



RITA 2018

## Waste to Sustainable Energy

Proceedings of the 6th International  
Conference on Robot Intelligence Technology  
and Applications

ISSN 2195-4356

ISSN 2195-4364 (electronic)

Lecture Notes in Mechanical Engineering

ISBN 978-981-13-8322-9

ISBN 978-981-13-8323-6 (eBook)

<https://doi.org/10.1007/978-981-13-8323-6>

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# Longitudinal Velocity Control Design with Error Tolerance Strategy for Autonomous Vehicle

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## **Abstract:**

This work serves as the proof of concept of an autonomous vehicle prototype developed by Moovita and Universiti Teknologi Malaysia. For a dependable driverless vehicle maneuver, it requires a stable velocity controller to allow for the desired longitudinal motion navigation. Thus, a multi-level longitudinal velocity control is proposed as part of the motion guidance strategy. The higher level formulates the desired braking and torque actuation relative to the obtained reference generator information, while the lower level aids the vehicle to actuate the actuators. The focus will be on the higher-level velocity control design, where (i) it is expected to yield alternate actuation between braking and gas, and (ii) to prevent the sudden increase in actuation and yield a more-human like behavior. An error tolerance strategy is included in the controller design to achieve this. The controller design is then validated on a varied speed real-time experiment as a proof of concept. Results show the proposed controller is able to provide the desirable navigation for controlled AV navigation in a predefined environment.

**Keyword:** Rehabilitation engineering; Biomechatronics; Autonomous Systems; Machine Learning; Intelligent Systems; Sensors and Actuators; Machine Vision; Instrumentation and control