A Scalable Framework for Wireless Distributed Computing

ABSTRACT

- We consider a wireless distributed computing system, in which multiple mobile users, connected wirelessly through an access point, collaborate to perform a computation task. In particular, users communicate with each other via the access point to exchange their locally computed intermediate computation results, which is known as data shuffling.
- We propose a scalable framework for this system, in which the required communication bandwidth for data shuffling does not increase with the number of users in the network.

CONT…

- The key idea is to utilize a particular repetitive pattern of placing the data set (thus a particular repetitive pattern of intermediate computations), in order to provide the coding opportunities at both the users and the access point, which reduce the required uplink communication bandwidth from users to the access point and the downlink communication bandwidth from access point to users by factors that grow linearly with the number of users.
- We also demonstrate that the proposed data set placement and coded shuffling schemes are optimal (i.e., achieve the minimum required shuffling load) for both a centralized setting and a decentralized setting, by developing tight information-theoretic lower bounds.

EXISTING SYSTEM

A coded distributed computing framework for a wireline setting, into the wireless distributed computing domain. To develop such a framework, we exploit three opportunities in conjunction:

1) Side-Information: When a sub-task has been processed in more than one node, the resulting intermediate outcomes will be available in all those nodes as side-information.
2) Coding: We use coding to develop packets useful to more than one mobile users.
3) Multicasting: Wireless medium by nature is a multicasting environment. It means that when a signal is transmitted, it can be heard by all the nodes.

PROPOSED SYSTEM

- In multicasting opportunities was initially proposed in the context of cache networks , and extended, where caches pre-fetch part of the content in a way to enable coding during the content delivery, minimizing the network traffic.
- In this paper, we demonstrate that such coding opportunities can also be utilized to significantly reduce the communication load of wireless distributed computing applications.

Hardware requirements

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)

REFERENCES

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