Ontologies for Tracking Ubiquitous Interest

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The evolving *BluScreen* networked-device OWL Lite ontology represents *Bluetooth Discovery* events that characterize the composition of an audience for a given advert presented on a public display. By inferring preferences and interests of individuals detected in that audience, agents can tailor bids for advertising rights based on the content they represent.

The ontology consists of four main disjoint classes (below) that together facilitate simple description and inference of user behavior over time and space, as well as group or community behavior and/or preference cues.

BluScreen sensor devices developed at the University of Southampton detect ubiquitous, Bluetooth enabled consumer devices (thus obviating the need for specialized hardware). Sensor clients have been developed for *Apple* and *Sony Ericsson* hardware.

By aggregating discovery events detected by sensor clients in the environment, details about social user and community behavior can be used to provision information targeted at specific users, based on the knowledge published about networked locations (e.g. attendance across several conferences, etc).

http://www.ecs.soton.ac.uk/research/projects/BluScreen/

Class: *Connection_Session*

Connection_Session instances are classified by the type of network connection that exists between two (or more) devices. Current major subclases include:

- *Bluetooth_Discovery_Events* - where a Bluetooth device is detected, and a connection can be created (such as an OBEX file transfer).
- *Network_Sessions* - which encompass both *wired* and *wireless network sessions*, depending on the type of *Network_Adapter* used by the device to maintain the network session, and the corresponding network adaptor providing the network service. This determines such concepts as access points and subnet masks, and thus can associate devices within a shared subnet.

Current definitions do not explicitly define fluents; this is open to further development…

Class: *Device*

Three major types of *Device* are considered:

- *Bluetooth_Enabled_Device* - these are instances of Bluetooth enabled devices can be detected by an instance of the subclass *Bluetooth_Sniffer*.
- *Network_Provider_Device* - these are devices that are provided by at a given *Networked_Location*, and may be subdivided into *Wired_Router* and *Wireless_access_point* devices. Instances of these *Devices* also include an associated *Network_Location*.
- *Networked_Device* - any device that is connected to a network.

These classes include information used to provide additional facts about the device itself (such as device name and owner), as well as the type and number of *Network_Adapters* used to provide *Connection_Sessions*.

Class: *Networked_Location*

Networked_Locations are those that are served by one or more *Network_Adapters*. Instances of this class can be asserted to provide information about a location or event that can support social-network based inferences generated about *Bluetooth_Discovery_Events*, such as communities of practice, etc.

Typically, it would be expected that this class (or subclasses) would be aligned with concepts describing existing locations or location events, such as descriptions of buildings (or parts of), or events such as conferences or meetings.

Class: *Network_Adapter*

Instances of the class *Network_Adapter* are responsible for facilitating networking capability to a device.

Devices may have a combination of such *Network_Adapters* (to support both wired and wireless network sessions) and also may have more than one type of *Network_Adapter* (such as a host acting as a gateway or router, or an ethernet hub).

The type of *Network_Adapter* used determines the type of *Network_Session* that can exist.

BluScreen - Exploiting Event Assertions for Agent-based Advertising

BluScreen is an agent-oriented ubiquitous framework for providing consumer-based advertising based on observations about the local audience and information discernable from public sources (i.e. published OWL assertions).

Users standing in front of a *Public Screen* are detected by the unique (Bluetooth) address of their mobile phones. This identification is then used to retrieve and infer further assertions, such as past activity when viewing different classes of adverts, or information about preferences based on inferred communities of practice or familiar strangers. These assertions are used by the advertising agents to determine the "value" of displaying their specific advertisement on the Public Screen.

A *Vickrey* auction is used to determine which of the agents bidding for the advertising space will display their advert, based on their prediction of the future audience composition and its preferences.