

Tutorial Proposal
IEEE 15th International Conference on Industrial Informatics INDIN' 2017
-The Undergoing Industrial Informatics R-Evolution-

Tutorial Title: Connected Vehicles

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1. KEYWORDS

Wireless technologies, V2X, connected vehicles, autonomous vehicles.

2. AIMS AND LEARNING OBJECTIVES

Traditionally, the perception system of autonomous vehicles is composed of an array of sensors that include vision cameras, radar, lidar, and ultrasonic. Although not a sensor per se, wireless communications can significantly enhance the perception system of autonomous vehicles thus leading to the concept of “connected vehicles” as an enhancement of traditional autonomous vehicles perception system. In this tutorial, participants will be given a detailed overview and in depth discussions on the state of the art of wireless technologies and standards that support the concept of connected vehicles together with a survey of research and development projects including a discussion of commercial offerings.

Learning Objectives

1. Requirements to support autonomous vehicles
2. Main technologies and standards
3. Survey of research and development projects
4. Survey of commercial offerings

3. SHORT SUMMARY OF CONTENTS

Tutorial Outline

Autonomous vehicle perception system
Role of V2X in autonomous vehicles perception systems
V2I, V2V, V2P
Requirements to support autonomous vehicles
Real-time
Safety



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Main technologies and standards

DSRC, Cellular (5G)

Survey of research and development projects

Intelligent Transportation Systems of the U.S. DOT

Integrative Systems + Design: University of Michigan

Commercial offerings

Cadillac V2V safety technology

FordPass

Tesla Model S

Toyota

4. TARGET AUDIENCE

Students, researchers, and professionals interested in autonomous vehicles.

5. DURATION

90 min.

6. SHORT BIOGRAPHY OF SPEAKER (max. ½ page)

Dr. Juan R. Pimentel is a Professor of Computer Engineering at Kettering University in Flint, Michigan, USA. He is an expert in the area of Internet of Things, Industrial Internet, wireless communications, safety-critical systems and industrial computer networks, particularly issues related to real-time protocols, safety-critical protocols, dependable automotive embedded distributed systems, and distributed industrial and embedded systems. He is a recognized international expert in the area of industrial communications and real-time and dependable systems. He has written 3 books on networking, multimedia systems, and safety-critical systems. He has worked with major manufacturing and process control projects involving products from companies such as Siemens, Rockwell, Schneider Electric, ABB, and GE-Fanuc.

As a 1980 graduate of the University of Virginia, his accomplishments include the co-development of the application layer for Profibus (with Siemens), and the development of FlexCAN, a CAN-based safety-critical architecture.

