Smart World: A Better World
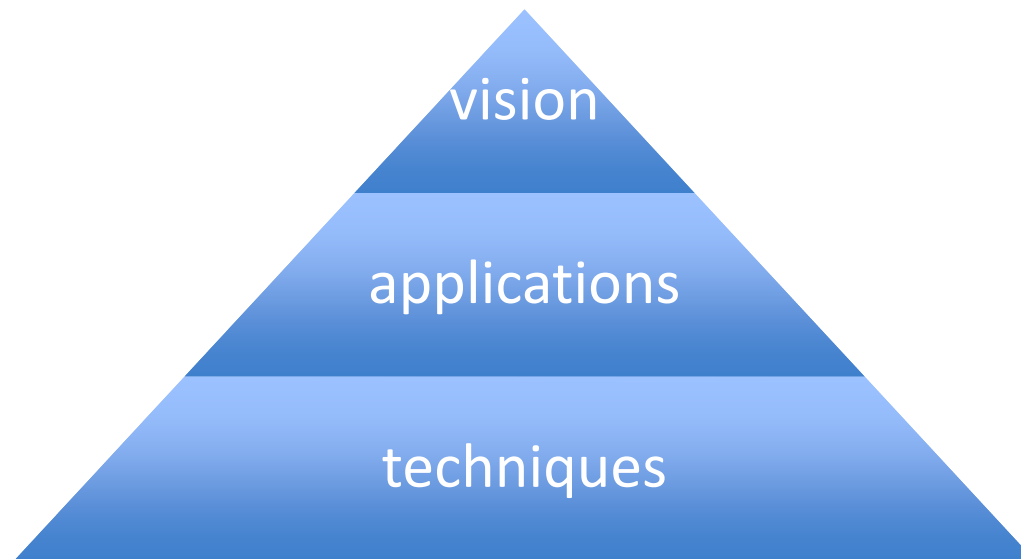
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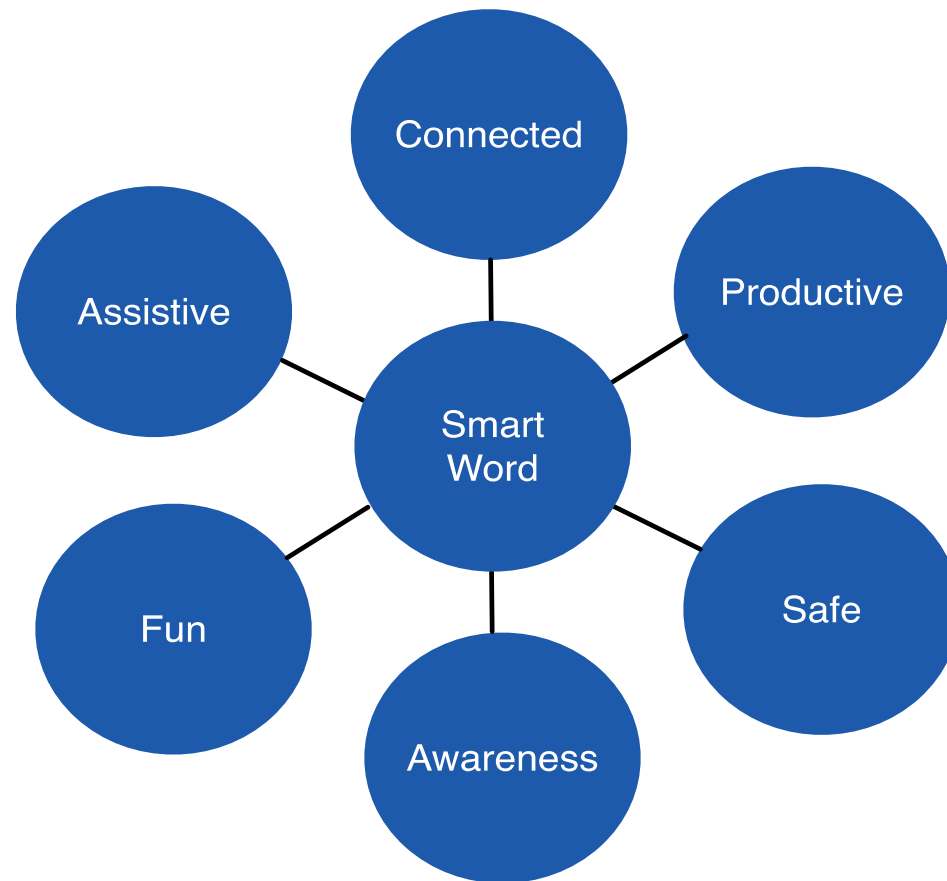
Outline

- The vision of a smart world
- Some representative applications
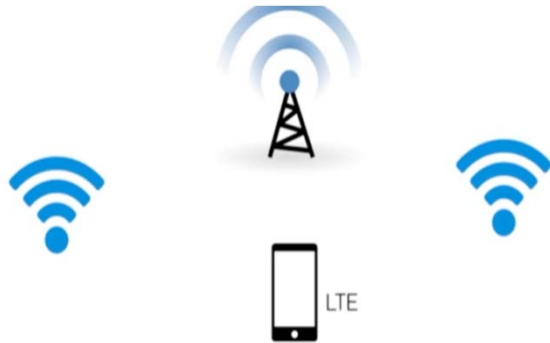- The emerging techniques

The Vision of A Smart World

Demonstrative Applications (1)

Seamless connection

Smart vehicle

Danger avoidance

Video-based navigation

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Demonstrative Applications (2)

