection

Abstract

The research seeks to utilize human cognition capabilities to improve facial image manipulation detection.

Background

Bonafide Subject 1

Morphed Image

Bonafide Subject 2

Sophisticated facial manipulation such as morphing are persistent threats to security.
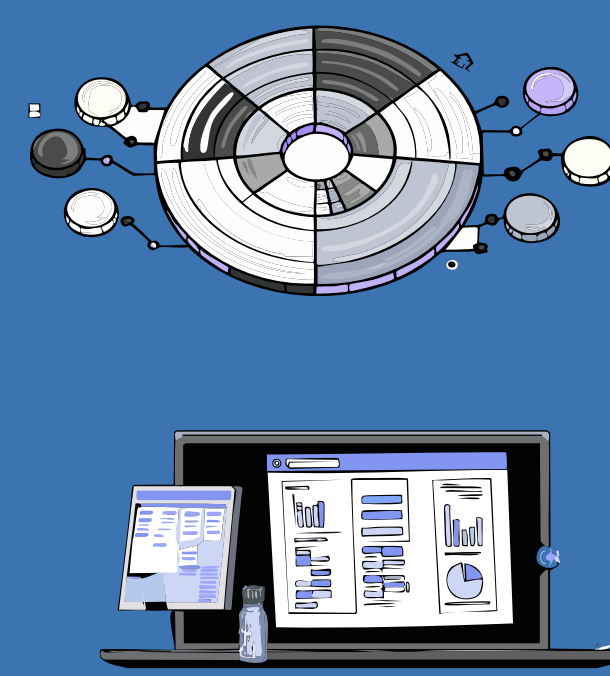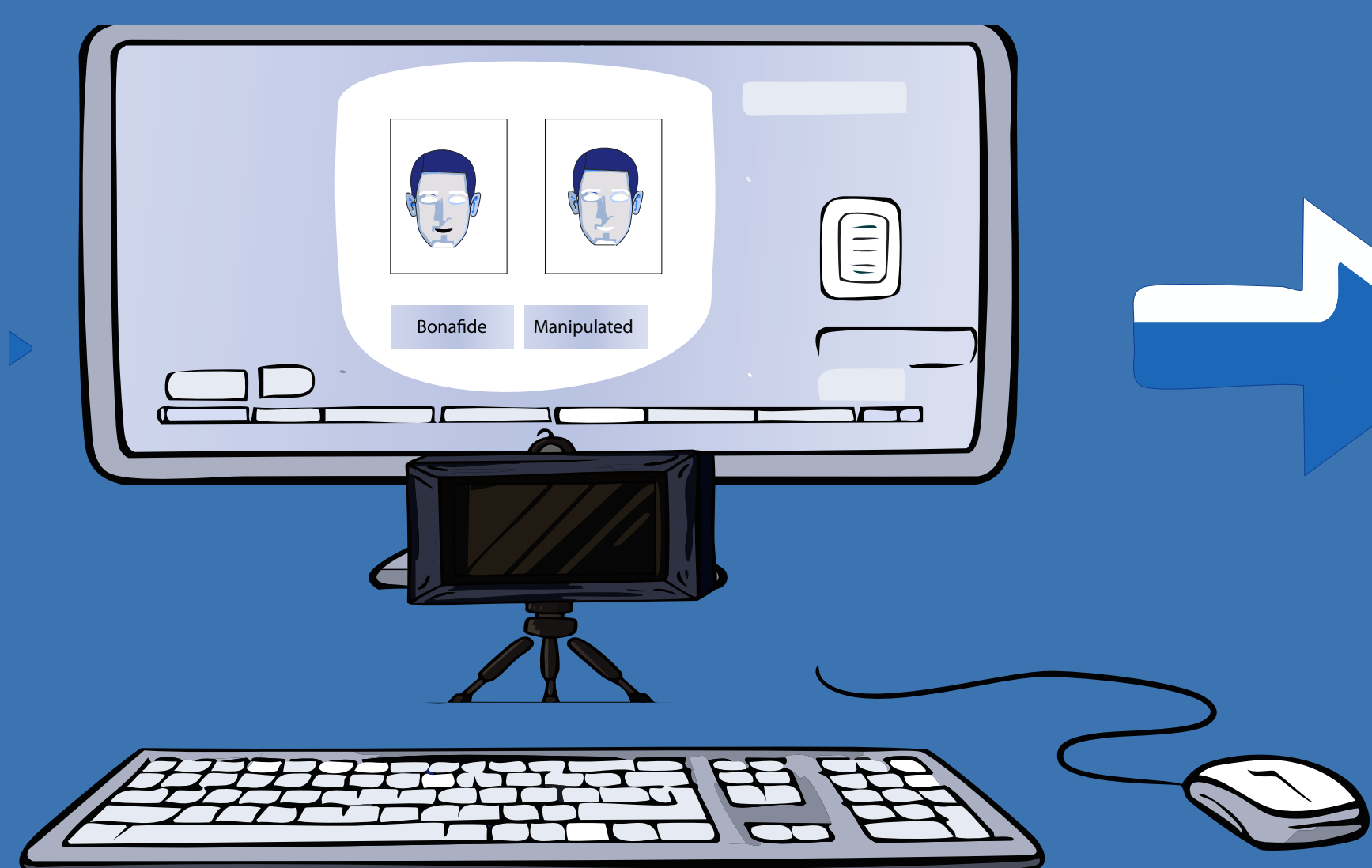
Human experts are often relied upon for manipulation detection, however, the underlying cognitive processes behind their judgment remain largely unexplored.

Methodology

Data Collection
Conduct eye-tracking studies with expert and non-expert participants to analyze gaze patterns during manipulation detection.

Data Analysis
Analyze performances and use them to develop machine learning models to improve manipulation attack detection accuracy.

Validation
Validate developed models in real-world scenarios and monitoring their effectiveness based on findings by comparing with trained human experts.

Expected Outcomes

Identify and reduce biases in facial recognition systems to develop more inclusive and fair algorithms

Study human perception of manipulated faces and recommend improvements for human expert detection

Use attention mapping techniques from human perception to improve facial manipulation detection

Bhanu Shrestha
bhanu.shrestha@ntnu.no

Main Supervisor
Assoc. Prof. Dr. Kiran Raja

Co-Supervisor
Prof. Dr. Raymond Veldhuis

NTNU