StratAG

Strategic Research in Advanced Geotechnologies
Taighde Straitéiseach sna hArd-Gheoteicneolaíochtaí

FUTURE INTERNET AWARD
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Mobile Spatial Interaction in the

Future Internet of Things

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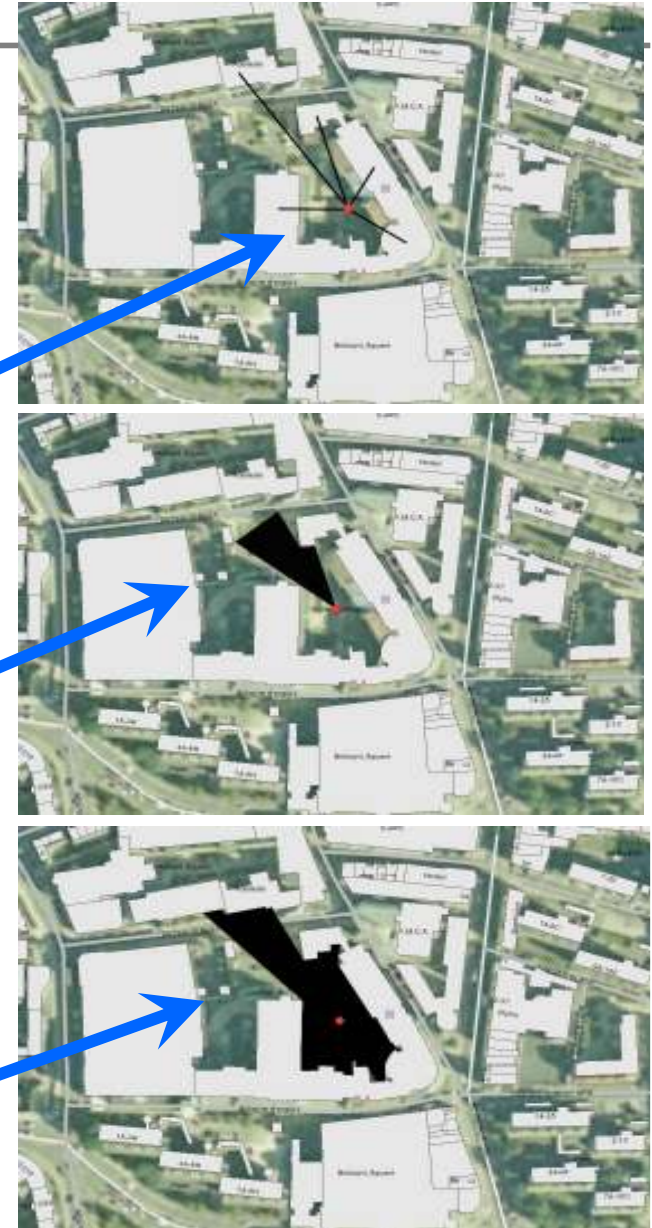# Mobile Spatial Search 2D

Intelligence (less ↑ / more ↓)

Range Query (buffer radius or window)
-Retrieve information about all surrounding objects

Nearest Neighbour Query
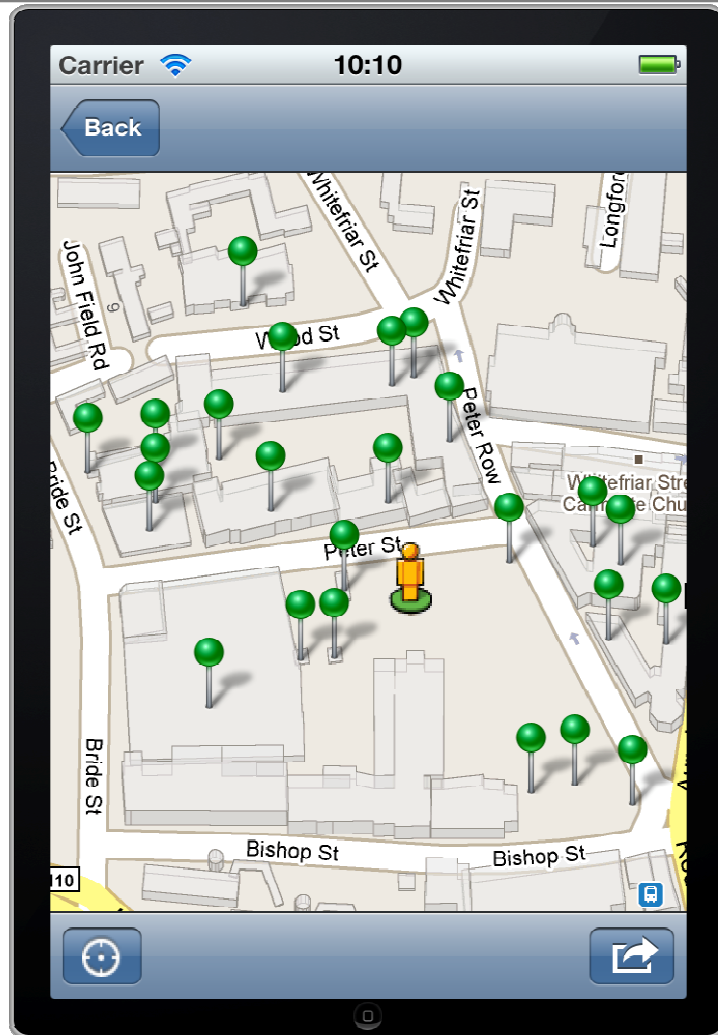-Retrieve information about closest object only

