Natural Language Processing

Project (Spring 2024-2025)

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It is required to develop a project using the Artificial Intelligence (AI) and the Natural Language Processing (NLP) techniques.

- **Team Members**: group of **5** students.
- **Important Dates**: Table 1 illustrates the due dates for this project.

Table 1: Due Dates.

	Required Task	Details	Date
1	Project Team and Project Plan	Submit a word or pdf document on Moodle website includes: 1. Names of students in the team. 2. Project description and sub-tasks.	Saturday **15/3/2025** at 11:59 pm.
2	Project Submission	Submit a ZIP file on Moodle website includes: 1. The project source code. 2. The project documentation. 3. A video demonstrates how the project works. 4. A power point presentation about your project.	Friday **9/5/2025** at 11:59 pm.
3	Project Discussion	**Note**: **Each student in the team should implement one algorithm from the required algorithms**. **Project Discussion**. Attend a Face-to-Face discussion in the center according to the schedule that will be submitted to you later. **Note**: discussion attendance is **mandatory** to get a grade for the project.	From Saturday **10/5/2025** to Tuesday **13/5/2025**.

Project Details:

Develop a simple application (Image Caption Generator) with graphical user interface (GUI).

Input: upload one image.

Output:
- For each image caption generation algorithm, display caption (or description) for the uploaded image written in English along with the Arabic translation for this caption generated from the translation algorithm.

Required Tasks:
1. **Pre-Processing Phase**:
   - Any pre-processing tasks you can do to the input image before starting the processing phase.
2. **Processing Phase**:
   Use the image caption generator to generate caption for the input image in English then use the machine translator to translate this caption to equivalent caption in Arabic.
   a. **Image Caption Generator**: Image caption generation is a process of **recognizing the context of an image and annotating it with relevant captions using deep learning and computer vision**.
   b. **Machine Translation** (between English and Arabic): Creating a machine translation system from bilingual corpora containing translation examples.
3. **Post-Processing Phase**:
   - Any modifications you can do to the output description before displaying it to the user.

Guidelines:
- Select and use suitable datasets for the required tasks, split data into train and test sets, use **5** machine learning and/or deep learning algorithms for the required tasks, then compute the accuracy for the used **five** algorithms.
  - Use **4** different algorithms for the image caption generation task and use **1** algorithm for the machine translation task such that each student in the team is responsible to implement one of these algorithms.

Important: The project documentation should include the datasets and algorithms details along with the computed accuracies for the five algorithms.