Reconfigurable communication and ubiquitous analytics make your system **resilient to unforeseen events**, e.g. device failures, natural threats, and cyber attacks.

Bluetooth Low Energy Peripherals and Edge-to-Cloud Data Assessment as a Service, with Docker, Node-RED, MQTT, Scala, Spark, Kafka, HDFS, and Android SDK: a demo

Mirco Soderi and John Gerard Breslin
Data Science Institute, University of Galway, Galway, Ireland

Introduction

Reconfigurable manufacturing is aimed to cost-effective, quick reaction to market changes. Ubiquitous software installation, configuration and reconfiguration, and operation as a Service (AAS), is part of it. Soderi et al. are being developing a software framework for Ubiquitous and reconfigurable Big Data engineering, visualization and analytics as a Service.

Reconfigurable Communication

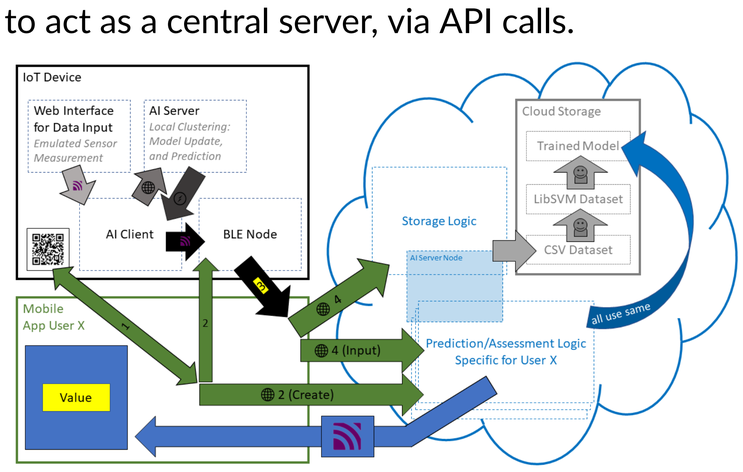
Recently, a module was added to turn any device equipped of a Docker engine and a Bluetooth Low Energy (BLE) adapter into a remotely reconfigurable BLE server, and a demo is proposed that involves a peripheral device, a central device, and a mobile app. All software is installed and configured via API requests. All artifacts are available on GitHub, and Docker Hub.

Conclusion

Ready-to-use micro-services exist that make any system resilient to unforeseen disruptive events, including data communication failures.

Demo

A notebook with a BLE adapter was used as data source. Inputted values go through a local assessment, then they are delivered to connected apps via Bluetooth. For connecting the app, a QR code must be scanned. Once connected, the app receives values and local assessments, and it displays them. Also, via API calls, the app adds some logic to the central server, and then starts sending values to that, for central assessment. Central assessments are published to a configured MQTT broker/topic. The app reads from there, and displays values and all assessments on a unified interface. For demo purposes, a Web interface was created in the source notebook for data input, and a second notebook was prepared to act as a central server, via API calls.



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Soderi, M., Breslin, J.G.: Crazy nodes: towards ultimate flexibility in ubiquitous big data stream engineering, visualisation, and analytics, in smart factories. In: Leveraging Applications of Formal Methods, Verification and Validation. Practice: 11th International Symposium, ISoLA 2022, Rhodes, Greece, October 22–30, 2022, Proceedings, Part IV. pp. 235–240. Springer (2022)
Soderi, M., Kamath, V., Breslin, J.G.: A demo of a software platform for ubiquitous big data engineering, visualization, and analytics, via reconfigurable micro services, in smart factories. In: 2022 IEEE International Conference on Smart Computing (SMARTCOMP). pp. 1–3. IEEE (2022)
Soderi, M., Kamath, V., Breslin, J.G.: Toward an api-driven infinite cyber-screen for custom real-time display of big data streams. In: 2022 IEEE International Conference on Smart Computing (SMARTCOMP). pp. 153–155. IEEE (2022)
Soderi, M., Kamath, V., Morgan, J., Breslin, J.G.: Ubiquitous system integration as a service in smart factories. In: 2021 IEEE International Conference on Internet of Things and Intelligence Systems (IoTaIS). pp. 261–267. IEEE (2021)
Soderi, M., Kamath, V., Morgan, J., Breslin, J.G.: Advanced analytics as a service in smart factories. In: 2022 IEEE 20th Jubilee World Symposium on Applied Machine Intelligence and Informatics (SAMI). pp. 000425–000430. IEEE (2022)

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