Introduction

Deepfake is a combination of 2 words, “deep” which refers to deep learning and “fake” means the fake data. This fake data consists of photographs, audios and videos, where these data are manipulated by using some AI tools or advanced editing techniques. In short, deepfake is a study of these fake dataset using deep learning modules, these modules are created to understand which data is fake and which one is real. We need to create models that can distinguish between real and fake audios, videos and photos.

1. **Deepfake Generation:**

* **GANs (Generative Adversarial Networks):** GANs are often used to generate a realistic deepfake videos. GANs consist of two parts: a generator that creates fake content, and a discriminator that tries to distinguish between fake and real. Both parts are trained simultaneously, improving each other’s performance.
* **Autoencoders:** Another method where the encoder compresses an image or video into a latent space, and the decoder reconstructs it. By training a network on real data and using it to generate fake data, deepfake creation is possible.
* **FaceSwap:** A specific technique in deepfakes, which involves swapping the face of one person with another in a video. It uses a variety of methods, from traditional image processing to modern deep learning.

1. **Detection Techniques:**

* **CNNs (Convolutional Neural Networks):** Often used for detecting deepfakes by analyzing images or frames for inconsistencies, such as artifacts that occur during the creation process.
* **XceptionNet:** A deep CNN architecture based on depthwise separable convolutions, known for high performance in image classification tasks. It's one of the top models used in deepfake detection.
* **Other Models:** Consider researching new architectures such as **Vision Transformers (ViTs)** or **Capsule Networks**, which have shown promise in image-related tasks.

References:  
1. [Preeti, M. Kumar, H.K. Sharma, (2023), A GAN-Based Model of Deepfake Detection in social media](https://www.sciencedirect.com/science/article/pii/S1877050923001916)

2. [Disheng Feng, Xuequan Lu, and Xufeng Lin, (2020), Deep Detection for Face Manipulation](https://www.researchgate.net/publication/347048202_Deep_Detection_for_Face_Manipulation)