DISCOPAR: A Visual Reactive Programming Language for Generating Cloud-Based Participatory Sensing Platforms
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A Visual Reactive Programming Language for Generating Cloud-Based Participatory Sensing Platforms

Participatory Sensing
Participatory sensing is a data collection and analysis approach that utilizes the mobile devices of individuals for people-centric environmental monitoring. Participatory sensing has become a well-established research field and gained a lot more traction due to smartphones becoming increasingly powerful and sensor-laden. Participatory sensing provides the enabling technology to deploy so-called citizen observatories.

Ad Hoc Solutions
Each citizen observatory has a similar structure. Information is gathered by mobile users and uploaded to a server for aggregation and global analysis, after which it is visualized on a webpage. However, despite these similarities, constructing a new citizen observatory for a new type of data (e.g., noise pollution, mobility patterns of users of public transportation, etc.) requires all software infrastructure to be rebuilt from scratch.

Generic Platform
Developing a new citizen observatory remains a labour-intensive process that requires high technical expertise. We present DISCOPAR, a visual reactive language geared towards the construction of reusable citizen observatories. With DISCOPAR, users interact with visual components to implement the various elements of a PS platform without having to worry about its underlying technological complexities.

Mobile App
(Distributed) Live Programming
Graph designer can test mobile app functionality during its development. Graph designer can modify an application running on the server from within a client-side browser.

Server
Input / Output Port Typing
Ports can only be connected if they are type-compatible. The colour of the port indicates what type of data the component can receive.

Graph Validation
Whenever one of the predefined constraints is not satisfied, a visual cue is shown to the graph designer to indicate that there are still unresolved issues.

Presence of participants' appreciation of the features of (D) Distributed Live Preview (P) Port Typing (G) Graph Validation.

Quasi-Experiments
DEMO HERE