Driver's condition detection system using multimodal imaging and machine learning algorithms

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Project goal

The project's aim is to create, test, and improve a driver condition detection system using multimodal imaging and machine learning algorithms. The driver's condition is classified as tired or untired.

Intelligent driver assistance systems are becoming more crucial to keeping people safe on the road. According to EU guidelines, such systems must be installed in automobiles. As part of this project, an innovative system comprised of at least two cameras: RGB and thermal, as well as software implementing the designed and tested machine learning algorithms assessing, for example, a person's activity, temperature, breath frequency, and other parameters, should be developed.

Achieved results

1. Conducting a systematic literature review and becoming familiar with existing solutions for detecting driver fatigue.
2. Access to three data sets was granted: YAWDD, INVEDRIFAC, and NTHU-DDD.
3. Preliminary data analysis and experiments on the detection of distinguishing facial features.
4. Developed and proposed system architecture.
5. Becoming acquainted with the Google Coral platform.
6. Design of the simulation stand and data collection procedures for measuring the driver's face image (pedals + steering wheel).

Further work

1. Preparation of our own dataset based on recordings made with RGB and thermal cameras.
2. Designing and building a module based on the Google Coral platform for installation inside a vehicle.
3. Implementation of the system in accordance with the proposed architecture.
4. Training of the implemented model on our own data and public datasets.
5. Testing the system in controlled environment.
6. Testing the system in a real-world setting.
7. Preparation of a scientific publication based on the obtained results.

