**IoT Device Profile Dataset**

**Source:** How to exploit the Social Internet of Things: Query Generation Model and Device Profiles’ Dataset.

**Dataset Description:**

The dataset contains files such as: **Object Description, Objects Profile, Private Devices, Public Devices, Adjacency Matrices and Lysis Dataset.**

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| **Object Description**  (Total16216 devices: 14600(Private users) + 1616(Public services) | |
| **id\_device** | Device ID |
| **id\_user** | owner ID of the device |
| **device\_type** | category associated (code) to the device |
| **device\_brand** | brand of device, ranging from 1 to 12 |
| **device\_model** | model of device, ranging from 1 to 24 |

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| **Private Devices**  Total 14600 private devices | | |
| **Device** | **Mobility** | **Device Type** |
| Smartphone | Mobile | 1 |
| Car | Mobile | 2 |
| Tablet | Mobile | 3 |
| Smart Fitness | Mobile | 4 |
| Smartwatch | Mobile | 5 |
| Pc | Static | 6 |
| Printer | Static | 7 |
| Home Sensors | Static | 8 |

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| **Public Devices or Models** | | | |
| **Data Model** | **Description** | **Mobility** | **Device\_type** |
| Point of Interest | Specific point location that a user may find useful or interesting. | Static | 9 |
| Environment and Weather | Object responsible of the environmental and weather monitoring. | Static | 10 |
| Transportation | Vehicles, taxis or buses. | Mobile | 11 |
| Indicator | Digital signage to display information. | Static | 12 |
| Garbage Truck | Collection and transport of waste products. | Mobile | 13 |
| Street Light | Street lamp to illuminate roads in the city. | Static | 14 |
| Parking | Location designed for parking. | Static | 15 |
| Alarms | Security supervisor or traffic monitoring. | Static | 16 |

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| **Public/Private Static Devices** | | |
| **Id\_Device** | **X** | **Y** |
| Device ID | X- coordinate of the device | Y- coordinate of the device |

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| **Public/Private Mobile Devices**  **(**Each user (and his/her devices) alternates movement states and rest states. The dataset describes the information about mobile objects and the coordinates of the user during the rest state**)** | | | | |
| **timestamp\_start** | **timestamp\_stop** | **id\_user** | **x** | **Y** |
| timestamp of the beginning of the rest state | timestamp of the end of the rest state | user ID | X- coordinate of the device | Y- coordinate of the device |

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| **Objects Profile**  **(**The profile defines the set of possible services offered by each type of devices as well as the possible applications that each device category is interested in, i.e. the possible set of applications an object could request.**)** | |
| **device\_type** | category associated (code) to the device |
| **id\_off\_service** | list of offered service ID (from 1 to 16) |
| **id\_req\_application** | list of application ID (from 1 to 28) |

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| **id\_off\_service** | |
| **Service** | **ID** |
| LOCATION | 1 |
| DATETIME | 2 |
| PEOPLE PRESENCE | 3 |
| ENVIRONMENT (CO2, SOUND, TEMPERATURE,  ACTUATOR AS IRRIGATOR, ETC.) | 4 |
| WEATHER (WIND, SOLAR RADIATION, ETC) | 5 |
| ENERGY CONSUMPTION | 6 |
| TRAFFIC STATUS | 7 |
| STREET LIGHT (BOTH SENSOR AND ACTUATOR) | 8 |
| MOVEMENT (ACCELEROMETER, GYROSCOPE) | 9 |
| PEOPLE COUNTER (IN BUS) | 10 |
| GARBAGE TRUCK STATUS (FULL, EMPTY) | 11 |
| PARKING STATUS (FULL, EMPTY) | 12 |
| MEDICAL DATA (PRESSURE, BPM, ECG, HR, ETC) | 13 |
| INDOOR DATA (PRESENCE, TEMPERATURE, ENERGY | 14 |
| CONSUMPTION AND SO ON IN INDOOR ENVIRONMENTS) | 15 |
| GARBAGE TRUCK MOVEMENT | 16 |

