Assignment on Image Classification and Related Topics

Assignment Instructions

1. **Introduction to Image Classification (2+4+4 points)**
   - Define Image Classification.
   - Explain its significance in modern applications.
   - Provide examples of real-world use cases.
2. **Image Segmentation (5+5+5 points)**
   - Define Image Segmentation.
   - Differentiate semantic segmentation and instance-based segmentation.
   - Illustrate examples of each type.
3. **Object Detection Models (5+20+5 points)**
   - Define Object Detection and describe its role in computer vision.
   - Provide an overview of the progression from R-CNN to Fast R-CNN, Faster R-CNN, and YOLO.
   - Highlight key improvements in each model.
4. **Architectures: ResNet, GoogleNet, and RetinaNet (5+5+5 points)**
   - Describe the architecture and key components of ResNet.
   - Explain the motivation and structure of GoogleNet.
   - Provide an overview of RetinaNet and its contributions to object detection.
5. **Application Scenario (30 points)**
   - Choose one model (e.g., YOLO or ResNet) and explain how it would be used to solve a specific problem in any industry (e.g., healthcare, security, autonomous vehicles).
   - Provide a step-by-step outline of how the model would be implemented.

Rubric for Evaluation

1. **Clarity and Depth of Explanation (20 points)**
   - Clear, concise definitions and explanations.
   - Inclusion of appropriate examples.
2. **Technical Accuracy (20 points)**
   - Correct description of concepts, architectures, and methods.
   - Accurate explanation of model improvements and comparative metrics.
3. **Illustrations and Diagrams (10 points)**

- Inclusion of diagrams where applicable (hand-drawn).
- Diagrams must be labeled and used appropriately to support explanations.

4. **Comparative Analysis Quality (10 points)**
   - Thorough comparison of models with insightful distinctions.
   - Clear presentation of advantages and disadvantages.
5. **Application Scenario (10 points)**
   - Practicality and relevance of the chosen model's application.
   - Comprehensive and step-by-step approach.

Guidelines for the Handwritten Assignment

1. **Format and Presentation:**
   - The assignment must be handwritten neatly on plain or ruled sheets.
   - Use blue or black ink for writing. Diagrams may be drawn with a pencil for clarity.
   - Ensure all pages are numbered and your name, roll number, and course name are mentioned on the top-right corner of each page.
2. **Content Requirements:**
   - Address each topic/question in sequence as outlined.
   - Provide clear definitions, explanations, and examples.
   - Support explanations with diagrams where relevant. Label all diagrams accurately.
3. **Language and Clarity:**
   - Write legibly and coherently.
   - Use technical terms accurately and provide explanations where necessary.
   - Avoid unnecessary jargon. Keep explanations simple, clear, and precise.
4. **Length and Structure:**
   - Provide detailed responses that convey in-depth understanding.
   - Use bullet points for lists and organize content logically with headings/subheadings.
5. **Citations and References (if applicable):**
   - If referring to specific research papers, books, or online resources, include a reference list at the end.
   - In-text citations are not required but references should acknowledge external material.
6. **Academic Integrity:**
   - Ensure the work submitted is your own.
   - Plagiarism in any form is prohibited and will incur penalties.
7. **Submission Requirements:**
   - Submit the assignment by 12 PM, 18/11/2024.
   - Late submissions will not be allowed unless justified with prior approval.
8. **Assessment Criteria:**
   - Refer to the rubric for detailed marking criteria.

- Focus on clarity, technical accuracy, illustrations, comparative analysis, and application scenarios.

9. **Additional Instructions:**
   - Contact your instructor for any questions or clarifications well in advance.
   - Proofread your assignment for errors or omissions before submission.