CMPE/CMSE 424 Introduction to Image Processing
(Fall 2024/2025)
Information on Term Project

Term project of CMPE/CMSE 424 course will be prepared, submitted and presented by a group of 3 or 4 students. The steps of the project that students will follow are as follows:

Part 1 - Step1: Due: (October 8, 2024 Tuesday) GROUP MEMBER AND TOPIC SELECTION

Each student will select his/her group members and a project topic. The topics will be selected among the topics listed below. Each group may select one topic. The topics are:

1. Digital image processing applications in medicine
2. Digital image processing applications in astronomy
3. Digital image processing applications in industry
4. Digital image processing applications in remote sensing
5. Digital image processing applications in law enforcement
6. Digital image processing applications in biology
7. Digital image processing applications in defense
8. Digital image processing applications in geography (pollution)
9. Digital image processing applications in meteorology (weather forecasting)
10. Digital image processing applications in machine perception (character recognition, ...)
11. Digital image processing applications in environmental science (global warming, ecology, ...)
12. Image Enhancement
13. Image Restoration
14. Image Compression
15. Noise Removal
16. Image Filtering
17. Color image processing
18. Texture processing/classification
19. Image and Video Watermarking
20. Image Segmentation
21. Plant Recognition from Leaves
22. Plant Disease Classification Using Image Processing Techniques
23. Defect Detection (on products such as textile, eggshell, peanuts, ...)
24. Animal Recognition Using Facial Images
25. Lane Detection (roads)
26. Automated license plate recognition (cars)
27. Object Recognition

Part 1 - Step2: Due: (October 22, 2024 Tuesday) PROPOSAL SUBMISSION

Related to the topic chosen, each student will search for 1 recent article (3 or 4 articles will be selected for each group) published in 2014 - 2024 in an international refereed journal. These articles may be chosen from a journal listed below:

- IEEE Transactions on Image Processing
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Medical Imaging
- IEEE Transactions on Information Forensics and Security
- Computer Vision and Image Processing
- IEEE Access
- IET Image Processing
- IET Computer Vision
- IET Biometrics
- Signal, Image and Video Processing (Springer)
- Pattern Recognition (Elsevier)
- Pattern Recognition Letters (Elsevier)
- Digital Signal Processing (Elsevier)
- Image and Vision Computing (Elsevier)

- EURASIP Journal on Image and Video Processing
- Journal Of Visual Communication And Image Representation (Elsevier)
- Journal Of The Optical Society Of America A-Optics Image Science And Vision
- Journal Of Signal Processing Systems For Signal Image And Video Technology (Springer)
- Journal Of Real-Time Image Processing (Springer)
- Signal Processing-Image Communication (Elsevier)
- International Journal Of Computer Vision (Springer)
- Journal Of Mathematical Imaging And Vision (Springer)

Then each group will write <u>1 page Proposal</u> and submit its <mark>printed form</mark> and the <mark>hard copy</mark> <u>of the selected articles</u> in the following format in a <mark>colored folder</mark>:

The proposal page should be in the following format:

CMPE/CMSE 424 – Introduction to Image Processing
Term Project Proposal

Project Group Number: ....
Selected Topic Number and Name: ....
Group Members (Std.No, Name-Surname):

        ....
        ....
        ....
        ....

Selected Articles:
1. ....
2. ....
3. ....
4. ……………………………………………….

At the bottom of the above proposal, the format of the article information will be as follows:

<u>Format:</u> Author names, **Article Title**, Journal Name, Volume&Issue numbers, page numbers, **Year of Publication**. (Total number of pages)

<u>Example Article:</u>
L.Ma, T.Tan, Y.Wang, D.Zhang, **Efficient iris recognition by characterizing key local variations**, IEEE Transactions on Image Processing, Vol.13, No.6, pp.739-750, **2004**. (12 pages)

<u>Project Grading:</u> (Proposal: 5 pts, Slides: 3 pts, Presentation: 6 pts, Report: 6 pts – TOTAL: 20 pts)

Part 2: Due: (2-24 December 2024) : Term Project Presentations File Submission and Presentations
Term project of CMPE/CMSE 424 course will be prepared, submitted and presented by each group. The steps of the project (part 2) that students will follow are summarized below.

