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Optimized driver presence detection

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OPTIMIZED DRIVER PRESENCE DETECTION

Technical task:

The task of the technical innovation is to optimize the driver presence detection.

Initial situation:

The driver presence is based on at least 3

Presence signals detected. The most common signals are:

- Drivers door
- Driver's belt
- Seat occupancy

The driver presence information is safety relevant because e.g. Upon detection of the absence of various systems are placed in their safe state, the vehicle is secured against rolling away and various driver warnings are displayed.

For reasons of robustness and safety, the 3 driver presence signals are evaluated via a 2out3 evaluation. The driver is e.g. recognized as absent if:

- Door and belt on
- Door open and seat not occupied
- Strap on and seat not occupied

The pure 2aus3 evaluation, the driver may be too early as absent recognized.

Example:

The driver unbuckles himself to take off his jacket for a moment and lifts his buttocks out of the seat for a short time. Or the driver opens the door, unbuckles himself but sits in his seat.

This can lead to various systems already setting their function (safer Condition), the driver may be warned even though he is still sitting in the vehicle and the vehicle is already secured, although the driver still has a driving intent.

Solution:

An additional functionality for the spreadsheet program automatically generates the totals formulas for a hierarchy selected on the worksheet, replacing a complex manual input.

The representation of the hierarchy can be done in the variants described above:

1. Hierarchy in columns
2. Hierarchy in columns with complete path specification for positioning in the graph
3. Hierarchy in a column with cell entries

The cell areas for which an automatic entry of the sum formulas can be selected by the user specifically. For example, it is necessary to specify a column in order to only enter the sum formulas of the node elements here. In the example shown, this is column D.

But also complex cell areas are possible. For example, one could specify that only in cells D4 and D10 formulas are to be entered.

In addition, the same functionality is possible with a horizontal hierarchical structure representation. Compared to the vertical structure shown here, the „ramification“ of the hierarchical structure is not shown down but to the right.

The technical innovation describes an optimization of the 2aus3 evaluation.

If it is detected by 2 signals that the driver may be absent, then the third signal is used for the evaluation.

If the third signal is indicative of driver presence (e.g., door closed) and a correct activity of that signal has already been detected in that drive cycle (e.g., door was once properly opened / closed), then the third signal becomes Driver presence with evaluated.

Example:

- Strap on
- Seat not occupied
 - > 2 out of 3 condition fulfilled
- Driver's door: Driver's door is closed and a correct opening / closing has been detected in this cycle.
 - > Driver is still recognized as present due to the door condition.

In addition to the pure 2aus3 evaluation, a validity signal is stored for each presence signal in each drive cycle. The validity signal is activated if a correct edge change from „open -> closed“ or „unassigned -> occupied“ has been detected in the drive cycle.

The validity signal is deleted after the end of the drive cycle.

If an absence is detected via the 2out3 evaluation, but the third signal still shows presence and is valid, a presence is still assumed.

This evaluation can also be used for other majority decisions:

- 3 out of 4
- 4 out of 6
- 5 out of 8 etc.

Advantages:

- Increased comfort with consistent safety and robustness.

Possible application:

- All vehicles with driver presence detection.