D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY
Department of Electronics and Communication Engineering
Academic Year: 2021- 2022 (ODD Semester)
Innovative Teaching Method

B-Tech, Semester& Branch: IV/ I Semester ECE
Title: Digital Image Processing
Name of the Faculty member: Dr. N.Venkata Rao
Name of the Topic: Image Sharpening using frequency domain filters
Name of the Innovative Practice: Flipped Classroom
Date& Duration: 26.06.2021&30 Minutes

Description of Flipped Classroom

Flipped Classroom is a pedagogical approach in which the conventional notion of classroom based learning is inverted, so that students are introduced to the learning material before class, with classroom time then being used to deepen understanding through discussion with peers and problem solving activities.

Justification for choosing the topic using flipped class room activity:

The students were given assignment on the particular topic some few days back and they were asked to discuss the same topic inside the class room. They could be able to deliver more concepts. Since the assignment was given some days back, they got time to prepare and discuss efficiently in the class room.

Details of the Implementation:

There are a number of filtering techniques that can be used in frequency domain in this article we will be discussing a couple of useful methods. Smoothing low pass filters We can achieve smoothing in frequency domain through high-frequency attenuation (low pass filtering).

1. Ideal Lowpass Filters (ILPF)

The low pass filter which passes without attenuation of all frequencies within a radius Do from the origin and which cuts off all the frequencies outside this radius is called an ideal lowpass filter. The filter is specified by the following function:

where,

D0 = positive constant

D(u, v) = distance between a point (u,v) in the frequency
domain and the center of the frequency rectangle.

M, N = padded sizes given as follows

M >= 2P -1

N >= 2Q — 1

P, N = array dimensions

Note: M and N are the padded sizes of the arrays.

In the ideal pass filter all the frequencies on or inside the radius Do are passed without attenuation but all frequencies frequencies outside the circle are completely filtered. The filter is completely defined by a radial cross section as it is radially symmetric about the origin.

2. **Butterworth Lowpass Filters (BLPF)**

This filter is designed so as to have a flat frequency response in the passband. The frequency response is flat in the passband and rolls-off towards zro in the stopband. The rate of roll-off is based on the order of the filter.

Reference :

1. Anil K.Jain, “Fundamentals of Digital Image Processing”, Prentice Hall of India, 9th Edition, Indian Reprint,2002.
2. B.Chanda, D.Dutta Majumder, “Digital Image Processing and Analysis”, PHI, 2009.

D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY
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Academic Year 2021- 2022 (EVEN Semester)
Innovative Teaching Method

B-Tech, Semester& Branch: II/ II Semester ECE
Title: Analog Communication
Name of the Faculty member: Dr. N.Venkata Rao
Name of the Topic: Shot Noise
Name of the Innovative Practice: Multimedia clip
Date& Duration: 11.01.2022&10Minutes

Description of Multimedia clip:

Multimedia clip is a brilliant and innovative new way to encourage students to communicate stories, ideas and concepts in a creative and original way. It can be particularly useful as a tool to encourage the creativity of students. Animated videos are a one stop solution that can grab the attention of the students.ith it s entertaining visuals, it can clearly comprehend the concept. Since it is an analogy to cartoons, students will get hooked to it. By using animation videos, students learn analytical thinking as to how to present a scenario.

Justification for choosing the topic using multimedia clip:

The basic of communication starts from modulation and demodulation process and transmitted through wired channel. One must know about how the noises can affect the system and channel. So I have chosen this topic as a multimedia clip for better understanding and how the signal is affected by the shot noise.

Details of the Implementation:

The multimedia clip explaining about the noise and its types especially shot noise affected the communication system was played using the LCD projection available in the classroom.

Significance of Results:

Assessment of Effectiveness/Success of the Activity:

- Theassessmentofeffectivenessoftheactivitywasfeltwhenaskedquestionsinthe classroom after showing the video.
- Due to this activity, the students were able to recall the topics they had learnt in the classroom and they were also able to reproduce it in the exam.

ReflectiveCritique:

- **Benefits of conducting this activity:**
  - This video gives conceptual explanation about the communication system affected by noise
  - The students showed more interest by listening to multimedia clip, apart from theory concept.
- **Challenges:**

  Though it was a multimedia clip, certain explanations were given by me in between the multimedia clip for better understanding of the students.

References:

1. J.G.Proakis, M.Salehi, “Fundamentals of Communication Systems”, Pearson Education 2014
2. SimonHaykin,-“CommunicationSystems”,4thEdition,Wiley,2014
3. https://www.youtube.com/watch?v=GdunxCyMGuw