Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Criteria 1.3 : Curriculum Enrichment

1.3.3 Percentage of students undertaking project work/ field work/ internships (Data for the latest completed academic year) -2020-21

Department of Electronics & Telecommunication-M.E

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List of Student Project & Special Topic Seminars 2020-21

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Special Topic Seminars by Students

Department of Electronics and Telecommunication

Sr. No	Name of Student	Class	Title of the Seminar	Guide Name	Attendance	Document Link
1	Sriya M S	ME	Image Processing Technique for Oil Spill Detection	Dr. Chandansingh Rawat	📄 Sriya M.…	📄 STS …
2	Telang Supriya Tejrao	ME	Digital Image Tampering Detection Using Deep Learning	Dr. Nadir Charniya	📄 Supriya …	📄 supri…

Sample Special Topic Completion Certificates

Vivekanand Education Society's
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A Special Topic Seminar

On

Survey on Recent Advances in Fake Image Detection

Submitted to Mumbai University

In the partial fulfillment of requirement for the degree of

Master of Engineering

In

Electronics and Telecommunication

Submitted by

Miss. Supriya Tejrao Telang

Under the guidance of

Dr. Nadir N. Charniya

Department of Electronics and Telecommunication

Vivekanand Education Society's Institute of Technology

Chembur, Mumbai-400074

2020-2021

Vivekanand Education Society's
Institute of Technology

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Certificate of Approval

This is to certify that special topic seminar entitled **'Survey on Recent Advances in Fake Image Detection'** for the degree of **Master of Engineering in Electronics and Telecommunication** submitted to the University of Mumbai by **Miss. Supriya Tejrao Telang**, bonafide student of **Vivekanand Education Society's Institute of Technology**, Chembur, Mumbai-400074 has been approved for the award of **Master of Engineering** in **Electronics and Telecommunication Engineering**.

Dr. Nadir N. Charniya
(Project Guide)

Prof. Mrs. Shoba Krishnan
(Head of Department)

Dr. Mrs. J. M. Nair
(Principal)

Department of Electronics and Telecommunication
Vivekanand Education Society's Institute of Technology
Chembur, Mumbai-400074
2020-2021

Special Seminar Topic Report Approval for Master of Engineering

This special seminar topic entitled **'Survey Recent Advances in Fake Image Detection'** by **Miss. Supriya Tejrao Telang** is approved for the degree of **Master of Engineering** in **Electronics and Telecommunication.**

Examiners

1.

2.

Department of Electronics and Telecommunication

Vivekanand Education Society's Institute of Technology

Chembur, Mumbai-400074

2020-2021

Vivekanand Education Society's
Institute of Technology

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A Special Topic Seminar On

'Oil Spill Detection Using Image Processing'

Submitted to Mumbai University

In the partial fulfilment of requirement for the degree of

Master of Engineering

In

Electronics and Telecommunication

Submitted by

Miss. Sriya Mohanasundaran

Under the guidance of

Dr. Chandan Singh Rawat

Department of Electronics and Telecommunication

Vivekanand Education Society's Institute of Technology

Chembur, Mumbai-400074

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Certificate of Approval

This is to certify that special topic seminar entitled 'Oil Spill Detection Using Image Processing' for the degree of Master of Engineering in Electronics and Telecommunication submitted to the University of Mumbai by Miss. Sriya Mohanasundaran, bonafide student of Vivekanand Education Society's Institute of Technology, Chembur, Mumbai-400074 has been approved for the award of Master of Engineering in Electronics and Telecommunication Engineering.

Dr. Chandan Singh Rawat

(Project Guide)

Dr. Mrs. J. M. Nair

(Principal)

Department of Electronics and Telecommunication

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Sample Special Topic Seminar Report

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A Special Topic Seminar

On

'Survey on Recent Advances in Fake Image Detection'

Submitted to Mumbai University

In the partial fulfillment of requirement for the degree of

Master of Engineering

In

Electronics and Telecommunication

Submitted by

Miss. Supriya Tejrao Telang

Under the guidance of

Dr. Nadir N. Charniya

Department of Electronics and Telecommunication

Vivekanand Education Society's Institute of Technology

Chembur, Mumbai-400074

2020-2021

Chapter 1

Introduction

Image or Photo is representation of the external form of a person or thing in art or we can say it is an Impression of something.

Nowadays, Capturing moments with different available tools & storing copy of the same has become Mandatory for Almost Everyone and because of the rapid growth & achievements in technology lots of software, applications are available with which one can easily edit or tampered the actual image for various purposes and it is very difficult to differentiate between real picture & tampered one just by seeing it. By means of which many time the genuineness of an image cannot be verified or recognized just by looking at it.

