



Contribution ID: 13

Type: **not specified**

Probabilistic and Deep Learning Approaches for Robot Navigation and Autonomous Driving

Wednesday, October 6, 2021 4:00 PM (1 hour)

For autonomous robots and automated driving, the capability to robustly perceive their environments and execute their actions is the ultimate goal. The key challenge is that no sensors and actuators are perfect, which means that robots and cars need the ability to properly deal with the resulting uncertainty. In this presentation, I will introduce the probabilistic approach to robotics, which provides a rigorous statistical methodology to solve the state estimation problem. I will furthermore discuss how this approach can be extended using state-of-the-art technology from machine learning to bring us closer to the development of truly robust systems able to serve us in our every-day lives.

<h1>Bio</h1>

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<p>Wolfram Burgard is a Professor for Computer Science and the Head of the Autonomous Intelligent Systems Research Laboratory at the University of Freiburg. He received his PhD from the University of Bonn in 1991, where he then became the Head of the research lab for Autonomous Mobile Systems. His areas of interest lie in artificial intelligence and mobile robots, for which he developed pioneer techniques for localization, simultaneous localization and mapping (SLAM), robot navigation and control and path-planning, among others. Prof. Burgard has co-authored over 350 papers and articles, as well as 2 books. He received numerous awards, including the Gottfried Wilhelm Leibniz, 14 best paper awards, and an ERC Advanced grant in 2010 and the IEEE Robotics and Automation Technical Field Award in 2021. He is member of the German Academy of Sciences Leopoldina and the Heidelberg Academy of Sciences, as well as Fellow of the IEEE, the AAAI and the EurAI. He was the Editor-in-Chief of the IEEE/RSJ International Conference on Intelligent Robots and Systems from 2014 to 2016 and he served as President of the IEEE Robotics and Automation society from 2018 to 2019.</p>

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Session Classification: Keynotes