Each group will prepare a PowerPoint presentation and one student from each group will submit it by e-mail to the instructor 1 day before the presentation date until 22:00 (Late submissions will get reduction for all members of the group from the presentation grade.)
The subject of the e-mail must be "CMPE/CMSE 424 Term Project Presentation".
The name of the file must be written as follows:
(**FILENAME: PrjGr#_Topic#_ShortTopicTitle.pptx**) (include your own project group number and your own topic title into the file name !!!). For example: **PrjGr1_Topic6_DIPinBiology.pptx.**

Each group should prepare 1 pptx file including 8-10 slides as follows:
1. Slide #1 (Course code and course title; group member names, surnames, student numbers; project group number and project topic name)
2. Slide #2 (Outline of the presentation: point-by-point)
3. Slide #3-4 (Definition of the topic in general in 2-3 statements only)
4. Slide #5 (List of 4-5 Previous Works on that topic (except selected articles): put references only in chronological order (according to publication year))
5. Slide #6-7 (Summary of 1st/2nd articles)
6. Slide #8-9 (Summary of 3rd/ 4th articles (if any))
7. Slide #10 (Comparison of articles: state which article is the best/worst and why)

The oral project presentations of the term projects (**25 minutes** for each group) will start on **3 December, 2024** (in lecture hours in the classrooms). The schedule of presentation sessions and group numbers will be as follows and group numbers for each session will be decided later:

Session#	Date & Time	PrjGr#	PrjGr#	PrjGr#
1	3.12.2024 Tuesday 14:30			
2	4.12.2024 Wednesday 10:30			
3	10.12.2024 Tuesday 14:30			
4	11.12.2024 Wednesday 10:30			
5	17.12.2024 Tuesday 14:30			
6	24.12.2024 Tuesday 14:30			

Part 3: Due: (30 December 2024 Monday) Final Report

Related to the selected project topic and using the selected articles, each group will search on the selected topic and the previous work done on the corresponding topic. In other words, the students will prepare at most 1 page information on the selected topic and 2 page summary on the state of the art of the selected topic, e.g. what was done before on this topic, which methods were used and applied by whom (the authors) and in which year these methods were applied and the success rate of the corresponding methods must be summarized.

Each student will study his/her selected article to give a summary on the work done for that article. The summaries of each article must include the method(s)/approach(es)/technique(s) used in the corresponding article, the success rate compared to other methods/approaches and advantages and disadvantages of the methods used (if exist). In other words, the students will prepare the final report including the summary of each selected paper. Then the students will write the summaries of each paper and a comparison among these articles.

The **<u>Final Report</u>** must be submitted in <mark>hard copy</mark>. The format of the final report should be as follows:

CMPE/CMSE 424 – Introduction to Image Processing
Term Project Final Report

Project Group Number: ....
Selected Topic Number: ....
Selected Topic: ....

<u>Group Members:</u>
1. StudentNumber   Name-Surname
2. ……………………………………
3. ……………………………………
4. ……………………………………

<u>Selected Articles:</u>
    1.   ....
    2.   ....
    3.   ....
    4.   …………...

(Page 1)

Information About (The Selected Topic)

...

...

(Page 2)

Summary of Previous Work Done

....

....

Additional References:

1. ....
2. ....

(Pages 3-4)

Summary of Article#1
(*Reference of article...*)

....

.... *(Page 5)*

Summary of Article#2
(*Reference of article...*)

....

.... *(Page 6)*

Summary of Article#3
(*Reference of article...*)

....

.... *(Page 7)*

Summary of Article#4
(*Reference of article...*)

....

.... *(Page 8)*

(Pages 5-8)

Comparison of Articles

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....

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....

(Page 9)

If the selected articles are not enough to find the related information on the topic and the previous work done on the selected topic, the students may find other appropriate journal or conference papers and write their references as additional reference at the end of this report. Note that these additional articles must be included in the report as "Additional References".

The format of the article information in the fist page and in Additional References in the third/fourth page will be as follows:

Format: Author names, **Paper Title**, Conference/Journal Name, Volume&Issue numbers (for journal), Place (of Conference), page numbers (for journal), **Year of Publication**. (Total number of pages)

Journal Paper Example:
L.Ma, T.Tan, Y.Wang, D.Zhang, **Efficient iris recognition by characterizing key local variations**, IEEE Transactions on Image Processing, Vol.13, No.6, pp.739-750, **2004**. (12 pages)

Conference Paper Example:
J.Cui, Y.Wang, J.Huang, T.Tan, Z.Sun, **An iris image synthesis method based on PCA and super-resolution**, International Conference on Pattern Recognition (ICPR'04), Cambridge, UK, **2004**. (4 pages)