**Car Accident Detection Model**

To reduce the intervention time during road accident, the ‘SPF Mobility and transport’ decide to launch a new project. Use a ***live car accident on the traffic cam*** installed in the city of Brussels.

**Project Description:**

The aim of this project is to develop an ***intelligent car accident detection system*** leveraging machine learning techniques. The system should detect any accident in live video.

**Objectives:**

1. *Data Preprocessing*: The dataset provide for the project contain images and some videos sequence of traffic road.
2. *Feature Engineering*: Extract meaningful features from the provided data to represent different types of driving behaviors and events.
3. *Machine Learning Model Development*: Build and train a machine learning model capable of detecting and classifying car accidents based on the generated features.
4. *Model Integration and Real-time Detection*: Integrate the trained model into a real-time detection system to identify potential accidents using incoming sensor data.
5. *Evaluation and Testing*: Evaluate the accuracy, precision, and recall of the model in detecting accidents. Test the system using simulated or real-world scenarios to validate its effectiveness.

**Key Tasks:**

1. *Data Collection and Processing*: You can add any other dataset to the provided dataset. But keep in mind to introduce the dataset you add in the document you will write.
2. *Feature Extraction and Selection*: Identify and extract pertinent features from the sensor data that could indicate potential accidents or unusual driving patterns.
3. *Model Training*: Utilize supervised learning techniques to train a classification model capable of recognizing accident patterns from the selected features.
4. *Real-time Integration*: Develop a real-time system that can continuously process a video to detect accident.
5. *Testing and Validation*: Evaluate the model's performance using appropriate metrics and conduct comprehensive testing to ensure the accuracy and reliability of the detection system.

**Expected Deliverables:**

At the end of you project in the respected delay, you will deliver (directly on <https://exams.ecole-it.com>) *a zip file* containing:

1. *Trained machine learning model and code source (any notebook)* capable of accurately detecting car accidents.
2. *Detailed* *documentation (docx, md or latex)* of data preprocessing, model development, and model improvement.

Between 2 to 10 pages describing any steps used to solve each problems, and any additional features (improvements) you did.

Used the following specification:

For title:

font=Times New Roman,

size=16,

style=Bold, center, underline.

For paragraph:

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size=12,

style=justify.

1. *Presentation (pptx, canvas, Prezi)* summarizing the project's objectives, methodologies, results, and challenges faced.

RESPECT THE DEADLINE MENTION ON <https://exams.ecole-it.com>

**Skills and Technologies Involved:**

* *Data preprocessing* and *feature engineering,*
* *Machine learning algorithms* (classification models like Random Forest, SVM, or Neural Networks),
* *Python programming language and relevant libraries/*frameworks (e.g., Pandas, Scikit-learn, TensorFlow),
* *Real-time data processing* and *system integration*.

**Evaluation Criteria:**

The project will be evaluated based on the following criteria:

1. The *functionality and usability* of the Model **(60 pts)**,
2. The *documentation* *quality* **(10 pts)**,
3. The *presentation* of the *project's outcomes* **(20 pts)**,
4. All *improvements* you did on your project (only if *it is well documented*) **(10 pts)**.

**Resources:**

Access to the provided :

1. *The dataset* : do not work on the git, fork the dataset on your git before make any changes,
2. *Programming tools* : be careful only those listed,
3. *Libraries* : be careful only those listed,
4. *Mentorship & support* : I will be available throughout the project duration.

**Recommendations**:

You can use any knowledges and materials you got during your courses (all level included) at Ecole-IT or eithers to make your project.

You can cross borders and propose more features in your project, but just keep in mind to include it in the document. Any improvements not documented will not be considered.

Citations and references are highly recommended. Source code and Capture are not welcome in your documentation.

Believe you can and you will.

**GOOD LUCK !!!**