A Collaborative Crowdsourced User-Carrier-App Ecosystem to Enable Next Generation Wireless Research

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Challenges Conducting Measurement Studies using Commercial 5G Services

Closedness of a Diverse 5G Ecosystem

- Difficult to access chipset, radio and other logs
- Limited OS/API support
- Non-removable Battery

- Limited to Zero Visibility to Carrier’s Infrastructure
- Traffic Policies & Config.

- Evaluating QoE of real and/or emerging apps is difficult.
- Vital to understand app/service characteristics

Handling Missing/Inaccessible Information

Data Quality Concerns

Evaluating 5G & 5G Apps
Major 5G carriers in the US advertise 5G as “its all perfect”, but there is a long road ahead…

e.g. for mmWave 5G, providing a coverage map is challenging [2, 3].

Industry will not be capable to timely find all the bottlenecks and (potentially novel) issues.

e.g. especially from the upper-layer view

Can existing mechanisms be tweaked or is there a need for “novel” mechanisms to address the issues?

- e.g. use UE-side contextual info to predict mmWave 5G throughput [3] that can help build 5G-aware apps.

5G is expected to support a programmable core, provide edge-support (MECs) to apps, network slicing, etc.

Commercial 5G still in its infancy… a challenging journey ahead…
In a rapidly evolving space, research in the industry is driven by business goals and other interests.

With NSF’s support, academia (with industry’s cooperation) can take a more holistic approach in designing (cross-layer and cross-stakeholder) systems.

Academia can help identify issues industry may be unaware of, propose new mechanisms/solutions and provide value to industry.

We propose the need to have a collaborative crowdsourced User-Carrier-App ecosystem to reap the benefits offered by 5G and further enable research of 5G and beyond.