Metropolitan area people-centric distributed sensing of and reaction to environmental phenomena.

325,083 feet

A system to monitor and react to environmental phenomena in densely populated areas using existing and readily available, easily deployed technology.

10,000 feet

A delay-tolerant system that *records*, *analyses* and *reacts* to *environmental sensor data* provided by *a large number* of mobile nodes in a metropolitan area.

1000 feet

A network of *intelligent* mobile *sensor* nodes, *well-connected* '*drop-off*' nodes, *storage* and *control* nodes combined to *record*, *disseminate* and *control* data flow within the system. The system has built in feedback mechanisms that react to detected phenomena, with sophisticated mechanisms for sharing and reporting of data, intelligently spreading global queries to drive local operations, such as requesting more data in a particular area, causing nodes to increase sample rate or alerting users to a phenomenon.

100 feet

The system uses swarm intelligence to remove the overhead of node specific instructions. 'Drop-off' nodes report data to central systems which record and react appropriately. Drop-off nodes relay global instructions and act as post-offices for the system. These drop off nodes, can be fixed or mobile, but they must be location aware, be well-connected, and synchronised with other nodes.

10 feet

Mobile nodes are implemented on human participants, these nodes record environmental data, and opportunistically share this data with their peers in a way that reduces the reporting time to drop-off nodes. The nodes are able to geo-locate themselves, either with a map of their environment which shows the locations of drop-off nodes, or by dynamically building and sharing their own map of the environment. Using these maps, mobile nodes are able to reason about how they should share their data or control their sensing, for example, dropping off data to passing node going in the direction of a drop-off point, increasing their sampling frequency to provide enhanced information about a local phenomenon or learning from previous behaviour to predict whether the human is likely to pass a drop-off point soon.

1 foot

Body worn devices, which as a whole make up a wearable computer, are tasked to report data about the environment, and have a node/part/widget/dongle which records the information. The system as a whole, or an individual node (acting as an agent), makes decisions about how to store the data, when to offload data to different nodes locally for storage or persistence, how to react to the data it has recorded and shared (using the local environmental data for the benefit or the system/user), when to share the data with remote nodes and how to react to global requests.