Researcher in deep learning applied to 3D mesh data

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 applying deep learning to mesh data. A mesh is one of the representations of 3D data points and is the main representation for computer graphics. Unfortunately, this data representation is not fit to be used by Convolutional Neural Networks (CNN) as they exist. A workaround to process this data has been developed and is called Graph CNN [1] [2] unifying Graph Spectral Theory concepts and the properties of regular CNN.
This architecture seems to enable promising applications such as mesh generation [3] and mesh deformation and estimation [4]. Classic CNN were a big revolution in the computer vision industry and Graph CNN might be the same for computer graphics.

The objectives of the project are:

- Investigate the state-of-the-art in this area while considering the possible outcomes of this technology for the team
- Apply the gathered knowledge on Smart Me Up's related problem to create proof of concepts
- Keep an eye on the pertinence and performance of other mesh compatible architecture

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, computer graphics. 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] Convolutional Neural Networks on Graphs with Fast Localized Spectral Filtering, NIPS 2016, Defferrard et al., https://arxiv.org/abs/1606.09375
[2] Semi-Supervised Classification with Graph Convolutional Networks, ICLR 2017, Kipf et al., https://arxiv.org/abs/1609.02907
[3] Rank3DGAN: Semantic mesh generation using relative attributes, , Saquil et al. 2019, https://arxiv.org/abs/1905.10257
[4] DEMEA: Deep Mesh Autoencoders for Non-Rigidly Deforming Objects, , Tretschk et al. 2019, https://arxiv.org/abs/1905.10290