Practical approaches to processing and visualizing crowdsourced data

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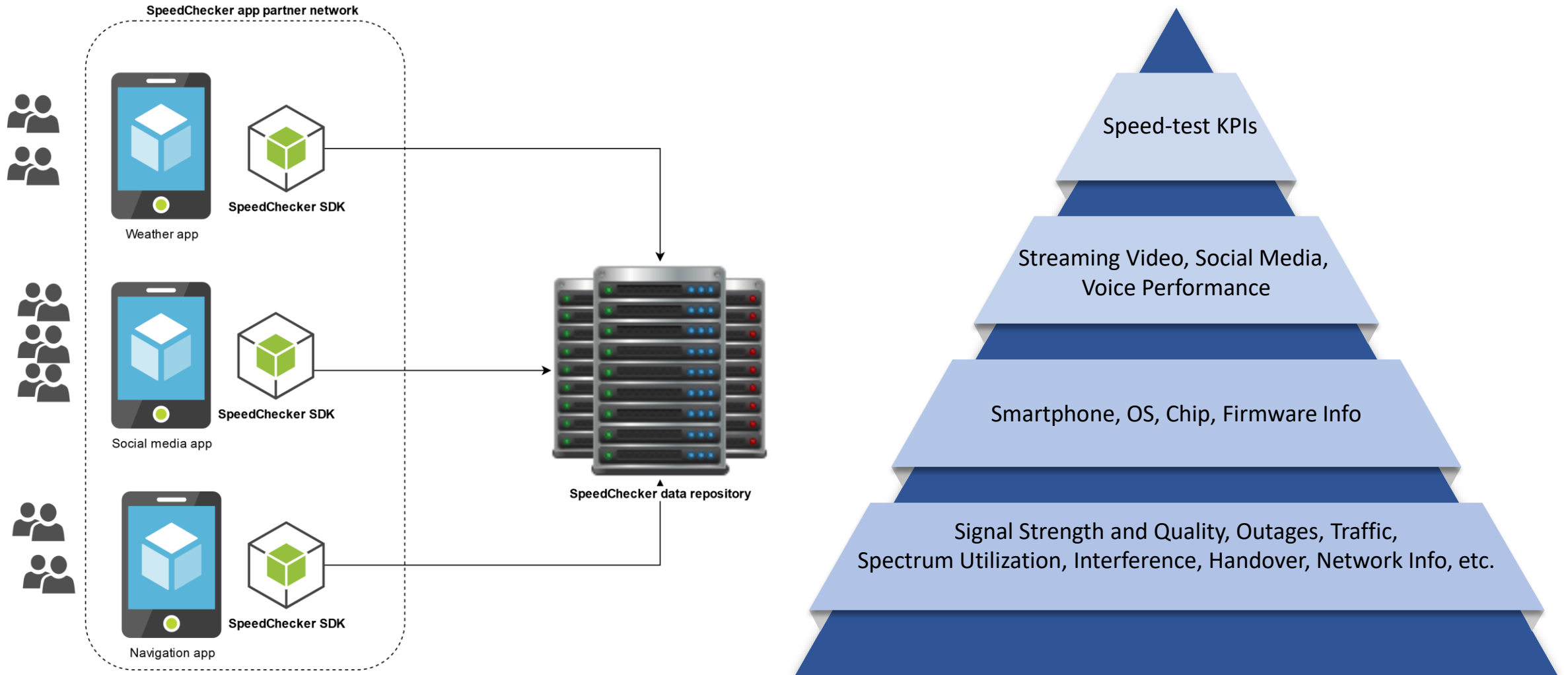
About SpeedChecker

SpeedChecker is focused on delivering solutions which are built on our extensive knowledge of crowdsourcing **QoS** and **QoE** data. Our solutions help **MNOs**, **ISPs** and **regulators** in making their Internet infrastructure better and more available for everyone.

Our research into new methodologies of collecting data using **crowdsourcing** approach has taken us to contribute to development of new ITU standards, provide tools which can be used freely in 3rd party apps, offer consumers apps and websites to test their connections or help telecom regulators getting more visibility into quality of service.

ITU ASSOCIATE

Crowdsourced data

SpeedChecker app partner network

Weather app — SpeedChecker SDK

Social media app — SpeedChecker SDK

Navigation app — SpeedChecker SDK

SpeedChecker data repository

Speed-test KPIs

Streaming Video, Social Media, Voice Performance

Smartphone, OS, Chip, Firmware Info

Signal Strength and Quality, Outages, Traffic, Spectrum Utilization, Interference, Handover, Network Info, etc.

