Research Proposal Workshop

Activity 1

Focused Topic:

- Apply Explainable AI to detect image forgeries that have been tampered with a method using copy-move in a forensics point of view
- Using Explainable AI to detect copy-move forgeries

Activity 2

- Explainable AI answers the questions to why and how machine learning uses the technique copy-move to tamper an image

Activity 3

Topic:

- Detection of fake image tampering using digital forensics
- Apply Explainable AI to detect image forgeries that have been tampered with a method using copy-move in a forensics point of view

Question:

- Because I want to find out how explainable AI is able to determine at a high accuracy that an image has tampered with

Significance:

- In order to help my reader to understand that developed machine learning can help identify images that are fake to prevent any image crime from occurring

Activity 4

- Explainable AI will detect pixel-based image forgeries of images that are copy-move, spliced, and image retouching.

Activity 5

Analysis of Matrix

Name	High Complexity in Algorithm	Coloured Images	Grey Scaled Images	Compressed Images
Convolutional Networks	Y	Y	Y	Y
Block-Based Method Intensity Based PCMIFD	N	N	Y	N
Zernike: SIFT Feature Extraction and Multiple Keypoint Matching	Y	Y	Y	N
CISDL	N	Y	Y	Y/N

Activity 6

- Explainable AI Detecting Pixel Based Image Forgeries

Activity 7

- I will deliver an explainable AI model to detect pixel-based image forgeries

Activity 8

- I will deliver an explainable AI model to detect pixel-based image forgeries
    - Success is measured that the model is completed with a satisfactory percentage of accuracy to detect images that are forged

Activity 9

- Judges, Digital forensics Officer
    - This model/tool if developed with high accuracy and justifiable evidence pointing out image forgeries are useful to these stakeholders in determining whether the image is forged or not
- Academics, General Public
    - The model can be used for educational purposes and further learning into explainable AI of how it works in detecting these forgeries

Activity 10

Judges, Digital forensics Officer

- Aim 1: To find out if the image is forged by copy-move, splicing, or image retouching
- Aim 2: Answer questions of why and how is this image forged

Academics, General Public

- Aim 3: To understand how Explainable AI is able to detect and how the image is forged

Activity 11

- You want to detect if the image is forged
- Hackers manipulate images with ease
- Together, we can use explainable AI to detect these types of forgeries

Activity 12

Advanced AI forged images are proving it difficult for the general public to detect. These images are way too difficult to detect with the human naked eye. The area of forgery that will be focused on is pixel forgeries. The techniques in this type of forgery are copy-move, splicing, and image retouching. In a court case, the judge would want to be informed if this image is forged or not, with the addition of knowing how and why? Without knowing how and why the case and evidence might not be sufficient enough to make the evidence be dismissed.

To keep up with this movement explainable AI is being developed at a high detection rate with the use of a convolutional neural network. These types of machines are built to look at each layer that correlates to each pixel within the images. The explainable AI will take the information from the CNN and highlights the areas and give reasons to why and how this image is forged which solves the issue and evidence will be admittable.

Activity 13

Explainable AI can be used to detect image forgeries to answer the question of how and why was a certain image is forged. A lot of machines have been produced to give a yes or no answer if the image is tampered with, but not many have explained how and why for the judge to accept the image as evidence of it being forged. Pixel-based imageries is the core focus and 3 different type of techniques arise which are copy-move, splicing and image retouching. This project will explore strengthening the detection and highly focus on which part of the image is forged and why is it forged.