Researcher in sensor simulation for data generation using Neural Network

SMART ME UP
a Magneti Marelli company

Company
Smart Me Up is a start-up company designing the new generation of visual perception technologies for autonomous driving systems. The team (8PhDs & 10 AI engineers) focus on scientific research taking a disruptive approach to tackle automotive industry challenges. Recently acquired by a major automotive supplier, we are beginning a period of rapid growth. So, we are glad to provide opportunities for any brilliant and friendly people, lovers of science, and motivated to reduce road fatalities for 1.3 million people per year down to 0 with mathematics.

Topic
Smart Me Up would like to propose a position on the subject of using neural networks to learn sensor modelisation for the purpose of synthetically generating high quality sensor data. Briefly, autonomous vehicles use a variety of sensors and it is notoriously difficult and expensive to gather data for some of them (e.g. LiDAR, RADAR, infrared imaging system). Being able to simulate data would tackle this issue. However it is extremely difficult to create a robust mathematical modelisation of such sensors, thus making it impossible to generate synthetic data. To overcome this issue we are investigating the effectiveness of intrinsically learning those models using Neural Networks to generate physically realistic data.
Already successful applications have been published (convert RGB image to InfraRed image [1], LiDAR sensor modeling [2]).

The objectives of the project are:

- Investigate the different approaches for generating sensor data and find the most promising ones for our use cases
- Implement and optimize the chosen approaches, quantify the results

Data is a key component of the deep learning pipeline and with such approaches the cost of data collection will drop while maintaining or even increasing model's accuracy.

Profile
The successful candidate would operate within the Smart Me Up offices in Grenoble, France attached to the Virtual research team. The candidates should have a background in at least one of the following areas: deep learning, mathematics, computer vision, physics. They should have familiarity with the Python programming language and ideally with deep learning libraries such as Tensorflow or Caffe/PyTorch.

Contact
Candidates should send their CV to jobs@smartmeup.io, and are free to contact the same address for any questions on the offer or Smart Me Up itself.

[1] Facial Feature Embedded CycleGAN for VIS-NIR Translation, CoRR, Wang et al 2019, https://arxiv.org/abs/1904.09464
[2] LiDAR Sensor modeling and Data augmentation with GANs for Autonomous driving, ICML 2019, El Sallab et al. 2019, https://arxiv.org/abs/1905.07290