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Increasing automation reduces but does not eliminate car crashes

Title of the dissertation	How Passenger Cars Protect their Drivers and Should Cars be Protected from their Drivers: from Airbags to Automated Driving Kuinka autot suojaavat kuljettajiaan ja pitäisikö autoja suojata kuljettajiltaan: turvatyynyistä ajamisen automaatioon
Contents of the dissertation	<p>Passenger car safety technology has been under development for a long time, and new passenger cars are very safe. Currently, human drivers are responsible for driving, and several safety systems protect and support them.</p> <p>This dissertation examined how and how efficiently modern passenger cars can protect their drivers. On the other hand, the work also looked at those crashes that are the most difficult to prevent using current safety technology (up to SAE level 2 automation). The research was carried out as a statistical analysis using Finnish databases as material.</p> <p>The results show that drivers of passenger cars equipped with electronic stability control (ESC) cause fewer fatal (-58%) and injury (-29%) motor vehicle crashes than the drivers of the older, non-ESC cars. On the other hand, if a car is equipped with state-of-the-art active safety devices, its driver is estimated to cause one fatal crash per two billion kilometres when sudden illness attacks and suicides are excluded.</p> <p>Despite the automation, drivers are still able to cause crashes on purpose, and the safety system is unable to prevent active but erroneous driver input. In addition, adverse weather and road conditions are challenging not only for the driver but also for the current safety systems. Looking to the future, the results of this dissertation should provide ways to identify weaknesses in existing systems and, in turn, to develop better safety devices.</p>
Field of the dissertation	Machine Design, Vehicle Engineering
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Place of the defence	Aalto University School of Engineering, building K1, lecture hall 216, Otakaari 4, Espoo
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