Customer Requirements Specification

**Speed Bump ML**

**ـــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــ**

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# **Document Status:**

|  |  |  |
| --- | --- | --- |
| **Name** | PO\_SB\_CRS\_ML | |
| **Version** | V1.2 | |
| **Status** | Released | |
| **Author** | SS | |
| **Date** | [2-12-2022] | |
| **Team approval** | MO | Approved |
| **Mentor approval** | EA | Approved |
| **Final approval** | EA | Approved |

## Document History:

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Author** | **Date** | **Change** |
| 1.0 | SS | [29-10-2022] | Initial Creation |
| 1.0 | MO | [31-10-2022] | Adding system context |
| 1.0 | AA | [31-10-2022] | Adding requirements  PO\_SB\_CRS\_*00***1**-V1.0 PO\_SB\_CRS\_*00***2**-V1.0 PO\_SB\_CRS\_*00***3**-V1.0 PO\_SB\_CRS\_*00***4**-V1.0 PO\_SB\_CRS\_*00***5**-V1.0 |
| 1.0 | MO | [22-11-2022] | Modifying :  System context  and Requirements :  PO\_SB\_CRS\_*001*-V1.0  PO\_SB\_CRS\_*00***2**-V1.0  PO\_SB\_CRS\_*00***3**-V1.0  PO\_SB\_CRS\_*00***4**-V1.0  PO\_SB\_CRS\_*00***5**-V1.0  PO\_SB\_CRS\_*00***6**-V1.0  PO\_SB\_CRS\_*00***7**-V1.0  PO\_SB\_CRS\_*00***8**-V1.0 |
| 1.1 | SS | [30-11-2022] | Adding requirements :  PO\_SB\_CRS\_**009**-V1.0  INFO\_PO\_SB\_CRS\_*001*-V1.0  INFO\_PO\_SB\_CRS\_*00***2**-V1.0  Modifying Requirements :  PO\_SB\_CRS\_*001*-V1.1  PO\_SB\_CRS\_*00***2**-V1.1  PO\_SB\_CRS\_*00***3**-V1.1  PO\_SB\_CRS\_*00***4**-V1.1  PO\_SB\_CRS\_*00***5**-V1.1  PO\_SB\_CRS\_*00***6**-V1.1  PO\_SB\_CRS\_*00***7**-V1.1  PO\_SB\_CRS\_*00***8**-V1.1 |
| 1.2 | SS | [2-12-2022] | Requirements cleaning |

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### Reference Document:

|  |  |  |  |
| --- | --- | --- | --- |
| **Ref.number** | **Doc.Name** | **Version** | **Status** |
| 1 | PO\_SB\_CR\_ML | V1.1 | Released |

#### 

#### Project Description:

Definition:

A Deep learning model that detects the speed bumps on the road and estimates the distance between the car and the bump.

Features:

* Model that detects speed bumps on road.
* Estimate the distance between vehicle and bump.

Key Elements:

* The deep learning model shall contain algorithms for data mining.
* The deep learning model shall detect speed bumps using neural network
* The distance between the car and the bump shall be estimated.

System Context:

Shape

Description automatically generated with low confidence

CRS Requirements:

|  |  |  |  |
| --- | --- | --- | --- |
| **Req\_ID** | PO\_SB\_CRS\_*001*-V1.2 | **Covers** | PO\_SB\_CR\_*001*-V1.1 |
| **Description** | The Bump\_detection\_class shall resize the Input\_imgframes and generate INN\_Resized\_Frames | | |

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| **Info\_ID** | INFO\_PO\_SB\_CRS\_*001*-V1.0 |
| **Description** | The INN\_Resized\_Frames is an inner signal which is the output from data preprocessing process |

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| **Req\_ID** | PO\_SB\_CRS\_**002**-V1.2 | **Covers** | PO\_SB\_CR\_*00***2**-V1.1 |
| **Description** | Bump\_detection\_class shall detect bumps using the Deep learning model that takes INN\_Resized\_Frames as an input and generates the INN\_detected\_bump\_coordinates | | |

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| **Info\_ID** | INFO\_PO\_SB\_CRS\_*00***2**-V1.0 |
| **Description** | The INN\_detected\_bump\_coordinates is an inner signal which is the output from bump detection process. |

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| **Req\_ID** | PO\_SB\_CRS\_**003**-V1.2 | **Covers** | PO\_SB\_CR\_*00***3**-V1.1 |
| **Description** | After successful bump detection process , Bump\_detection\_class shall provide Distance Estimation Algorithm with INN\_detected\_bump\_coordinates to estimate the distance between the car and bump at detection time. | | |

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| **Req\_ID** | PO\_SB\_CRS\_**004**-V1.1 | **Covers** | PO\_SB\_CR\_*00***3**-V1.1 |
| **Description** | The Bump\_detection\_class shall return Output\_detectedBumpInfo to ECU. | | |