Borsa di ricerca: “Deep learning on Implicit Neural Representations of Shapes”

Oggetto della ricerca: Implicit Neural Representations (INRs) have emerged in the last few years as a powerful tool to encode continuously a variety of different signals like images, videos, audio and 3D shapes. When applied to 3D shapes, INRs allow to overcome the fragmentation and shortcomings of the popular discrete representations used so far.

Yet, considering that INRs consist in neural networks, it is not clear whether and how it may be possible to feed them into deep learning pipelines aimed at solving a downstream task. Very recently, a few papers have addressed this challenging research problem and delivered promising preliminary results. Yet, several challenges remains open: how to process INRs which do not share a common initialization, which is routinely exploited by the existing frameworks to make the learning task converge; how to extend the ability to process INRs encoded by different neural architectures; how to generate INRs which are represented by non-modulated architectures, like SIREN; how to process INRs encoding signals with high-resolution, like ImageNet images.

Dettaglio attività da svolgere: The researcher will carry out the following activities: study the existing literature on this recent topic; decide with the PI which one of the research challenges highlighted above can be successfully addressed in the timeframe of the research fellowship; propose and experimentally validated a solution to the selected challenge; write a scientific paper describing the results.