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Visual perception for autonomy application to object detection and behavior analysis in complex environmental conditions

Automated visual monitoring involves data acquisition, analysis, and interpretation for understanding objects and object behaviours. Automated visual data analysis systems are mostly used for military, law enforcement and commercial applications. Sensors of different types and characteristics in various platforms are used for the acquisition of data. In recent years, there has been a spurt in the development of palm-sized cameras for the consumer market that are equipped with fish eye lenses on front and back sides to deliver 360 degree spherical views. Intelligent analysis of these data is an important task in applications such as automatic human detection, identification, activity recognition, behavior analysis, anomaly detection, alarming, etc. Object motion analysis and interpretation are integral components for activity monitoring and situational awareness. We present the development of a robust automated system which can detect and identify people using imagery captured using visible, infrared and omnidirectional cameras in a mobile platform and track their actions and activities by a spatiotemporal feature tracking mechanism. The automated visual analysis procedure includes preprocessing of data for distortion correction, novel methods for feature extraction, and machine learning based approaches for object classification.

Biography

Vijayan K Asari is a Professor in Electrical and Computer Engineering and Ohio Research Scholars Endowed Chair in Wide Area Surveillance at the University of Dayton (UD), Dayton, Ohio, USA. He is the Director of the Center of Excellence for Computer Vision and Wide Area Surveillance Research at UD. He received his PhD in Electrical Engineering from the Indian Institute of Technology, Madras in 1994. Prior to joining UD in February 2010, he worked as Professor in Electrical and Computer Engineering at Old Dominion University, Norfolk, Virginia for 10 years. He holds three patents and has published more than 600 research papers in the areas of image processing, pattern recognition, machine learning, neural networks and high performance embedded systems. He has supervised 26 PhD dissertations and 40 MS theses in electrical and computer engineering. Currently several Masters and Doctoral level graduate students are working with him. He has received several teaching, research, advising and technical leadership awards including the University of Dayton, School of Engineering Vision Award for Excellence in August 2017, the Sigma Xi George B Noland Award for Outstanding Research in April 2016, and the Outstanding Engineers and Scientists Award for Technical Leadership from The Affiliate Societies Council of Dayton in April 2015. He is a Senior Member of IEEE and SPIE, and is a co-organizer of several SPIE and IEEE conferences and workshops.

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