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| **Application** | **ID** | **Service required** | **Description** |
| CRASHDETECTAPP | 1 | 5, 8, 10 | Evaluate car crash with environment and traffic sensors. |
| STREETLIGHTAPP | 2 | 4, 8, 9 | Street light control based on bright intensity and presence of objects. |
| CITYCONSUMPTIONAPP | 3 | 7 | Energy consumption of public objects in the Smart City. |
| TRAFFICAPP | 4 | 1, 5, 8, 10 | Traffic information using presence and sound sensors, and other information obtained by cars. |
| BUSAPP | 5 | 1, 2,10, 11 | Information regarding public transport (such as occupancy, frequency, Timeliness) in real time. |
| TEMPERATUREAPP | 6 | 1, 5 | Temperature in a selected location. |
| HOMECONSUMPTIONAPP | 7 | 16 | Users’ home energy consumption analysis using home sensors. |
| EVENTAPP | 8 | 3 | Information about events in Point of Interests. |
| PARKINGAPP | 9 | 1, 13 | Search for available parking slots near the user. |
| CROWDAPP | 10 | 1, 5, 6 | Using sound, air and weather sensors, evaluate crowd and status of the location. |
| DRIVEMONITORINGAPP | 11 | 5, 6, 8, 9, 10 | Monitor the driver style considering the road, the weather and the car. |
| FIREDETECTAPP | 12 | 4, 5 | Fire detector using air and other environment sensors. |
| IRRIGATIONAPP | 13 | 5, 6 | Irrigation park controller considering environment and weather information. |
| PANELAPP | 14 | 3, 8, 13 | Data visualization in panels around the city. |
| POLLUTIONDETECTAPP | 15 | 1, 5 | Pollution detector using environment data in order to reduce air contamination. |
| HEALTHAPP | 16 | 14 | Health analysis with smartphone and/or smart-fitness data. |
| APPLIANCEOPTIMIZEAPP | 17 | 7, 15 | Appliances optimisation using home sensors |
| AUTHORIZATIONAPP | 18 | 4 | Security system in certain locations, such as Point of Interests. |
| ELECTRICCARCHARGEAPP | 19 | 5, 6, 7 | Optimizer for charging the electrical cars. |
| CINEMAAPP | 20 | 1, 2, 3, 4 | Film and crowd information for cinemas |
| INTRUSIONDETECTIONAPP | 21 | 4, 15 | Intrusion detection system in a users’ home. |
| ALARMAPP | 22 | 4, 5 | General danger detector and warning to the interested population. |
| WASTESTATUS | 23 | 12, 16 | Garbage trucks status to optimise routes. |
| SMARTPHONEDETECTIONAPP | 24 | 1, 4 | Find a friend in a crowd. |
| CHILDREXPLORERAPP | 25 | 1, 2 | Children monitoring |
| WEATHERAPP | 26 | 1, 2, 5, 6 | Weather information around the city. |

**Adjacency Matrices**

According to notions of Social Internet of Things (SIoT), nodes establish social links and create social networks.

**OOR (Ownership Object Relationship):** type of relationship defined for objects owned by the same user. About public static devices, objects will create a relation only if they are in the communication range of each other. We use three different technologies: LoRa (around 1500 meters), Wi-Fi (around 400 meters) and Bluetooth (around 40 meters). Public mobile objects don’t create this type of relation.

**POR (Parental Object Relationship):** relation created among objects in the same type, model and brand, only if their distance is greater than a two threshold: 2 or 2.5 km.

**C-LOR (Co-Location Object Relationship):** if static devices (public or private) and private mobile take contact more than 13 times (number of meetings), can create a co-location relation.

**SOR (Social Object Relationship):** this relationship is based on three parameters, that are the number of meetings (N = 3), the meeting duration (TM = 30 minutes) and the interval between two consecutive meetings (TI = 6 hours). The relation is created between private mobile devices.

**SOR2 (Social Object Relationship):** a variant of the SOR called SOR2 is created to connect the public mobile devices. In particular the relation is between public mobile devices and users’ mobile objects. The parameters, as in the SOR, is set as follow: N = 3, TM = 1 minute and TI = 1 hour.

**SIoT:** completely SIoT network is created with the combination of all relationships (all relations with an operation of disjunction OR).

**Plan to use this Dataset:**

* Generalize the dataset with our approach. We need to add few things that we have taken in our device profile but those are not presented in this dataset.
* In this dataset, the services are indicated by some identification number but instead of that we have to create microservices for our implementation.
* It provides the relationship among the devices using different parameter (presented in Adjacency Matrix) that can help in discovering devices/microservices dynamically.
* This dataset is suitable for our case study (we have taken in previous two paper) because it provides the information about position, Id, location, services provided, and required application for both mobile and static devices.
* The aim of the experiment is to show the interoperability and scalability of IoT devices with the use of containerized microservice architecture and device profile.
* We can address the issues such as: single point failure, replacing devices, plug-n-play services, application specific service composition.