

# Photogrammetry + Deep learning in enforcing IPR

Ejiofor C



# Agenda

## Areas of Interest

Introduction

Objectives

Previous Studies

literature

Methodology

Results

Recommendation

# Intro duction

**PHOTOGRAMMETRY**

**3D DATA**

**LIST SOME ADVANTAGES & DISADVANTAGES**

**AI -> ML -> DL -> NEURAL NETWORKS -> SIAMESE**

**EXPLAIN SIAMESE NETWORKS TO TWINS- SIMILARITY**

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# Problem statement

We aim to address shortcomings in recordation, analysis, detection of counterfeit goods.

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# Paper Objectives

- 01 Collection of 3D data of IPR assets can supplement current methods or recording and documenting IPA's
- 02 Artificial Intelligence Techniques can increase efficiency in detection of counterfeit products

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# Previous Literature

## **HAN, XU, LUO (2020)**

Title: A deep learning framework for anti-counterfeiting based on hologram images

Achieved detecting between counterfeit and genuine holograms using distinct visual features.

- CNN for feature extraction
- Classification and Discrimination - SVM

## **LI, H., LIU, H., ZHANG, X., & LI, D. (2019)**

Title: Deep learning-based method for detecting counterfeit banknotes

Deep learning techniques to identify counterfeit notes by analyzing visible features.

- CNN for feature extraction
- SVM for classification

# METHODOLOGY

## QUANTITATIVE RESEARCH METHODOLOGY

- Collection data -  
dimensions
- Analysis of numerical data  
(dimension)
- Identify patterns  
relationships

# Steps in data acquisition





# Dataset & Features

## 1 - Data Collection



Randomn outlets  
QR and SMS codes.  
Identify +ve (1) & -ve samples (0)

## 2 - 3D image acquisition



Iphone LiDAR scanner.  
alternative is 3D scanner

## 3 - Software Utilization for feature extraction



a blend of open-source (blender)  
and proprietary software (sketchUp3D +  
AutoDesk Recap )

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# Labelling attributes

- 01 Diameter of cigarette
- 02 Filter length
- 03 Paper Texture
- 04 Hologram
- 05 Logo
- 06 Typo