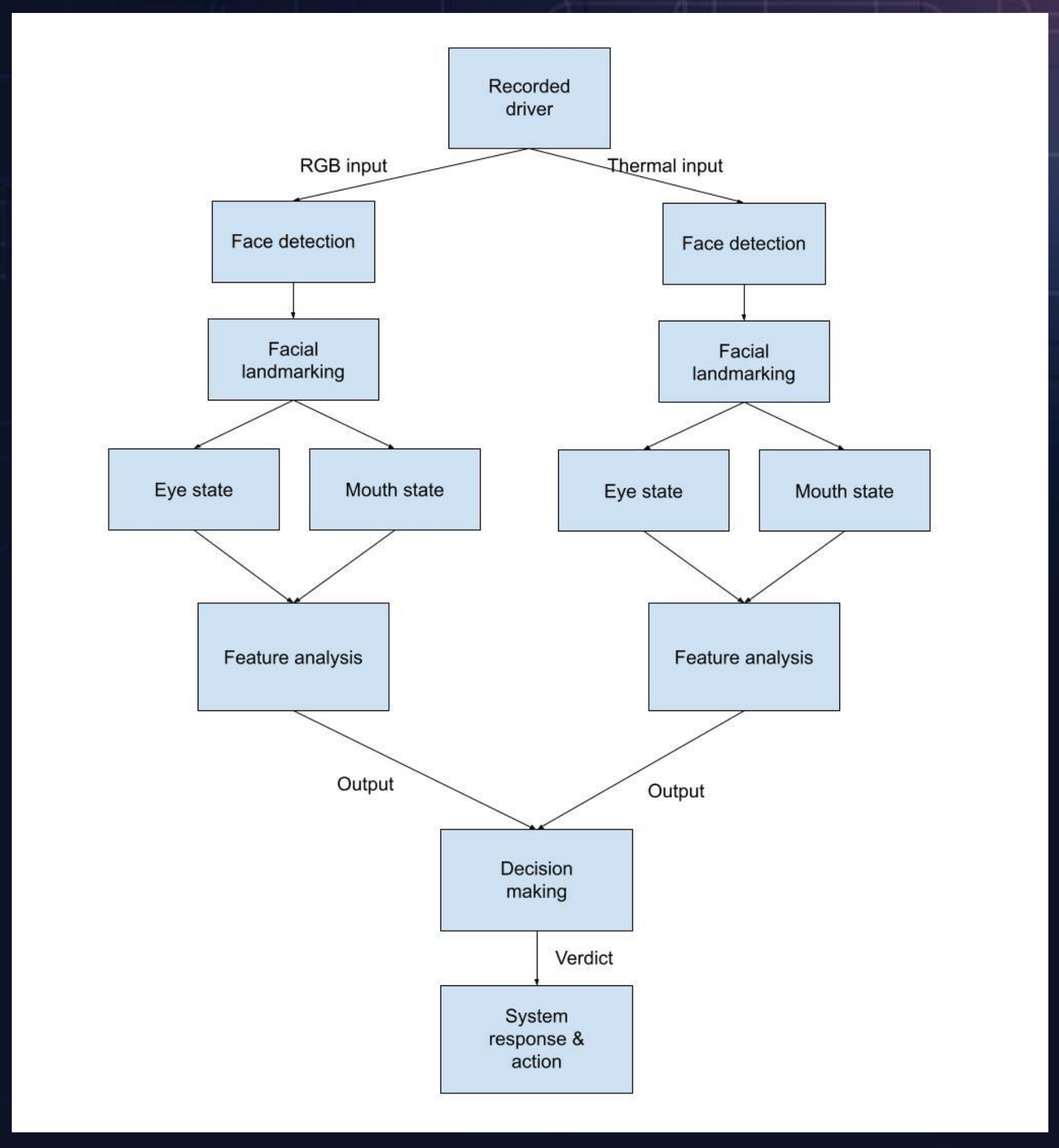

Fig. 1. Proposed system architecture

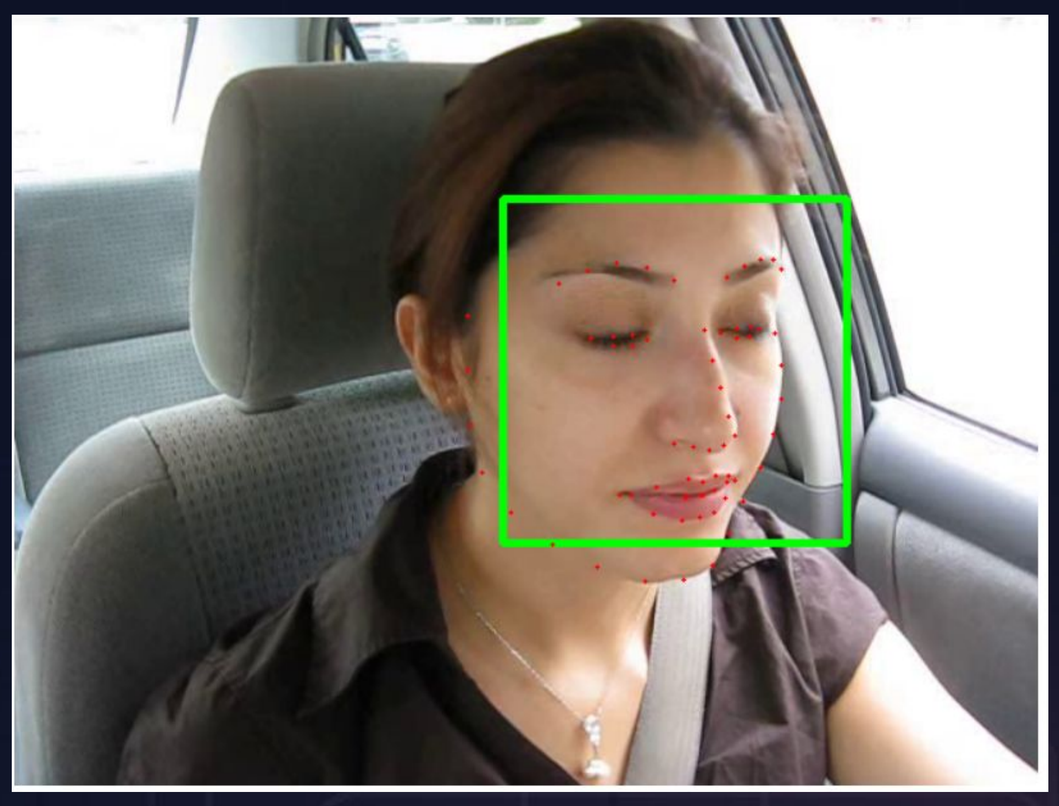

Fig. 2.Detection of facial points on a driver’s face

Projekt współfinansowany ze środków Unii Europejskiej w ramach Europejskiego Funduszu Rozwoju Regionalnego.
Program Operacyjny Polska Cyfrowa na lata 2014-2020.
Oś priorytetowa nr 3 „Cyfrowe kompetencje społeczeństwa”, działanie nr 3.2 „Innowacyjne rozwiązania na rzecz aktywizacji cyfrowej”.
Tytuł projektu: „Akademia Innowacyjnych Zastosowań Technologii Cyfrowych (AI Tech)”.