

Safety, Communication, CyberSecurity

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Safety Issues in Human-Robot Interactions

Milos Vasic¹ and Aude Billard²

https://www.google.com/search?safe=active&source=hp&ei=TZzMXKL8OIqC0wLPnoaoCw&q=safety+issues+in+human-robot+interactions&oq=Safety+issues+in+Human+Robot+&gs_l=psy-ab.1.0.0i22i30.2809.10711..12825...1.0..0.130.2888.20j10.....0....1..gws-wiz.....6..35i39j0i131i0i67j0i20i263j33i22i29i30.f9QX71k65Gw

Braking distance algorithm for autonomous cars using road surface recognition

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<https://iopscience.iop.org/article/10.1088/1757-899X/263/6/062034>

February 7, 2018

Autonomous Driving and Collision Avoidance Technology

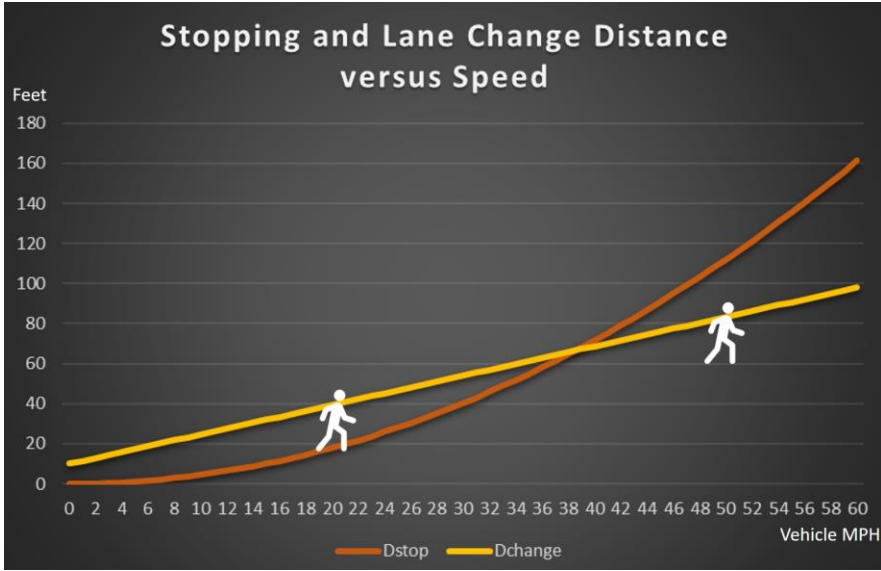
Implications for Bicyclists and Pedestrians

Will autonomous cars and automatic braking systems live up to their promise to improve public safety? Or will a rush to market flawed technology create greater peril for pedestrians and bicyclists?

<https://www.bikewalknc.org/2018/02/autonomous-driving-and-collision-avoidance-technology/>

Watch Video: <https://youtu.be/FTKxCE5qmQM>

2:31



Communication

Communication Technologies and Network Protocols of Automotive Systems

article.sciencepublishinggroup.com/pdf/10.11648.j.net.20180601.15.pdf

Abstract: Automotive industry has gone through rapid changes in the past few years. The usage of electronics and electronic control units (ECUs) have increased manifold, and this has also affected the way different subsystems communicate. This paper presents a survey of state-of-the-art and the most commonly employed communication technologies and protocols; both wired and wireless for in-vehicle and vehicle to vehicle (V2V) communication in the automotive systems.

The technologies such as LIN (Local Interconnect Network), CAN (Controller Area Network), MOST (Media Oriented Systems Transport), and Flexray are compared in terms of the performance, reliability, cost and protocol characteristics. The study shows that Flexray is an excellent network topology for in-vehicle communication that has higher degree of fault tolerance, and is suitable for hard real time systems with high bandwidth.

Moreover, wireless technologies i.e. Bluetooth, ZigBee, Wi-Fi and UWB are discussed that satisfy different requirements of diagnostics and multimedia communication for in-vehicle and vehicle to vehicle communication and can be used for advanced autonomous driving systems. The paper also presented issues that need to be addressed to fully realize the potential of these communication technologies and other advancements in automotive industry.

Keywords: Communication

Table 1. Comparison of Physical-layer Networking Technologies.

Technology	Automotive Domain	Subsystems	Speed	Advantages
Flexray	Car Backbone, X-by-Wire	Brake, Steering	10 Mbps	Time-triggered, Redundancy, Safety and Fault Tolerance
HS-CAN	Powertrain	Engine, Gearbox, ABS	1 Mbps	Event-triggered
LS-CAN	Body	Doors, Roof, Dashboard, Climate	125 Kbps	Event-triggered
LIN	Body	Electric seats, Windows, Mirrors	20 Kbps	Economical, Low-complexity



The prospect of an army of robots marching in unison to launch an attack on an unsuspecting city belongs in the realm of science fiction—as do most images of menacing autonomous machines wreaking all kinds of havoc on civilization.

That's not to say robotics is free from security and safety threats, however. In fact, experts say the growing use of robots by companies such as manufacturers, retailers, healthcare institutions and other businesses can present a number of cyber risks.

<https://www.csoonline.com/article/3139448/robots-present-a-cyber-risk.html>

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Duties and Responsibilities:

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- Writing performant and maintainable code in C++
- Creating tools as needed to get the job done efficiently
- Supporting manufacturing and testing efforts to deliver well-calibrated and reliable systems

Required:

- Bachelor's degree in robotics, computer science, electrical engineering, mechanical engineering, mechatronic engineering, biomedical engineering, control engineering or a related field;
- Excellent writing and communication skills;
- English proficiency.
- Extremely strong C/C++ development, testing, and debugging skills
- Experience working with physical mobile platforms
- Strong problem solving and analytical skills

Preferred:

- Master's degree or PhD in a related field;
- Experience in mechanical design software such as Solid Works;
- Experience in real-time control systems;
- **Familiarity with ROS;**
- Python development experience;
- The CMake build system;
- Experience in robotic projects;
- Sensor fusion including Cameras, LIDARs, IMUs;

- Machine learning for object detection, classification, and tracking;
- Experience with ADAS system or other safety critical applications in Aerospace, Medicine, or Automotive applications.
- Micro-controller programming including hobby boards like Raspberry Pi and Arduino
- Sensor calibration and processing
- Deep learning frameworks include Tensorflow, Caffe, and MX-Net

Job Type: Full-time

Salary: \$85,000.00 to \$150,000.00 /year

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General Motors Hires Security Team That Remotely Hacked Jeep

<http://www.electronicdesign.com/automotive/general-motors-hires-security-team-remotely-hacked-jeep>

James Morra ^[3] | Aug 04, 2017

General Motors hired two security researchers that hacked into a Jeep Cherokee ^[4] over the internet in 2014, cutting its transmission and disabling the brakes in an experiment that still reverberates in the automotive industry.

Chris Valasek and Charlie Miller were both hired by Cruise Automation, the autonomous driving unit that GM formed in 2016. Previously, Valasek worked on Uber's self-driving cars and Miller was a security researcher at Chinese ride-sharing firm Didi Chuxing. The hires were confirmed by Cruise's chief executive Kyle Vogt on Twitter last week.

The move is the latest acknowledgement of the looming threat that hackers pose to connected cars. Many experts consider security as a moving target as cars increasingly connect to the internet or start driving themselves on highways – a constant tug-of-war with hackers to prevent accidents and expensive recalls.