Smart Leak Detection with Machine Learning
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Abstract

Many of today's small leak detection systems suffer from high false alarm rates due to their high susceptibility to changing environmental conditions – their ability to detect leaks as well as their ability to reject false alarms varies significantly as the environmental conditions changes (temperature, visibility, lighting, etc.). The Smart LEak Detection (SLED) system, winner of an R&D 100 Award recognizing the top 100 inventions of 2017 by R&D Magazine*, uses COTS optical sensors and machine learning techniques to reliably detect the chemical fingerprint of small liquid leaks. SLED, through the use of advanced deep learning algorithms is able to overcome many of the shortcomings of today's technologies by reliably detecting small liquid leaks through varying environmental conditions. SLED is able to detect small hazardous liquid leaks including crude oil, gasoline, diesel and mineral oil, including being able to classify these different substances in real-time. SLED is able to operate fully unmanned and perform leak detection in less than 5 seconds. The technology can be deployed using a variety of mobile and stationary platforms and can nimbly adjust to different sensors and technologies. SLED is now being adapted by the U.S. Department of Energy to detect methane leaks.

Biography

Maria Araujo is Manager of Research and Development at Southwest Research Institute (SwRI), in San Antonio, Texas. Maria has been involved in initiatives to advance leak detection technologies, primarily involving the application of machine learning techniques to identify hydrocarbon liquid leaks as well as gas leaks. Maria is currently leading a Department of Energy project that is focused on utilizing machine learning techniques to autonomously detect methane leaks in oil & gas facilities in real time. Maria holds Bachelor of Science and Master of Science degrees in electrical engineering from the University of California, Los Angeles (UCLA). She is the recipient of an R&D 100 Award for the development the of the Smart LEak Detection (SLED) system and was named one of San Antonio's Top 40 Under 40 in 2017 by the San Antonio Business Journal.

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