

Automated People Mover Design and Implementation

By Ptucha, Raymond and Biviano, Nathan

It is no longer a question if self-driving cars will transform society, but when. By the mid-2020's, most agencies predict autonomous driving will transform the automobile market. These cars will make our roadways safer, our environment cleaner, our roads less congested, and our lifestyles more efficient. Because of safety, manufacturing costs, and limitations of current technology, autonomous off-road vehicles, such as people movers in large industrial or academic institutions, will probably emerge before autonomous high-speed highway driving. A three year multidisciplinary capstone project is underway which will transform a golf cart into an autonomous people mover. In year one, the cart was converted to remote control. In years two and three, tightly integrated but independent multidisciplinary senior design teams will enable the cart to drive autonomously in controlled and natural conditions respectively. The cart will include advanced sensing and vision technologies for navigation, and use advanced audio and vision technologies to communicate with passengers. This paper will describe several factors to consider when forming capstone engineering student design teams in academia, and then discuss specific issues in sensor selection and integration when designing an autonomous vehicle. Detailed design considerations and safety issues, along with the actual steps and parts necessary are covered. The paper will conclude with the year three plans to convert the golf cart into a fully autonomous people mover and beyond.

Ptucha, Raymond - Biography

Ray is an Assistant Professor in Computer Engineering at Rochester Institute of Technology specializing in machine learning, computer vision, robotics, and embedded control. Ray was a research scientist with Eastman Kodak Company for 20 years where he worked on computational imaging algorithms and was awarded 26 U.S. patents with another 23 applications on file. He graduated from SUNY/Buffalo with a B.S. in Computer Science (1988) and a B.S. in Electrical Engineering (1989). He earned a M.S. in Image Science from RIT in 2002. He earned a Ph.D. in Computer Science from RIT in 2013. Ray was awarded an NSF Graduate Research Fellowship in 2010 and his Ph.D. research earned the 2014 Best RIT Doctoral Dissertation Award. Ray is a passionate supporter of STEM education and is an active member of his local IEEE chapter and FIRST robotics organizations.

Biviano, Nathan - Biography

Nathan Biviano is a 5th year student in the Industrial and Systems Engineering department at Rochester Institute of Technology, currently working towards a Bachelor's of Science degree. His areas of interest are statistical quality control, technology and automotive production systems. Nathan has spent four co-ops with GlobalFoundries, where he will return full time after graduation.