One cannot imagine how one fake image or tampered image (with minor changes) can change anyone's Life or Damage the reputation of anyone, Since the digital Image can be manipulated with multiple available options. So detection of any counterfeit Image has a great Importance as it comes to huge Risk when someone tries to manipulate or impersonate the real image. This plants the Need to verify the trueness of an Image. In fake image detection with the help of Suitable features one can capture the deviation. Such as Image Splicing, copying or moving particular part of specific image.

As the term Fake itself says that, it is something which looks similar to real but created just to mislead people. Whereas, Image Tampering is characterized as a sort of forgery, in which the graphic content of the image is altered.

There has been a significant rise in the number of images being manipulated since the advent of the image editing software. Consequently, a large variety of image manipulation tools and software have been developed which can further used for malicious activities like mob agitation and fake news spreads through platforms like social media.

Since the photos are proves of reality, what has happened, many fake images are used or being used in many Fields such as Forensic, Medical imaging, E-commerce, Education, Social Media, News & journalism which eventually hampers these fields. Therefore we cannot take this for granted.

1.1 Way of image manipulation:

- **Color Blending:** It is skill of adding two or more colors to create a new shade of color usually by moving tints and shades.
- **Combining multiple Images:** Application like PekoStep have this feature. To combine two or more images together to generate a new one. This technique is

1

commonly used to change the background of real image.

Fig. 1.1, Face of Angela Merkel replaced with Donald Trump's [14]

- **Piecing photos or negative copy of photos in darkroom:** It is somewhat similar feature to combining multiple images, only difference between these two is, in photo combining we merge complete images together and in piecing feature we add just a piece(small part) of image to edit real image.
- **Adjusting Shadows:** Shadow pays an important role in every image. Shadows can help to direct attention to a specific point in the composition. They can reveal form or hide features that may be better left unseen.

1.2 Software's/ Tools used to manipulate genuine image:

- Photoshop
- GIMP
- Fireworks
- Inkspace
- Pixelmator

1.3 Important terms related to Image Manipulation:

A) Image Forgery: It is defined as image forgery is the part of image manipulation, which is used to generate fake content in some part of the image to deceive the facts happened in the past.

B) Image Tampering: It is characterized as a sort of forgery, in which the graphic content of the image is altered.

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Image tampering detection algorithm:

Above algorithm uses various techniques for forgery detection, which are as listed below:

1) Principal Component Analysis (PCA):

PCA is used in exploratory data analysis and for making predictive models. It is commonly used for dimensionality reduction by projecting each data point onto only the first few principal components to obtain lower-dimensional data while preserving as much of the data's variation as possible.

Advantages:

 i) Color Reduction

 ii) Object Orientation

 Limitations:

 i) Insensitivity to relative scaling of original variables

2) Discrete Cosine Transform (DCT):

A discrete cosine transform (DCT) expresses a finite sequence of data points in terms of a sum of cosine functions oscillating at different frequencies. This technology is mainly used for feature extraction but they do not produce good results in case of image blurring. Usually, sized to 8x8 pixels. A total of 64 Discrete Cosine Transform (DCT) coefficients are computed for each block, Converting block into frequency domain from spatial domain. The higher frequency coefficients are then rounded off as per their quantization matrix value, balancing between image quality and compression ratio. [1] The matrix of quantized DCT coefficients are then encoded into a binary stream with lossless Huffman compression and by reversing the same technique one can extract actual image from JPEG file.
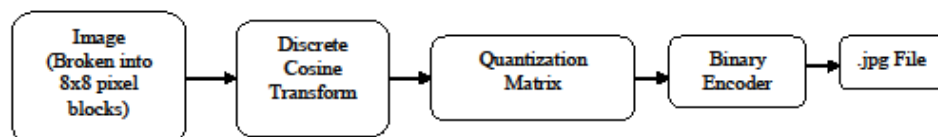
Fig 2.3 Block diagram of JPEG compression process [8]

Advantages:

 i) Various application in Lossy Compression of audio/image

Limitations:

 i) Poor at image blurring

 ii) Difficult to when it comes to video reconstruction.

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Chapter 5

Conclusion

The images can be used illegally in journalism, police investigation and as court evidences image tampering it can be threat to security of people and human society. There exists many techniques feature based techniques and other conventional techniques, such as, changing background or lightning environment of image or camera based detection. The challenges are most interesting as fake image creation and fake image detection techniques are developing together.

Therefore, development of fake image detection with recent advances in technology is a focus with consistent performance and accuracy. Looking into rapidly growing technology Deep Learning networks such as CNN, RNN and their variants have been suggested as the best approach that would be helpful in qualitative manipulation detection applications.

Deep learning networks have huge scope for development. Research and development in this field must be actively encouraged.

Thus we can say or conclude that fusion of artificial intelligence, Learning based approach and feature based approach is the key to the future.

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