INSA
EURO-MÉDITERRANÉE

TASK 2: "DESIGN OF AN AUTOMATIC PARKING SYSTEM FOR A SMART CAR"

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Requirements Specification

Overall description of Task 2:
Intelligent parking of the autonomous vehicle: Parking smart car in a small space, which requires a series of forwarding and backward movements that prove to be a complicated task for most drivers.

1- Client Requirements:

ID	*Requirement Text*
2.1.1	The system must be able to measure different distances necessary for the automatic parking of the vehicle.
2.1.2	The flow of information coming from different sensors must offer results more readable and easy to process.
2.1.3	Detection of the dimensions of the parking space.
2.1.4	Design a system of measurements of the distances necessary for the automatic parking based on the CAN bus.
2.1.5	Design the necessary algorithms for parking automatic vehicle.
2.1.6	Development of the automatic parking application of the vehicle on an embedded platform.
2.1.7	The data must be displayed in an HMI interface of the dashboard.

2- System Requirements:

2.1 - Software requirements specification (SRS):

ID	*Requirement Text*	*Related client spec ID*
Functional		
2.2.1	• The system can detect an obstacle.	2.1.1
2.2.2	• The system can detect an empty parking space (fits the size of the car).	2.1.1
2.2.3	• The system must be able to measure different distances necessary for the automatic parking of the vehicle.	2.1.5
2.2.4	• The system can choose the right type of parking (Parallel parking /Angle parking / Perpendicular parking).	2.1.3/2.1.5
2.2.5	• The system can park successfully.	2.1.5
2.2.6	• The user can take control of the system.	2.1.7
Non-functional		
2.2.7	• The system can parallel park successfully.	
2.2.8	• The system can Angle park successfully.	
2.2.9	• The system can Perpendicular park successfully.	
2.2.10	• The IHM should display the rear of the car and potential obstacles.	
2.2.11	• The IHM gives the user data about the distance between every obstacle.	
2.2.12	• The IHM should give the user the option to take over the system.	

2.2 - Hardware Requirements:

ID/Number	*Requirement Text*	*Related client spec ID*
2.3.1	• CAN bus modules	2.1.4
2.3.2	• MicroController	2.1.6
2.3.3	• Rear Camera	2.1.3
2.3.4	• IHM touch screen	2.1.7 / 2.1.6
2.3.5	• Distance sensors	2.1.1/2.1.2/2.1.3

Glossary:

IHM……..…….…..... Interface Human Machine
CAN..……...……..Controller Area Network
OpenCV……...….....Open Computer Vision
AUTOSAR……...……..…Automotive Open System ARchitecture
MISRA C……...……....Motor Industry Software Reliability Association
SDLC….……...……...……..…..…Software Development Life Cycle
SRS….……...……....….....…….Software requirements specification