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**Rueda et al.**

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(54) **METHOD FOR REAL-TIME TRAFFIC ANALYSIS ON PACKET NETWORKS**

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(57) **ABSTRACT**

An architecture for capture and generation, and a set of methods for characterization, prediction, and classification of traffic in packet networks are disclosed. The architecture consists of a device that stores packet timing information and processes the data so that characterization, prediction, and classification algorithms can perform operations in real-time. A methodology is disclosed for real-time traffic analysis, characterization, prediction, and classification in packet networks. The methodology is based on the simultaneous aggregation of packet arrival times at different times scales. The traffic is represented at the synchronous carrier level by the arrival or non-arrival of a packet. The invention does not require knowledge about the information source, nor needs to decode the information contents of the packets. Only the arrival timing information is required. The invention provides a characterization of the traffic on packet networks suitable for a real-time implementation. The methodology can be applied in real-time traffic classification by training a neural network from calculated second order statistics of the traffic of several known sources. Performance descriptors for the network can also be obtained by calculating the deviation of the traffic distribution from calculated models. Traffic prediction can also be done by training a neural network from a vector of the results of a given processing against a vector of results of the subsequent processing unit; noticing that the latter vector contains information at a larger time scale than the previous. The invention also provides a method of estimating an effective bandwidth measure in real time which can be used for connection admission control and dynamic routing in packet networks. The invention provides appropriate traffic descriptors that can be applied in more efficient traffic control on packet networks.

**21 Claims, 11 Drawing Sheets**