Typical map data visualization types
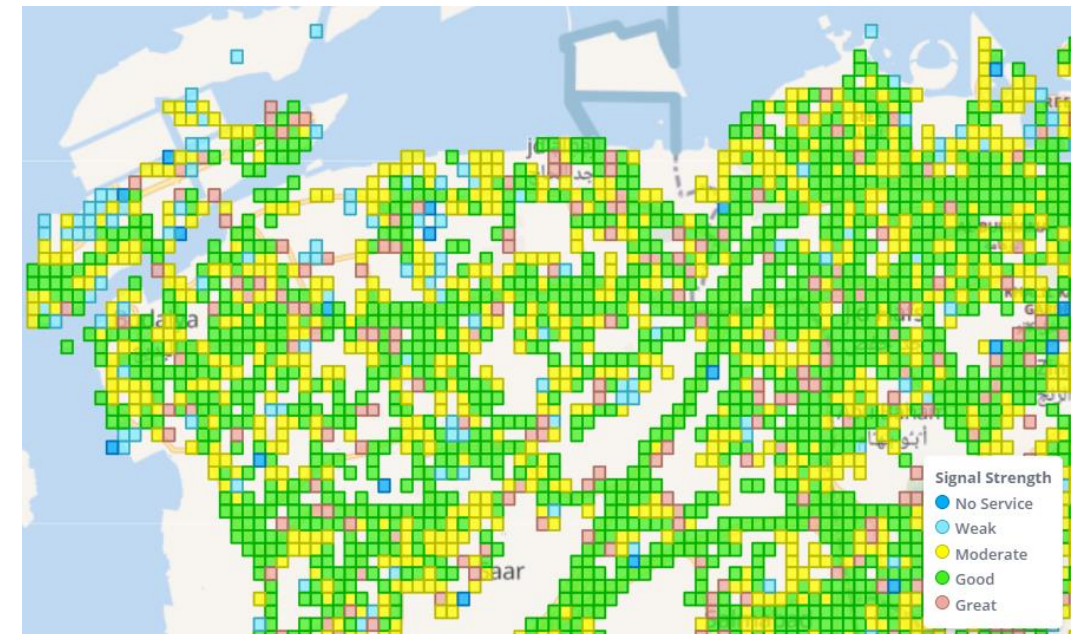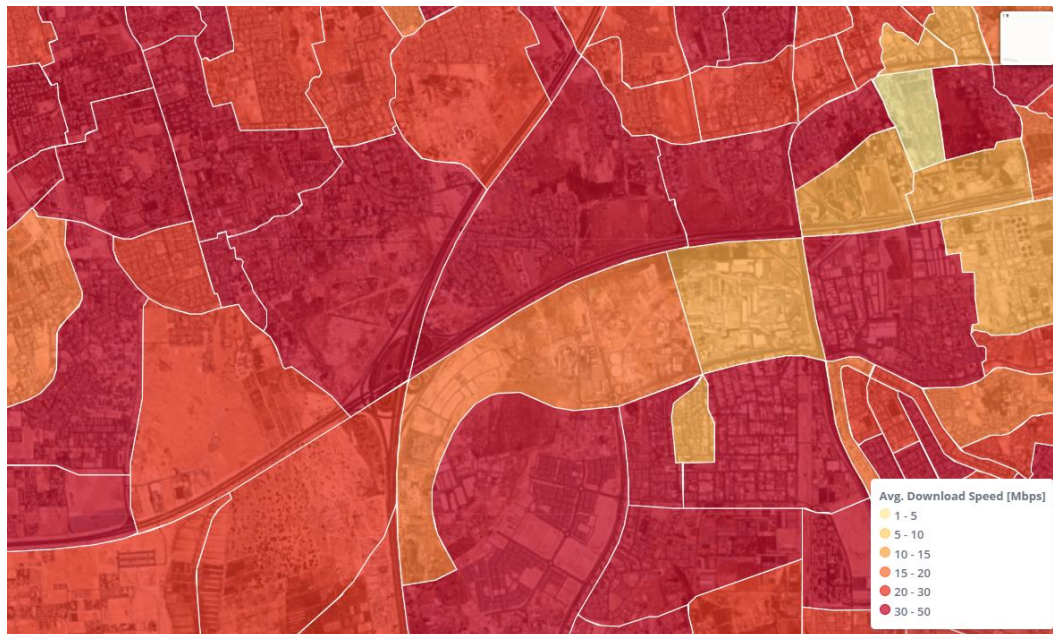
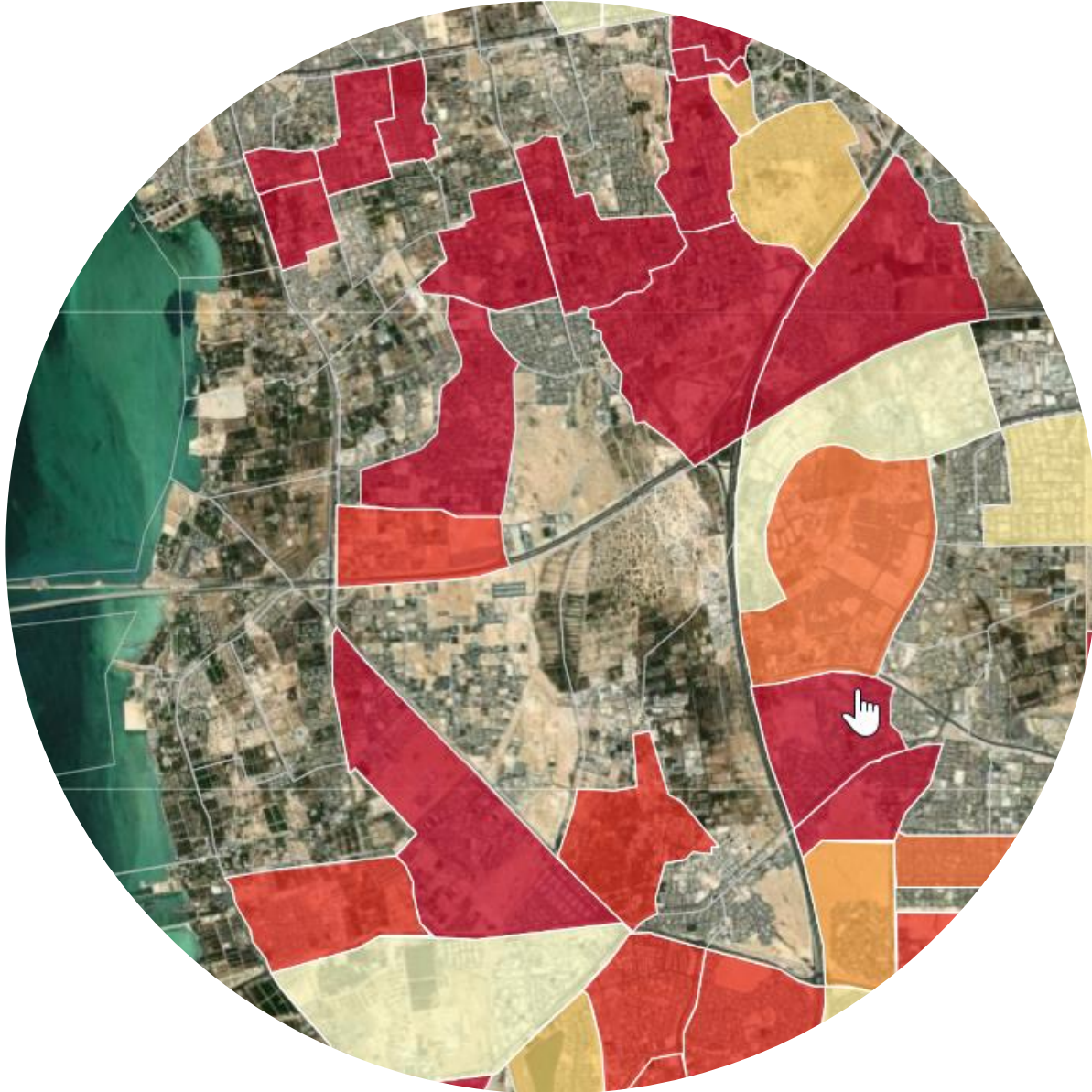## Choropleth / Regional Maps

