

## Incremental Learning for Scene Understanding

Karteek Alahari: [karteek.alahari@inria.fr](mailto:karteek.alahari@inria.fr)

Cordelia Schmid: [cordelia.schmid@inria.fr](mailto:cordelia.schmid@inria.fr)

<http://thoth.inriaples.fr>

**Location of the internship:** The internship will be in the Thoth team at Inria Grenoble, and will be co-supervised by Karteek Alahari (Inria researcher) and Cordelia Schmid (Inria Research Director). The team is specialized in computer vision, in particular visual recognition.

**Topic:** In the context of learning a network-based representation of data, there is a growing need to perform incremental updates. This problem manifests itself in two scenarios: when additional data samples of existing classes or new data from unseen classes becomes available. Despite their success for several computer vision problems, CNNs are ill-equipped for such incremental learning [3, 5]. For example, adapting the original model trained on a set of classes to additionally represent samples from new classes, in the absence of the initial training data, leads to a phenomenon called “catastrophic forgetting” [2, 4]. This phenomenon is an abrupt degradation of performance on the original set of classes, when the training objective is adapted to the new classes. Our recent work [1, 6] is a first step to address this issue. Both the approaches presented here exploit distillation loss to minimize the discrepancy between responses for old classes from the original and the updated networks. We will explore the use of synthetic data within the incremental learning setup, where imbalance between the number of samples belonging to the old and the new classes is an important issue. A few pointers in this direction are: (i) criteria for the choice of samples, building on [1], (ii) use of generative adversarial networks (GANs) [7], (iii) building on [8].

### References

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