

Background

Edison Cars AG performed quality control manually in previous years, as employees inspected and evaluated the car parts. As a result, their quality control is built on the knowledge of their experienced employees. Following the switch to the production of electric cars and a shortage of skilled employees, Edison Cars AG aims to automate quality control and management. To achieve the best results, they plan to introduce a computer vision system in their final production step due to recurring damage caused by scratches after mounting car parts on the backside. The system should detect if there is a scratch on the backside of the car. Based on the detection, the system should be capable of determining the coordinates of the scratch and recommend ways of dealing with it.

Dataset

You are provided with a dataset including 60 pictures of the back of the car, with scratches in different positions.

Task

Follow the provided instructions to start the offered Jupyter Notebook. Then, use the provided Jupyter Notebook to create and train your custom model for scratch detection on the cars.

Input

For this task, you will be provided with the following:

- Dataset with pictures of cars with scratches
- Instructions on setting up your custom object detection using YOLOv8.
- Further information for object detection and machine learning: These are possible approaches that have different advantages and disadvantages. Of course, you can also use other approaches and resources:
 - Code quality: browserstack.com
 - Object detection using YOLOv8: <https://yolov8.com/>

Submission

The following documents must be emailed to s3g@fim-rc.de as one zip folder by 10:00 am on 10.06.2024:

- Code file(s) to reproduce the results. Should the setup of a special environment or packages be necessary, a step-by-step guide is also needed
- The export of your model
 - Please export your model as a .pt-file according to this instruction: <https://docs.ultralytics.com/de/modes/export/#usage-examples>
 - Please also send the used versions of packages and libraries
- A PowerPoint presentation explaining your approach. You should be able to present your approach in the next lecture.

Keep in mind

The content provided here serves only as a starting point. Feel free to use your own approaches and algorithms to get the best possible object detection. Use only the dataset provided.

The following aspects are important for the assessment of your submission:

- Code quality: The code must be executable, readable, commented, and adhere to the output format
- Detection accuracy: The accuracy will be tested on a hidden test set.
- Explanation of the approach should be understandable