# 3D Examples

- 01 Cigarette
- 02 Iphone

# Tools

- 01 3D scanner
- 02 Blender
- 03 Paper Texture

# Format

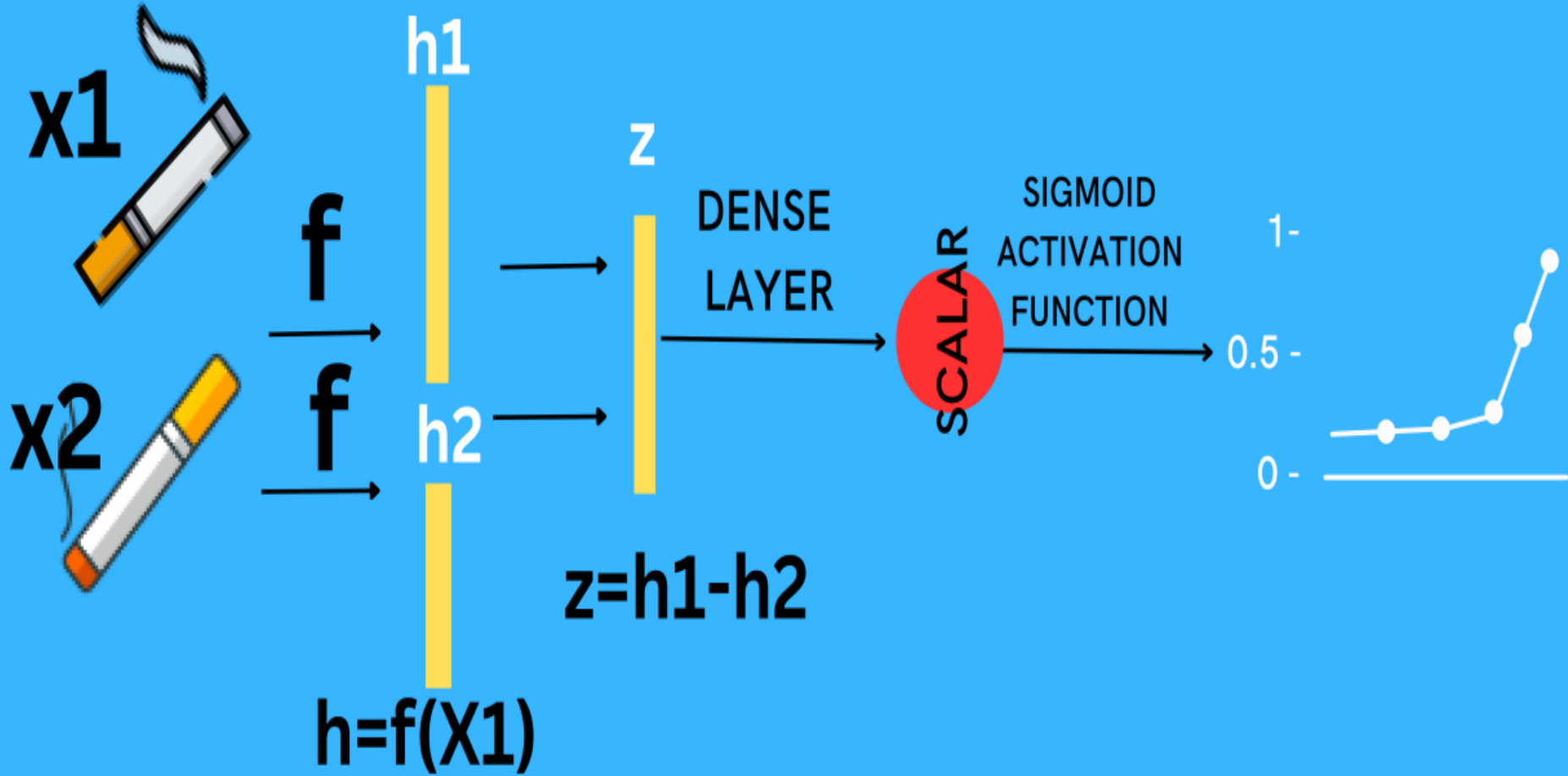
- A OBJ
- B GLTF / GLB
- C FBX

Back

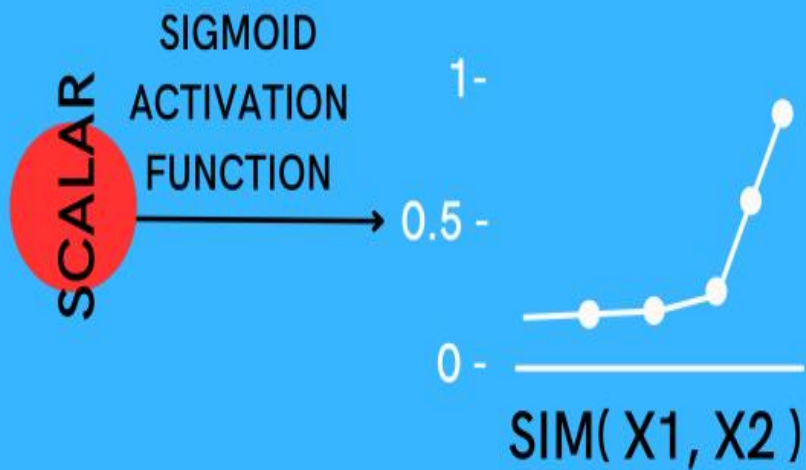


# DEEP LEARNING

TRAINING SIAMESE



# CONT



LOSS  
FUNCTION

+ve - x1  
-ve - x2

PREDICTION

- using  
One-Shot  
prediction

	SIMILARITY SCORE	PREDICTION	SUPPORT		
LENGTH	0.96	0.96	15		
DIAMETER	0.98	0.98	15		
TEXTURE	0.97	0.97	15		
COLOR QUALITY	0.99	0.99	15		

# Utilization

1. Recordation & Registration
2. Tool to monitor online counterfeits - ecom
3. Increase consumer awareness of a brand
4. Contribute to a cloud sourced repository
5. Policy Development
6. Empowers Society