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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Medical Electronics Engineering **Duration: 3 hrs.**
Course Code: 19ML6PCMIP **Max Marks: 100**
Course: Medical Image Processing **Date: 05.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as

			UNIT - I	*CO*	*PO*	Marks
1	a)		Illustrate with examples some of the basic relationship that exists between the pixels.	*CO1*	-	**09**
	b)		Specify the steps involved in converting colors from HIS color model to RGB color model. Suppose RGB color triplet for a particular color is given by (0.3,0.5,0.2). Convert RGB to HIS triplets.	*CO2*	*PO1*	**07**
	c)		Identify and explain the need of computers for analyzing the biomedical images.	*CO1*	-	**04**
			UNIT - II			
2	a)		Examine the type of basic intensity transformation required to highlight the contribution made to the total image appearance by specific bits.	*CO2*	*PO1*	**05**
	b)		Consider an image of size 64x64 pixels which is 3 bit image having the following intensity distribution. r_k: 0, 1, 2, 3, 4, 5, 6, 7 n_k: 790, 1023, 850, 656, 329, 245, 122, 81 Perform the histogram equalization.	*CO2*	*PO1*	**09**
	c)		Can we use second derivative for image sharpening? Justify your answer.	*CO2*	*PO1*	**06**
			OR			
3	a)		Identify and explain the basic intensity transformation suited for the following applications. i) To enhance white/gray detail embedded in dark regions of an image ii)To expand the values of dark pixels while compressing the higher level value pixels in an image	*CO2*	*PO1*	**06**

		b)	Apply 3x3 median filter, max filter and min filter on the image given in fig 3.b to obtain a filtered image. 5 1 2 6 7 4 4 7 5 8 2 6 20 6 7 3 1 2 4 5 10 2 1 2 3 fig 3.b	*CO2*	*PO1*	**06**
		c)	Explain the fundamentals of spatial filtering with relevant examples.	*CO2*	-	**08**
			UNIT - III			
	4	a)	Develop a frequency domain filter to improve the appearance of an image by simultaneous intensity range compression and contrast enhancement.	*CO2*	*PO1*	**10**
		b)	Distinguish between the different frequency domain image smoothing filters.	*CO2*	-	**10**
			UNIT - IV			
	5	a)	Discuss any four filters that can be used to restore an image which is degraded only due to additive random noise.	*CO2*	*PO1*	**08**
		b)	Explain the algorithm to restore an image by using adaptive median filter.	*CO2*	-	**08**
		c)	How image restoration is different from image enhancement.	*CO2*	-	**04**
			UNIT - V			
	6	a)	Suggest methods to detect isolated points and lines in an image.	*CO2*	-	**10**
		b)	Explain the simple descriptors that gives information about the boundary of a region.	*CO2*	-	**10**
			OR			
	7	a)	Exemplify the region growing algorithm based on 8-connectivity and 4-connectivity.	*CO2*	*PO1*	**08**
		b)	Summarize the procedure involved in region splitting and merging segmentation technique, with a suitable example.	*CO2*	*PO1*	**06**
		c)	Discuss the use of Chain code and Shape number w.r.t. suitable example.	*CO2*	*PO1*	**06**

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