Abstract: The goal of intelligent driver support systems is to provide proper warnings and alarms to the drivers to enhance safe driving. We will discuss multidisciplinary research activities focused on the design and evaluation of new types of Intelligent Driver Support Systems and their components. Systematic efforts to understand and characterize driver behavior and ethnography surrounding the task of driving are essential in the development of human-centric driver assistance systems. Novel instrumented vehicles are used for conducting experiments, where the rich contextual information about vehicle dynamics, surround and driver state are captured for careful, detailed ethnographic studies, as well as realistic data for developing algorithms to analyze multi sensory signals for active safety. In this presentation, we will provide a systems-oriented framework for developing multimodal sensing, inferencing algorithms and human-vehicle interfaces for safer automobiles. We will consider three main components of the system, driver, vehicle, and vehicle surround. We will discuss various issues and ideas for developing models for these main components as well as activities associated with the complex task of safe driving. The presentation will include discussion of novel sensory systems and algorithms for capturing not only the dynamic surround information of the vehicle but also the state, intent and activity patterns of drivers. We will also introduce a new type of visual display called “dynamic active display”. These displays present visual information to the driver where driving view and safety-critical visual icons are presented to the driver in a manner that minimizes deviation of her gaze direction without adding to unnecessary visual clutter. These contributions indicate the basic promise the “human-centric active safety” (HCAS) systems in enhancing the safety and comfort of automobile based travel.

Speaker Bio-Sketch: Mohan Manubhai Trivedi is a Professor of Electrical and Computer Engineering and the founding Director of the Computer Vision and Robotics Research Laboratory at the University of California in San Diego. Trivedi has a broad range of research interests in the intelligent systems, computer vision, intelligent (“smart”) environments, intelligent vehicles and transportation systems and human-machine interfaces areas. In partnership with several automobile companies, he established the Laboratory for Intelligent and Safe Automobiles (“LISA”) at UCSD to pursue a multidisciplinary research agenda. Mohan served on the Executive Committee of the California Inst. for Telecommunication and Information Technologies [Cal-IT2] as the leader of the Intelligent Transportation and Telematics Layer at UCSD and he is elected Vice-Chair of the University of California System Wide UC Discovery Digital Media Program. Mohan serves regularly as a consultant to industry and government agencies in the USA and abroad. Trivedi was the Editor-in-Chief of the Machine Vision and Applications (1996-2004) and is an Editor of the IEEE Transactions on Intelligent Transportation Systems. He served as the Chairman of the Robotics Technical Committee of the IEEE Computer Society and Program Co-Chair of the 2006 IEEE Intelligent Vehicles Symposium. Trivedi has received the Distinguished Alumnus Award from the Utah State University, Pioneer Award (Technical Activities) and Meritorious Service Award from the IEEE Computer Society.