Chapter 7
A Methodological Study of Fake Image Creation and Detection Techniques in Multimedia Forensics

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ABSTRACT

Nowadays, there is a huge concern of fabrication of real-world images/ videos using various computer-aided tools and software. Although these types of software are commonly used for personal entertainment but may create havoc when used by malicious people for concealing some sensitive contents from images for criminal forgery. Spread of fake information and illegal activities or creating morphed images

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of some individuals for taking revenge are some of the potentially destructive areas of advanced face information and structure manipulation technology in the wrong hands. Researcher fraternity in multimedia forensics have been working in this area since many years and in this paper, a comprehensive study of various techniques of fake image/video creation and detection are described. It also presents a survey on various benchmark datasets used by the researchers for fake image/video detection. The presented survey can be a useful contribution for the research community to develop a new method/ model for fake detection thereby overcoming the restrictions of the traditional methods.

INTRODUCTION

Social media plays an integral role in our lives today and has revolutionized the way people communicate and socialize on the web. Even the development of social media is an advantage to humans as well as has some negative effects. Fake content and growing disinformation by malevolent users have not only troubled our online social media system into disarray but also dispense humankind. The various studies explore the various methods of combating fake news on social media such as the Hybrid model and Natural Language Processing. Disclosure holds that the implementation of hybrid machine learning Techniques and combined effort of mankind could stand a more chance of fighting deception on social media.

Massive advances have been made in the field of automatic video enhancement strategies over the previous few years. In particular, amazing success has been demonstrated in the direction of facial manipulation tactics (*Li et al., 2018*). Similar facial features can be reproduced now with the help of the advanced technologies which involves altering facial emotions from one film to another (Korshunov *et al.,* 2018), (Afchar *et al.,* 2018). This makes it possible to switch between speaker identifications with little or no effort. Face manipulation systems and equipments have improved to the point where even users with no prior knowledge in photo editing or digital arts may use them. Indeed, all the things are pre-written in some code form or other forms, which are freely available to the general public on a high rate (Hsu *et al.,* 2020), (Villan *et al.,* 2017). On the one hand, technical advancements open up new creative prospects (e.g., film making, visible effect, visible arts, and so forth).

Unfortunately, it also facilitates the technique of video forgery with the help of malevolent consumers. Spread of fake information and illegal activities or creating morphed images of some individuals for taking revenge are some of the potentially destructive areas of advanced face information and structure manipulation technology in the wrong hands. The ability of detecting whether or not a face is manipulated in a videotape and pictures series is getting progressively important (Cueva *et al.,*