

Real-time 3D applications

Academia, industry and government agencies across Singapore are starting to combine three-dimensional indoor maps, physical sensors and powerful data analytics to take Singapore into the future.

3D INDOOR MAPPING



- A laser scanner is set up at various locations in a building. It emits a moving laser which makes an automatic 360-degree scan of an indoor space, taking measurements of many points in quick succession.
- At each point, the distance of the object is calculated based on the time taken for the laser to travel to it and be reflected back. The result is a "point cloud" data set that can be turned into a 3D indoor map using computer software.
- A camera mounted on the scanner takes photographs at the same time. Computers can be "trained" to automatically identify objects in the photographs and append the information to the 3D map.

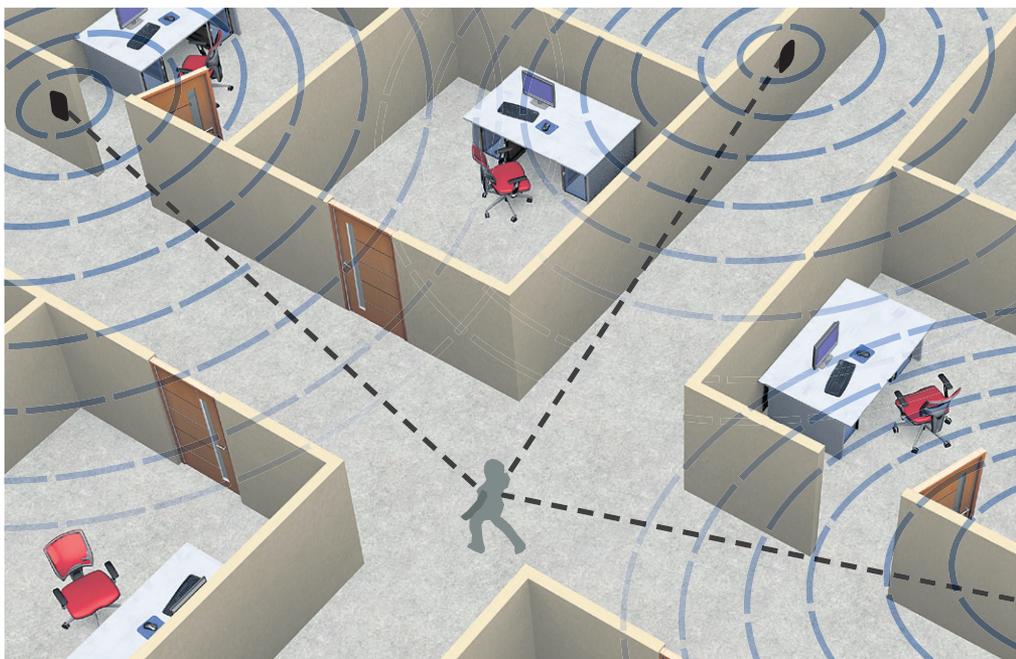
Scans up to
1 million points
a second

Ranges up to
120m

Resolution about
1cm

About
30
measuring stations
for a vacant two-storey bungalow

CALCULATING A PERSON'S POSITION USING SIGNALS FROM MULTIPLE RADIO TRANSMITTERS



Indoor positioning

- Devices such as smartphones can be configured to detect signals from Wi-Fi, Bluetooth or ultra-wideband transmitters located around the building. The signals weaken with increasing distance. The relative signal strengths of the different transmitters can be measured to determine the user's position.

- Ultra-wideband transmitters send out regular pulses of radio energy, each pulse covering a large range of frequencies. While triangulation using Wi-Fi or Bluetooth is accurate to several metres, ultra-wideband could potentially take it down to about 20cm.

SOME POTENTIAL APPLICATIONS OF 3D INDOOR MAPS WITH REAL-TIME DATA

- Building maintenance and heritage preservation
- Understanding customer preferences in shopping malls
- Managing crowds at big events
- Military war games and counterterrorism exercises