Analysis of Traffic for Adaptive Resource Allocation in 5G networks

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Analytics: Why useful in 5G?

- IoT
- Scaling of Data
- Computation at edge
Analytics: Core network

Traffic Profile: Core Network

Experiment was run across Telefonica’s 30-node national network

Features of Cellular Data Traffic

- More mobile users generate more traffic

Features of Cellular Data Traffic

- Aggregate traffic periodic
- Traffic per base station is not

Features of Cellular Data Traffic

- Temporal correlation is not significant between adjacent cells

Research Ideas

- Traffic prediction from partial information
  - Measurement facility may not be in all small cells
  - Partial information about traffic may be available

Granger Causality!!
Granger Causality

Granger defined the causality relationship based on two principles:

- The cause happens prior to its effect.
- The cause has unique information about the future values of its effect.

\[ P[Y(t + 1) \in A \mid \mathcal{I}(t)] \neq P[Y(t + 1) \in A \mid \mathcal{I}_{-X}(t)], \]
Granger Causality
Research Ideas

- Information Scaling
  - IoT is an important aspect of 5G
  - Big data analytics can be useful in scaling down the data
One Scenario

- There may be huge amount of traffic on the road during office hours
- Data feed from traffic cameras, usage pattern of users
- Similar data
- Eliminate redundant information: provide better routes
Result
References

7. Nebula: Distributed Edge Cloud for Data-Intensive Computing