Point-to-Select Query
-Retrieve information about an object by pointing at it

Field-of-View Query
-Retrieve information about all objects in users FoV – with *hidden query removal* out to a specified distance (e.g. 100m)

2D Isovist Query
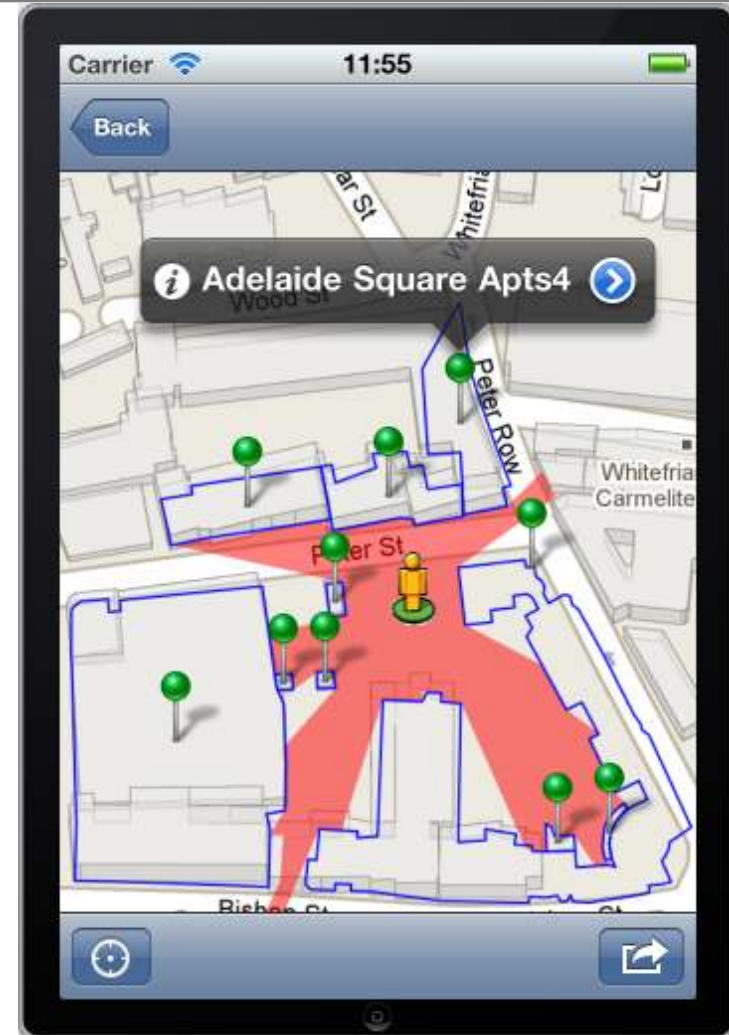-Retrieve information about all visible objects in 360° with *hidden query removal*

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Reducing Information Overload with *Hidden Query Removal*

200m Range Query   *vs*   200m Isovist Query

Mobile Spatial Search 3D

Intelligence — *less* ↑ / *more* ↓

Point-to-Select 3D Query

Retrieve information about a particular floor/window/door of a building by pointing

Field-of-View Frustum Query

Retrieve information about all objects in a users actual field-of-view *frustum* (vertical & horizontal) - with **hidden query removal**