High level QoS measurements
- Speed Test
- Social Media Performance Test
- YouTube / Streaming Video Test
- VoIP Call Performance Test

Geohash grid maps

Lower level network & QoS measurements
- Signal Strength and Quality
- Service Outage
- Interference
- Various measurements collected passively

Challenges
in Regional Performance Assessment

Very Small or Zero Test Counts

- Small number of mobile app installs in certain areas

- Low population rural areas

- Smaller time ranges (weekly/monthly)

Insufficient Test Count

- Relatively large number of SpeedChecker app users

- Number of tests are not reaching required sample size (to represent statistical relevance when data is aggregated)

Impact
Some regions are left empty on the map

Solution
insufficient test count regions

Alternative visualization

- Performance is estimated based on existing (insufficient) data

- Bound of error is calculated for each region

- Regions where the bound of error exceeds the threshold (5%) are highlighted on the map

- Popup is used to indicate potential accuracy constraints to a user

Impact
More rural regions get evaluated

Solution
very small or zero count regions

Stratification approach

▪Areas are classified into stratas (Dense Urban, Urban, Suburban and Rural) according to population density

▪Measurements from all regions of a particular strata are aggregated

▪Cumulative count of measurements becomes sufficient to evaluate performance on strata level

▪Rural regions with zero or low test count are evaluated based on aggregated strata performance

Impact
All regions get evaluated and indicated on the map

Thank you!

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