

1154-15-2464

Michael G Luby*, International Computer Science Institute, Suite 600, Berkeley, CA 94704.

Fountain codes and their applications.

A *fountain code* is an erasure code that has unprecedented scalability in two dimensions: (1) Data objects of any size can be efficiently encoded and decoded; (2) The amount of encoding data that can be generated from a data object is essentially unlimited. In a typical case, encoding data is generated from a data object and sent in packets from a sender to a receiver. Packets can be lost between the sender and receiver, and thus only a portion of the encoding data arrives at the receiver. A fountain code has optimal recovery if the data object can be recovered as long as the size of the received portion of encoding data is at least the size of the data object, independent of which portion of encoding data is received.

Based on elementary linear algebra and random graphs, we give a simple description of a fountain code.

We describe some of the conceptual and practical usages of fountain codes. Conceptual usages include reliable broadcast delivery of multimedia data, reliable real-time high speed delivery of data over large distances, reliable distributed storage, and a new internet design based on fountain codes. Practical usages include integration of fountain codes into a number of commercial standards, and a number of commercial and defense deployments. (Received September 17, 2019)