The SmartC 2019 Summer Program

Smart Cities are an excellent illustration of the types of digitalization challenges that future innovators will need to address. This is particularly the case for one of the most dynamic aspects of Smart Cities, namely Intelligent Transportation Systems (ITS).

The aim of the SmartC program is to develop a self-standing and low maintenance demonstrator platform and to foster collaboration in research and education between academia, industry, and public-sector entities at national and international level.
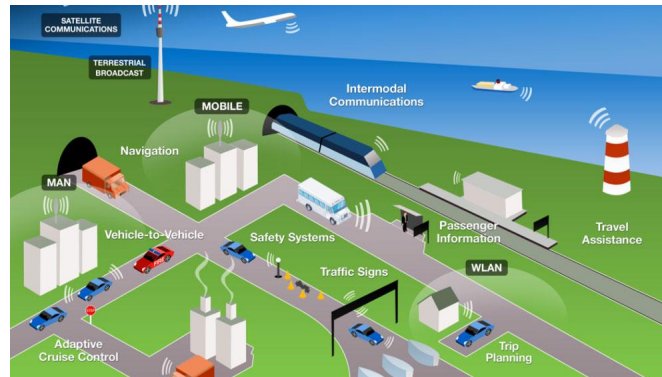
In previous work we have developed course material [1] and a scaled-down autonomous vehicles [2, 3] to support learning and acquiring the knowledge needed to prepare future innovator. The goal of this project is to develop a scaled-down experimental ITS platform called MicroITS. The key feature of this platform is that it is both easy to set up and operate and allows for advanced experimentation. Such platforms will have a crucial role in preparing tomorrow's innovators, starting from young children in primary school and going up to policy makers and researchers working in different fields.

Initial experience with home-made prototypes of the platform is promising [3]. For the next stage, we would like to use affordable and commercially available hardware [4] to develop a high-quality, open source software platform for Smart City and ITS services for the platform, and establish a community of developers and users of this platform. In the next step, we would like to explore a digital symbiosis between our platform and mixed reality. Mixed reality could provide the opportunity for adding virtual objects and replicating physical models.

Eligibility Criteria

The project will accept only 20 interns. Requirements include being an active student in a bachelors or masters program in computer science or engineering, mechatronics, electrical or electronics engineering, or mechanical engineering. Closely related subjects will also be considered. The program is open for students around the world including ERASMUS exchange program. However, some scholarships may be available on need basis. Project members will all work together, but they should indicate at the time of application the topic in which they would like to work.

Projects to Choose From

Your application should indicate one of the following as your primary topic:

1. Practical building blocks for SmartC (other than MicroITS)
2. Basic intelligent functionality
3. Reliable real-time functions
4. Resilience and survivability
5. Managing intersections
6. Vehicle following and platooning
7. Obstacle avoidance
8. Long-distance remote control
9. Improved positioning
10. Simulating the platform
11. Faster driving
12. Racing and other competition functions
13. Power efficiency
14. Automatic refueling
15. Automated test harness for all platform software (including using ROS)
16. Accountability and auditing
17. Emergency response
18. Taxi service
19. Cargo transportation
20. Cooperative functions
21. Payment options
22. Other (Please specify in your application)

How to Apply

Interested students should email a CV and brief cover letter to zain-ul-abdin@hh.se. The subject of the email should be "Application to SmartC 2019 Summer Program". The SmartC Summer program will be conducted between March to June 2019. The deadline for applications is January 31st. Notifications will be made around February 15th.

Registration Procedure

Each project will be issued a project code and the accepted students undertaking the project need to register before joining the SmartC 2019 program at the following link:
https://hh.moveon4.com/locallogin/5b8cfbf63d5d66d1397fde98/eng

Program Coordinator

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Project Responsibles

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References

[1] Flipping a First Course on Cyber-Physical Systems. Walid Taha, Lars-Göran Hedstrom, Fei Xu, Adam Duracz, Ferenc A. Bartha, Yingfu Zeng, Jennifer David, and Gaurav Gunjan. Workshop on Embedded and Cyber-Physical Systems Education (WESE'16). http://bit.ly/wese16p8

[2] Micro Intelligent Transport System - MicroITS. Project Description. Walid Taha. August 2018. http://bit.ly/microits1idea

[3] MicroITS: A Scaled-Down ITS Platform. Judicael Marchand, Gael Puissochet, Thomas Lithen, and Walid Taha. Workshop on Embedded and Cyber-Physical Systems Education (WESE'18). To appear.

[4] AlphaBot2. https://www.waveshare.com/wiki/AlphaBot2