| Engineering and Technology | | | |
| --- | --- | --- | --- |
| Ramaiah University of Applied Sciences | | | |
| Department | Computer Science and Engineering | Programme | B. Tech. |
| Semester/Batch | 7th/2018 | | |
| Course Code | CSE407A | Course Title | Computer Vision |
| Course Leader(s) | Dr. Aruna Kumar S V, Dr. Divya BS and Dr. Subarna Chatterjee | | |

|  | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Questions | Marking Scheme | | | Marks | | |
| Max Marks | First Examiner Marks | Moderator |
| 1 |  | | | | | |
| 1.1 | Implementation of noise reduction filter | | 5 |  |  |
| 1.2 | Implementation of histogram equalization filter | | 7 |  |  |
| 1.3 | Reduction of the salt-and-pepper noise from the input image | | 4 |  |  |
| 1.4 | Extraction of the gradient parts from the input image | | 4 |  |  |
| 1.5 | Conclusion and Recommendations | | 3 |  |  |
| **Question 1 Max Marks** | | | **23** |  |  |
| 2 | 2.1 | | Introduction to Segmentation and Creation of Dataset. | 3 |  |  |
| 2.2 | | Identification and explanation of the appropriate pre-processing techniques | 5 |  |  |
| 2.3 | | Identification and explanation of the appropriate Segmentation techniques | 2 |  |  |
|  | **Question 2 Max Marks** | | | **10** |  |  |
| 3 | 3.1 | | Pre-processing on the images of the created dataset | **5** |  |  |
| 3.2 | | Segmentation of the images. | **7** |  |  |
| 3.3 | | Results and Discussions. | **5** |  |  |
|  | **Question 3 Max Marks** | | | **17** |  |  |
| **Total Assignment Marks** | | | | 50 |  |  |

| **Course Marks Tabulation** | | | | |
| --- | --- | --- | --- | --- |
| **Question** | **First Examiner** | **Remarks** | **Moderator** | **Remarks** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| **Marks (Max 50 )** |  |  |  |  |
| **Signature of First Examiner Signature of Moderator** | | | | |

**Please note:**

1. Documental evidence for all the components/parts of the assessment such as the reports, photographs, laboratory exam / tool tests are required to be attached to the assignment report in a proper order.
2. The First Examiner is required to mark the comments in RED ink and the Second Examiner’s comments should be in GREEN ink.
3. The marks for all the questions of the assignment have to be written only in the **Component – CET B: Assignment** table.
4. If the variation between the marks awarded by the first examiner and the second examiner lies within +/- 3 marks, then the marks allotted by the first examiner is considered to be final. If the variation is more than +/- 3 marks then both the examiners should resolve the issue in consultation with the Chairman BoE.

**Assignment**

**Instructions to students:**

1. The assignment consists of **3** questions.
2. Maximum marks is **50**.
3. The assignment has to be neatly word processed as per the prescribed format.
4. The maximum number of pages should be restricted to **30**.
5. The printed assignment must be submitted to the course leader.
6. **Submission Date: 16th November 2021**
7. **Submission after the due date is not permitted.**
8. **IMPORTANT**: It is essential that all the sources used in preparation of the assignment must be suitably referenced in the text.
9. Marks will be awarded only to the sections and subsections clearly indicated as per the problem statement/exercise/question

**Preamble**

Computer vision is one of the hottest research fields in the data science world. Moreover, it has become a part of our personal lives. Recent developments in deep learning approaches and advancements in technology have tremendously increased the capabilities of visual recognition systems. As a result, computer vision has been rapidly adopted by companies. Successful use-cases of computer vision can be seen across the industrial sectors leading to widening the applications and increased demand for computer vision tools.

**Question-1**  **(23 Marks)**

Students need to perform following tasks :-

1. Implement the noise reduction for the noisy image Q1\_1.tif and submit your code and the denoised image.
2. Implement the histogram equalization to the input images Q1\_2.tif and Q1\_3.tif and submit your code and the output images.
3. Reduce the salt-and-pepper noise from the input image Q1\_4.tif and submit your code and the output image.
4. Extract the gradient parts from the input image Q1\_5.tif and submit your code and the output image.
5. Conclusion and Recommendation

**Preamble**

In [computer vision](https://en.wikipedia.org/wiki/Computer_vision), image segmentation is the process of partitioning a [digital image](https://en.wikipedia.org/wiki/Digital_image) into multiple segments ([sets](https://en.wikipedia.org/wiki/Set_(mathematics)) of [pixels](https://en.wikipedia.org/wiki/Pixel), also known as image objects). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and [boundaries](https://en.wikipedia.org/wiki/Boundary_tracing) (lines, curves, etc.) in images. More precisely, image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics.

**Question 2** **(10 Marks)**

A literature review is a comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research. The review should enumerate, describe, summarize, objectively evaluate and clarify this previous research.

**Literature review on segmentation techniques and its applications**

* 1. Introduction to the Segmentation techniques
  2. Identify and explain the appropriate pre-processing techniques.
  3. Identify and explain the appropriate Segmentation techniques.

**Question 3** **(17 Marks)**

Segmentation is often the critical step in computer vision. If segmentation is done well then all other stages in computer vision are made simpler.

**Perform segmentation of the object of interest in the image.**

* 1. Perform pre-processing on the images of the created dataset.
  2. Perform segmentation to segment the image.
  3. Results and Discussions.