Threat Dome Query

Retrieve information about all visible objects within a 360 degree 3D buffer out to a specified distance – with **hidden query removal**
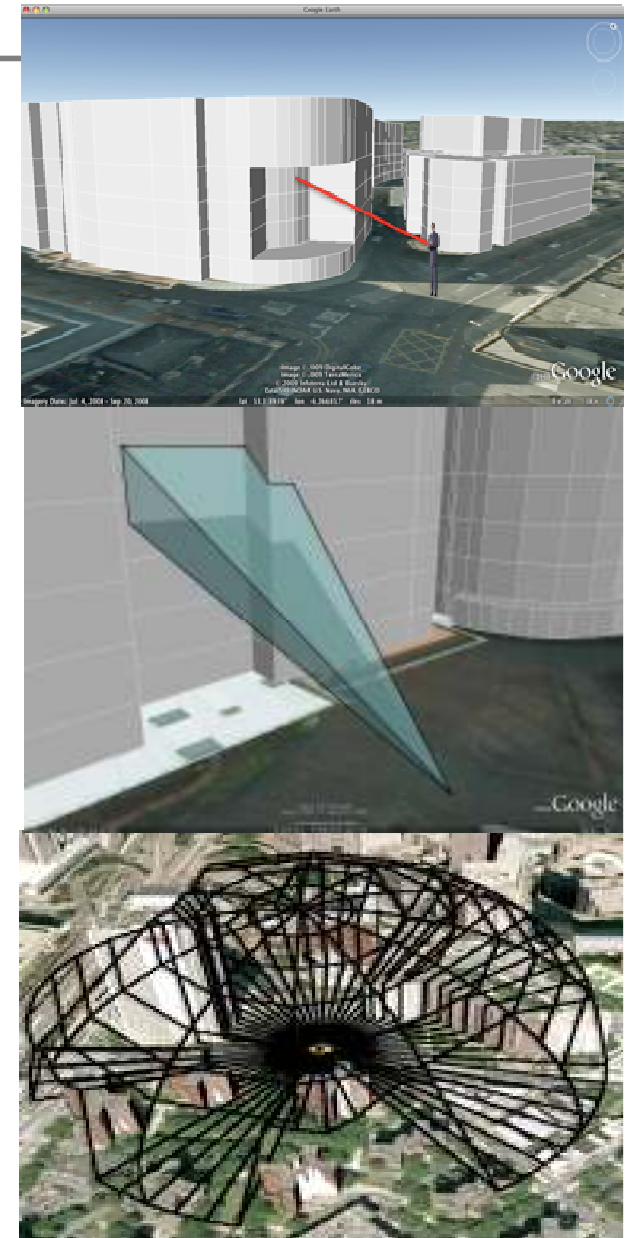
A military style *threat dome* query calculation for *smartphones* to **reduce information overload** and give a **more accurate and expected query result** in added-value LBS applications
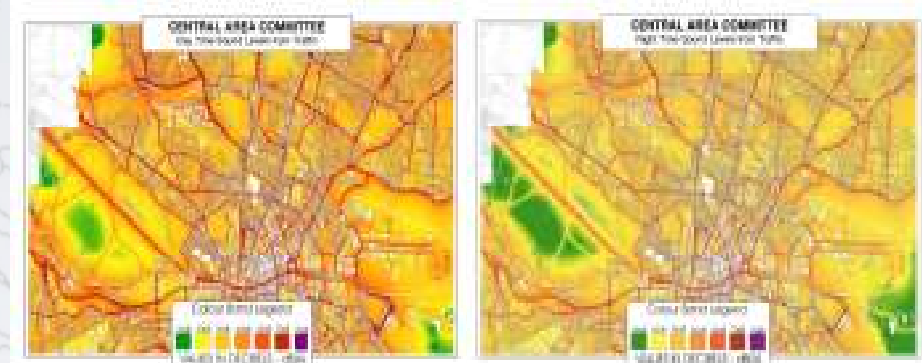

3DQ Features

- *hidden query removal* in 360º 3D
- off-the-shelf mobile devices
- Camera FoV query shape (frustum)
- Elevation of user <u>and</u> 3D cityscape taken into account

Mobile Citizen as Sensor:

- Extend the 3DQ prototype to 3D datasets of NUIM and Dublin City

    – populated with links to university and city specific meta-data
    (e.g. class schedules, office/lab locations, weather/air pollution sensors, etc.)

- Develop core data handling architecture to support *sensor data collection and visualisation* on Smartphones

    - Initial target sensors are
      noise levels (mic) and
      light levels (camera).

- Apply *map morphing* techniques for
  noise map and "quietest route" visualisation

Day and Night Noise Maps of Dublin City Centre

- Position 3DQ as a mobile *sensor web data mining tool* that supports efficient capture and convenient analysis of a variety of *Future Internet* data feeds
  - e.g. CO_2, NO_2 observations for calculating "cleanest route" visualisations, etc.

Thank You!

more information at…

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