IoT-Detective: Analyzing IoT Data Under Differential Privacy

Sameera Ghayyur*, Yan Chen**, Roberto Yus*, Ashwin Machanavajjhala**, Michael Hay†, Gerome Miklau††, Sharad Mehrotra*

* Department of Computer Science, UC Irvine, {sghayyur, ryuspeir}@uci.edu, sharad@ics.uci.edu
** Department of Computer Science, Duke University, {yanchen, ashwin}@cs.duke.edu
† Department of Computer Science, Duke University, yanchen@cs.duke.edu
†† College of Information and Computer Sciences, UMass Amherst, miklau@cs.umass.edu

ABSTRACT

- The success of emerging IoT applications depends on integrating privacy protections into the IoT infrastructures to guard against privacy risks posed by sensor-based continuous monitoring of individuals and their activities.
- This demonstration adapts a recently proposed system, PeGaSus [2], which releases streaming data under the formal guarantee of differential privacy, with a state-of-the-art IoT testbed (TIPPERS [9]) located at UC Irvine.

REFERENCES


TIPPERS

- TIPPERS: IoT data management & middleware technology to empower applications to be built on top of sensor data.

Supports collection, storage, management, querying, analysis.

TIPPERS Testbed @ UCI:
- Building: Donald Bren Hall, 6 floors, 125 faculty, 40 staff, 90 research labs, lecture halls, ~ 500 inhabitants, 1000+ visitors.
- Sensors: Beacons, Wi-Fi AP, Cameras, HVAC sensors, Raspberry Pi, Cell Phones, PC monitoring, .. 7000+ sensors.
- System: Over 40,000 lines of system code, 100+ APIs for sensors, wrappers, tech. integration, privacy tech. integrated – 6–6.
- Applications & Users: 4 apps with several services launched to a Bren Hall Supports collection, storage, management, querying, analysis.
- residents, more to come (ongoing discussions). ~ 100 active users.

IoT-DETECTIVE

IoT-Detective: A game in which a player is asked to perform one (or more) interactive analytics tasks using a visual analytics tool based on private streams. The purpose of the game is two-fold: 1) To illustrate the privacy-utility tradeoffs in the differentially private data generated by PeGaSus; 2) User-test this tool for a future study of whether users can use differentially private data for IoT analytics

On May 17th, detect which floor had over 100 people for at least ½ hour continuously?

Two-hour time period: 12:00 PM - 2:00 PM.

Gaming aspect:
- Finish tasks in the allotted time.
- Get points for accurately answering the questions.

Differential Private Data:
- Different levels of privacy guarantees

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