Structure health monitoring

Posture-based control

Posture-based gaming

Wi-Fi, Pressure Sensing

Wireless sensing

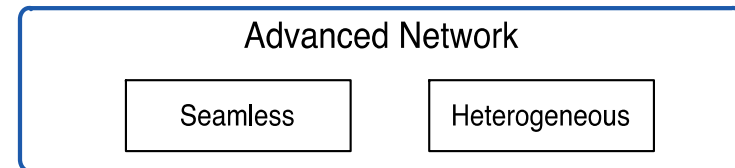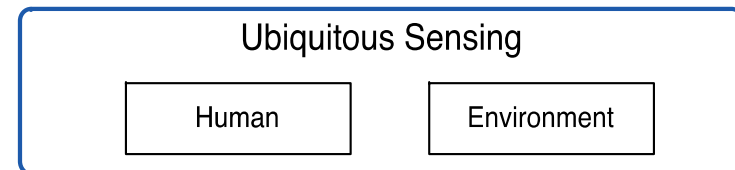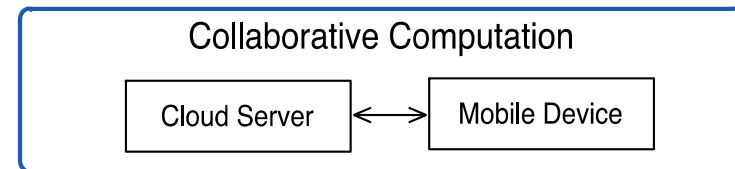SCIENCE CHINA PRESS

Emerging Techniques

- **Advanced Network**
  - Advanced heterogeneous network
- **Ubiquitous Sensing**
  - Accurate indoor localization
  - Sitting posture recognition
  - Wi-Fi sensing
- **Collaborative Computation**
 - Mobile cloud computing

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Advanced Heterogeneous Network

- To enable seamless connection, a fast and seamless handoff protocol is proposed.

- The protocol is based on context-awareness.

Accurate Indoor Localization

- We leverage Nanotron-chips to conduct an accurate indoor localization system.

- The system can be used in the construction site, which can ensure the safety of workers, such as alerting them around the danger zone.
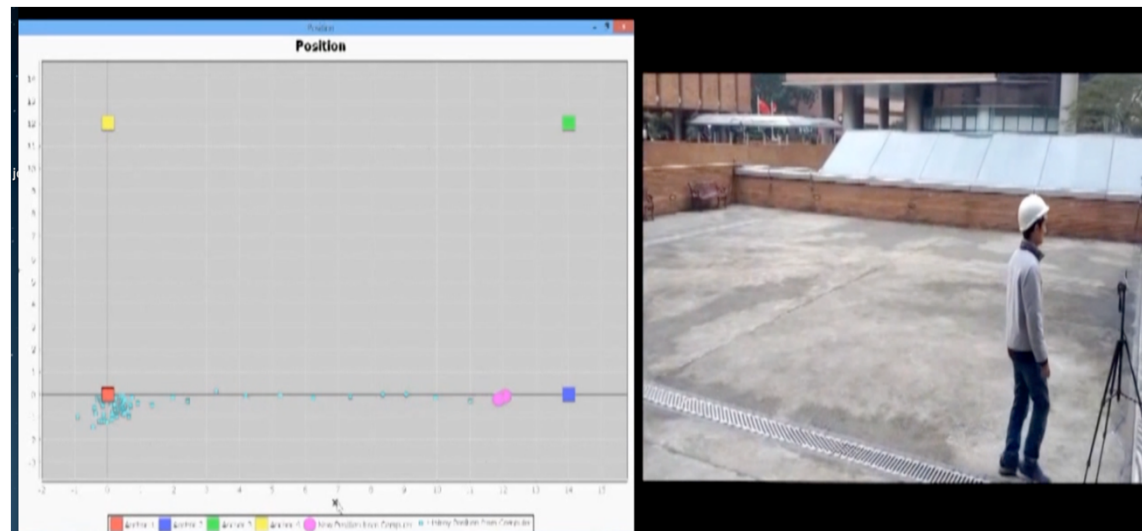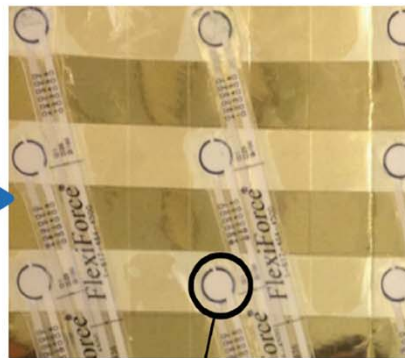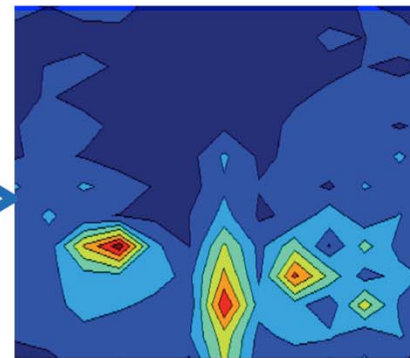
Sitting Posture Recognition

- Sitting posture recognition can offer new interface for the disabled.

- One non-intrusive approach is based on pressure sensors.

- The intuition is that different sitting postures result in different pressure distribution.

smart cushion   pressure sensor   pressure distribution

Wi-Fi Sensing

- Wi-Fi signals can be utilized to infer people's respiration rate.
- The key insight is that fine-grained wireless channel state information (CSI) can capture the rhythm of respiration.
- Based on the CSI, the patterns incurred by respiration can be extracted.

Mobile Cloud Computing

- We can perform video-based navigation such as identifying the description of building based on the video taken by mobile phone.

- Due to the limited computing capacity of mobile phone, we can offload some computation into the cloud to speed up the processing.

Smart World

assistive
more
awareness productive safe connected efficient fun