László Kundra

EIT Digital Budapest DTC

PhD topic: Computer vision aided traffic monitoring, and vehicle tracking

PhD supervisor: Péter Ekler, BME

Contact: kundra.laszlo@aut.bme.hu

'At EIT Digital I learned how I can change my perspective to see problems not only from the engineer, but also from the business point of view. The fact that I understand more and more about how an entrepreneur thinks, plans, and acts, gives me business confidence.'

Achievements & further plans

László is in the final phase of his PhD studies. His PHd topic focused on how to estimate **indoor position** and how to navigate effectively. Through the analysis of the field, he narrowed his topic to **orientation estimation with optical features**. This algorithm works on a wide range of devices from mobiles to wearables. He presented his results at conferences, and he also published a journal article which had an impact factor. Later on, his focus shifted towards image processing and computer vision, and he continued his research in the field of traffic monitoring and vehicle tracking based on video footage. László and his research group also developed applications that are actively used in the industry.

Vehicle counting and traffic monitoring contribute to the development of modern and 'good-to-live-in' cities, while they also hold great possibilities on the research and business development sides. Compared to manual counting, and in addition to urban well-being, security and sustainability may also gain profit from the results.

Educational status at Spring semester of 2016:

RA	OR	BMD	GH	Mobility	BDExp.
✓	✓	✓	⚙	⚙	⚙

Reserach topic

László works on the efficient integration of computer vision algorithm into cloud based vehicle counting and tracking. His focus is currently on the extraction and matching of feature points from the video, in combination with different tracking algorithms that take into account a-priori knowledge of a junction. Many methods have already been given for counting vehicles. However, the general application of these techniques do not meet the requirements of the industry. This is caused by frequent occlusions of vehicles, when observation is performed on a junction, and not on a highway. Also, changing environmental conditions effect the tracking capability of existing algorithms drastically. Moreover, a modern and reliable algorithm should also report when its output is not reliable.

László and his colleagues developed a complex system that is able to handle rapidly changing weather conditions and even the full occlusion of vehicles. They have also made efforts to write algorithms that report on their confidence in each decision, thus a final reliability sequence is also given. Using this, manual vehicle counting can be reduced to the unreliable parts of the video, which is a serious business advantage. They keep working on further improving their methods.