



Shilpa Anna George

Enabling Context-Sensitive Bandwidth-Efficient Visual Search on Edge Data

Tuesday, January 26, 2021 – 1:00 p.m. – REMOTE

Retrospective processing of video data captured at the edge typically requires creation of a DNN that is custom-built through transfer learning for the task at hand. Creating such a DNN requires construction of a large training set of examples, typically 10^3 to 10^4 true positives. In cases when a target is rare, a domain expert needs to go through millions of potential images to find a few positive instances of the target. Transmitting such a tremendous volume of data to the cloud for inspection is infeasible due to limited network bandwidth and significant cost.

My thesis will address these challenges. In particular, I claim that it is feasible and effective to create a human-in-the-loop labeling system that performs time-critical, distributed, low base rate active learning in an edge computing setting for novel search queries. To this end, I will present a prototype implementation of a system *Delphi*, an interactive labeling system that performs machine learning in the background. I will describe how *Delphi* can be used by a domain expert with no machine learning knowledge to customize and serve models for a novel target, while conserving network and human attention bandwidth. In this work, I will be validating the usability and generality of *Delphi* and explore building a tuning-wizard that can select the optimal learning and server parameters to match network bandwidths, data distribution, and computational loads on cloudlets.

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