Final Project, Phase 2

DESCRIPTION:

For this phase of final project, you are required to submit:

- An IEEE paper format with **5 pages max** covering:
  - The final design of your project, and if any of the blocks employed in phase I has been changed you need to discuss why this change occurred.
  - The results and discussion of the results. The discussion should include a mini critique of the results and algorithms employed in this project.
  - The paper should contain:
    - **Abstract:**
      1) consist of 1 paragraph describing the motivation for your paper and a high-level explanation of the methodology you used/results obtained.
    - **Introduction:**
      1) Explain the problem and why it is important. Discuss your motivation for pursuing this problem.
      2) Give some background if necessary.
      3) Clearly state what the input and output is.
    - **Related work:**
      Share the literature review for your problem, i.e.: what are the different studies that tackled this same problem.
      You should find existing papers, group them into categories based on their approaches, and discuss their strengths and weaknesses, as well as how they are similar to and differ from your work. What's the state-of-the-art?
      1) Google Scholar is very useful for this: https://scholar.google.com/ (you can click "cite" and it generates MLA, APA, BibTeX, etc.)
    - **Dataset and Features:**
      1) Describe your dataset: how many training/validation/test examples do you have? Is there any preprocessing you did? (Denoising, Segmentation...) What about normalization or data augmentation? What is the resolution of your images?
      2) Show some examples from your dataset.
    - **Methods:**
      1) Describe your learning algorithms.
      2) Show a **block diagram** of your methodology. If used multiple algorithms, for each algorithm, give a short description of how it works.
      3) Make sure to include relevant mathematical notation. For example, you can include the loss function you are using.

- **Experiments/Results/Discussion:**
  1) Give details about what (hyper)parameters you chose and how you chose them.
  2) What your primary metrics are: accuracy, precision, AUC, etc. Provide equations for the metrics if necessary.
  3) If you are solving a classification problem, you should include a confusion matrix or AUC/AUPRC curves.
  4) You should have both quantitative and qualitative results. Include visualizations of results, your plots should include legends, axis labels, and have font sizes that are legible when printed.
- **Conclusion/Future Work:**
  1) Summarize your report and reiterate key points. Which algorithms were the highest performing? Why do you think that some algorithms worked better than others?
  2) For future work, if you had more time, more team members, or more computational resources, what would you explore?
- **References:** This section is not included in the 5-page limit and should include citations for:
  1) Any papers mentioned in the related work section.
  2) Papers describing algorithms that you used which were not covered in class.
  3) Code or libraries you downloaded and used. This includes libraries such as scikit-learn, etc.
  4) Any choice of citation style is acceptable as long as you are consistent.
- **Contribution:** This section is not included in the 5-page limit. This section should describe what each team member worked on and contributed to the project.

- **Working source code**

GENERAL INSTRUCTIONS:

- This is a group-based assignment, the group is formed of 4 at max.
- The **paper and working code** should be submitted through Classroom.
- The due date for the submission of this phase is Friday, 16/05/2024.
- You are permitted to discuss the following problems with others in the class. However, you must write up your own solutions to these problems. Any indication to the contrary will be considered an act of academic dishonesty. Please Review the definition of cheating in the first presentation.

Best Regards,

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