

1. INTRODUCTION

In the age of digital information, visual representations such as logos serve as integral components of brand identity. However, the proliferation of fake logos, often fueled by advanced digital manipulation techniques, poses a serious threat to brand authenticity and consumer trust. This project endeavors to tackle this challenge by employing deep learning methodologies for the precise detection of fake and real logos. Through the implementation of advanced algorithms and neural networks, this system aims to provide an automated and accurate means of distinguishing authentic brand symbols from fraudulent ones.

1.1 Project Overview:

The primary objective of this project is to develop a robust Fake/Real Logo Detection system. By harnessing the power of deep learning, the system will analyze intricate visual patterns and features within logo images, enabling it to make informed decisions regarding the authenticity of the logos in question. This tool not only aids brand owners in protecting their intellectual property but also empowers consumers and stakeholders to make informed decisions based on trustworthy visual representations.

1.2 Purpose:

The purpose of this project is to develop a robust and accurate fake logo detection system. The proposed approach will be able to detect fake logos with high accuracy, even when the logos are slightly altered or completely new. This will help to protect consumers from fraud and deception.

Here are some of the key benefits of the proposed approach:

- **High accuracy:** The proposed approach is able to achieve high accuracy on a dataset of real and fake logos.
- **Robustness:** The proposed approach is robust to changes in logo design and can detect fake logos that are slightly altered or completely new.
- **Scalability:** The proposed approach is scalable to large datasets of logos.

The proposed approach is expected to have a significant impact on the following areas:

- **Consumer protection:** The proposed approach can help to protect consumers from fraud and deception by detecting fake logos.
- **Brand protection:** The proposed approach can help to protect brands from being counterfeited.
- **E-commerce:** The proposed approach can be used to detect fake logos in e-commerce listings.

2. LITERATURE SURVEY

2.1 Existing problem

Fake logo detection is a challenging task due to the subtle differences between real and fake logos. Fake logos may be slightly altered versions of real logos, or they may be completely new logos that are designed to deceive consumers. In recent years, there has been a growing interest in using deep learning to detect fake logos. Deep learning is a type of machine learning that uses artificial neural networks to learn from data. Neural networks are able to learn complex patterns in data, which makes them well-suited for the task of fake logo detection.

2.2 References

There is a growing body of literature on fake logo detection using deep learning. Some of the most relevant references include:

[1] Zheng, Y., Bian, X., & Liu, X. (2018). Fake logo detection based on a deep learning model. In 2018 IEEE 5th International Conference on Multimedia Big Data (BigMM) (pp. 106-111). IEEE.

[2] Bozkir, A. S., Aydos, M. (2020). LogoSENSE: A companion HOG based logo detection scheme for phishing web page and E-mail brand recognition. Computers Security, 95, 101855

[3] Tan, C., & Ahmed, M. (2020). Fake logo detection using deep learning and transfer learning. In 2020 12th International Conference on Information Technology in Asia (CITA) (pp. 1-6). IEEE.

[4] Hesselman, C. (2022). LogoMotive: Detecting Logos on Websites to Identify Online Scams-A TLD Case Study. In Passive and Active Measurement: 23rd International Conference, PAM 2022, Virtual Event, March 28-30, 2022: Proceedings (Vol. 13210, p

[5] Wang, Z., & Li, P. (2022). Fake logo detection based on improved convolutional neural network and deep residual learning. In 2022 3rd International Conference on Big Data, Computing and Communications (ICBCC) (pp. 1-6). IEEE.

2.3 Problem Statement Definition

The problem of fake logo detection can be defined as follows:

Given an image of a logo, determine whether the logo is real or fake.

This problem is challenging because real and fake logos may be very similar in appearance. However, there are subtle differences between real and fake logos that can be learned by a deep learning model. For example, fake logos may have lower resolution or different fonts than real logos. Additionally, fake logos may contain spelling errors or other mistakes. Deep

learning has been shown to be an effective method for fake logo detection. Deep learning models are able to learn complex patterns in data, which makes them well-suited for this task.