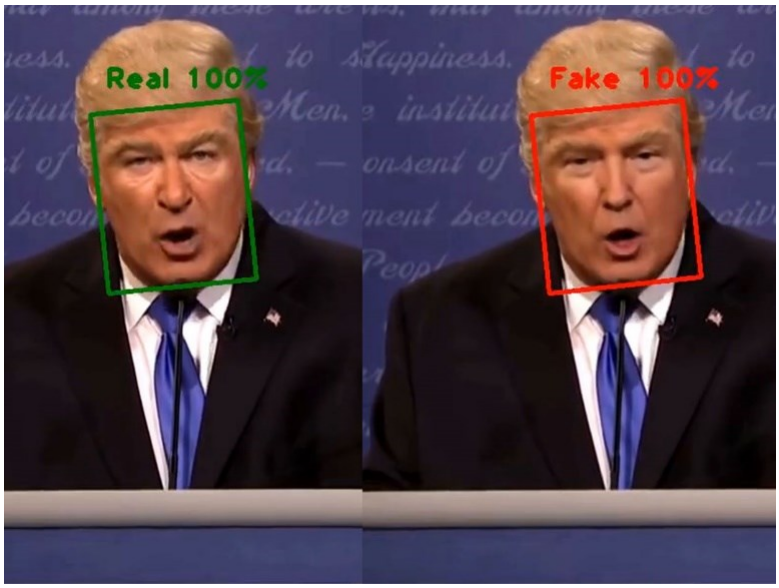
Title: **Face-Forensics: Deepfake endangering the Cybersecurity**



Motivation:
Deepfake is an AI-based technology used to create or alter images, audio, and video resulting in synthetic content that appears authentic. In recent time, we get some videos in which faces have swapped using Machine Learning and Deep Neural Networks. Situations are not perceived objectively, leading to misjudgments and false information. Deepfakes are going to wreak havoc on society.

Objective:
The main objective of this project is protect against Deep-fake image or videos. Secure our system against anti-fake technology.
Therefore, we want to develop a Deep-Learning –Model and integrate it with a web application.

Critical Challenges:
It is very much difficult analyse the facial mannerisms and expressions and see how they are unique to each individual.
The key challenge of face recognition is to develop effective feature representations for reducing intra-personal variations while enlarging inter-personal differences.

The face identification task increases the inter-personal variations by drawing **DeepID2** features extracted from different identities apart, while the face verification task reduces the intra-personal variations by pulling DeepID2 features extracted from the same identity together, both of which are essential to face recognition.

Conflicting Requirement
Create an appropriate ML model to detect fake image from very low quality or high definition HD+ image or video.

How Ps are addressed through the project and mapping among Ps, COs and POs

Ps	Attribute	How Ps are addressed through the project	CO	PO
P1	Depth of Knowledge Requirement	• The project requires study of research on deep convolutional neural networks mainly DeepFace, DeepID$_2$, and Digital Image processing **(K8)**	CO1 CO2 CO3 CO5 CO7 CO9 CO10	PO-b PO-c PO-e PO-h PO-j PO-l PO-a

		• data collection from user site like Online Newspaper, Social- media, etc. using web scraping **(K3)** • engineering design (multi-layer model design) **(K5)** and web app development using java EE tech.**(K6)** • knowledge of software engineering, Artificial Intelligence **(K3)** and image processing, Deep Learning **(K4)**		
P2	Range of Conflicting Requirement	Create an appropriate ML model to detect fake image from very low quality or high definition HD+ image or video.		
P3	Depth of Analysis Required	The work need to mode study on **Detector cascade,** consists of a sequence of simple-to-complex face classifiers and has attracted extensive research efforts. Moreover, detector cascade has deployed in many commercial products such as smartphones and digital cameras.	CO1	PO-b
P4	Familiarity of Issues	The DeepID systems were among the first deep learning models to achieve better-than-human performance on the task, **DeepID2** achieved **99.15%** on the Labeled Faces in the Wild (LFW) dataset, which is better-than-human performance. A Growing Cybersecurity Threat : Deepfakes and other manipulated data	CO4	PO-f
P5	Extent of applicable codes	Generate proper solution of machine learning model based on deep convolutional neural networks.	CO2 CO5	PO-c PO-h
P7	Interdependence	Image collection, image labeling, creating model, design app development	CO5 CO6 CO8	PO-h PO-i PO-k

Addressing Complex Activities (As) through the project

As	Attribute	How As are addressed through the project
A1	Range of Resources	In development stage, the project requires the use of diverse resources including different type of **material, Information's**: images (real and fake), **technologies**: DeepFace, $DeepID_2$, **people:** Developers, **Money**.
A2	Level of interaction	By using ML model analyse the facial mannerisms and expressions, detect fake image from very low quality or high definition HD+ image or video.
A3	Innovation	A degree of innovation is needed to develop the machine-learning based deep convolutional neural networks model using the available data set (Link).

A4	Consequences for society and the environment	By detecting deep-fakes and disinformation, it is easy to distinguish between real and fake media. If we can detect the fake image or image related information to make it viral that can stop bad consequences for our society.
A5	Familiarity	The project deals with cybersecurity based on deep-fake analysis for students.

CO-PO mapping for this project

CO No.	**CO Statements:** Upon successful completion of the course, students should be able to:	
CO1	**Identify, formulate, and analyse** a real world problem based on requirement analysis.	
CO2	**Design/Develop** a working solution on a real world problem using s/w designing tools.	
CO3	**Use** modern development tools, which are popular among s/w developers.	
CO4	**Identify** societal, health, safety, legal and cultural issues related to the project.	
CO5	**Practice** professional ethics, Responsibilities, and norms of engineering practice.	
CO6	**Work** as a team and fulfil individual responsibility.	
CO7	**Communicate** effectively through presentation and **write** effective reports and documentations on the project.	
CO8	**Apply** project management principles using Version Control System, and **produce** cost value analysis.	
CO9	**Recognize** the need for, and have the preparation and ability to engage in independent and **life-long learning** in the broadest context of requirement changes and introduction of modern development tools	
CO10	**Apply** the S/W Engineering knowledge to provide a working solution on a real world problem	

Appendix-1:
Washington Accord Program Outcomes (PO) for engineering programs:

No.	**PO**	**Differentiating Characteristic**
a	Engineering Knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical
b	Problem Analysis	Complexity of analysis
c	Design/ development of solutions	Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified
~~d~~	Investigation	Breadth and depth of investigation and experimentation

e	Modern Tool Usage	Level of understanding of the appropriateness of the tool
f	The Engineer and Society	Level of knowledge and responsibility
g	Environment and Sustainability	Type of solutions.
h	Ethics	Understanding and level of practice
i	Individual and Team work	Role in and diversity of team
j	Communication	Level of communication according to type of activities performed
k	Project Management and Finance	Level of management required for differing types of activity
l	Lifelong learning	Preparation for and depth of Continuing learning.

Conclusion:
Learnings from project