

**Title:**

Flow Vector Prediction

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**Abstract:**

This project considers the problem of predicting the number, length and distribution of traffic flows some time into the future, based upon packets collected in the present. Three methods-- the standard Expectation-Maximization algorithm, a distributed version of the Expectation-Maximization algorithm, and a Particle Filter-- are used to predict the mean flow length and complete flow distributions for subsequent timesteps. We propose a model to represent the histogram of flows corresponding to any given time interval, and use the aforementioned methods to estimate the parameters of the model. The proposed algorithms are tested on a large number of commonly-available data traces. The results indicate that the three methods perform comparably well in terms of the distance between the predicted flow distributions and actual flow histograms. An important application of our work is in resource reservation for protocols that require guaranteed qualities of service.