Children obesity treatment support with telemedicine

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Outline

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Meet the problem - Obesity

- Considered an endemic within Europe
- Example:
  - 1.5M/10 M Hungarian is definitely obese
  - 2.7 M/10M Hungarian considered overweight
- Several morbidities was casually linked to obesity:
  - non-insulin dependent diabetes mellitus (NIDDM), **stroke**, **ischemic heart disease (IHD),** immunological and reproductive dysfunctions and certain neoplasms.

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Meet the problem - Children obesity

- Diseases such as:
  - Down-syndrome → remain at younger mental state
- Obese kids do not want to do sports
- Obese kids still like to play
- Motivation is a key to success
- How to motivate a „children”?
  - „Good outfit” → no effect…
  - Also other higher level drives are poorly or not working
  - Gamification of the problem is an option…

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Gaming hardware available

- PC games
- Console games with movement sensors
  - Wii
  - Microsoft Xbox + Kinect
  - Sony Playstation
  - Omni
- Primary ranking factors
  - Price
  - Popularity
  - Effectivness

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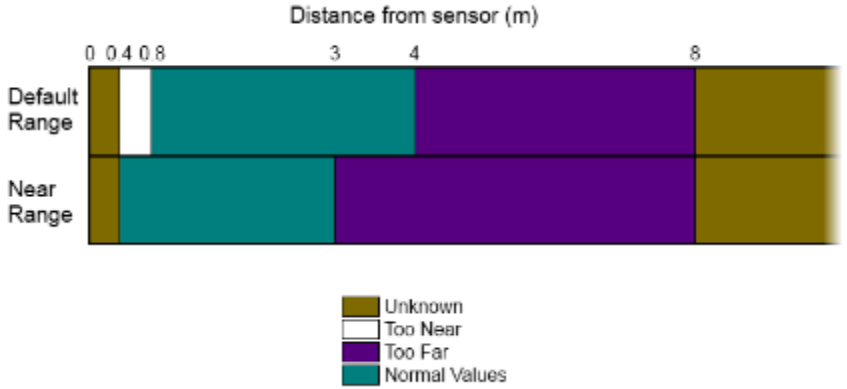
MS XBOX & Kinect

Kinect with RGB camera and infra sensor



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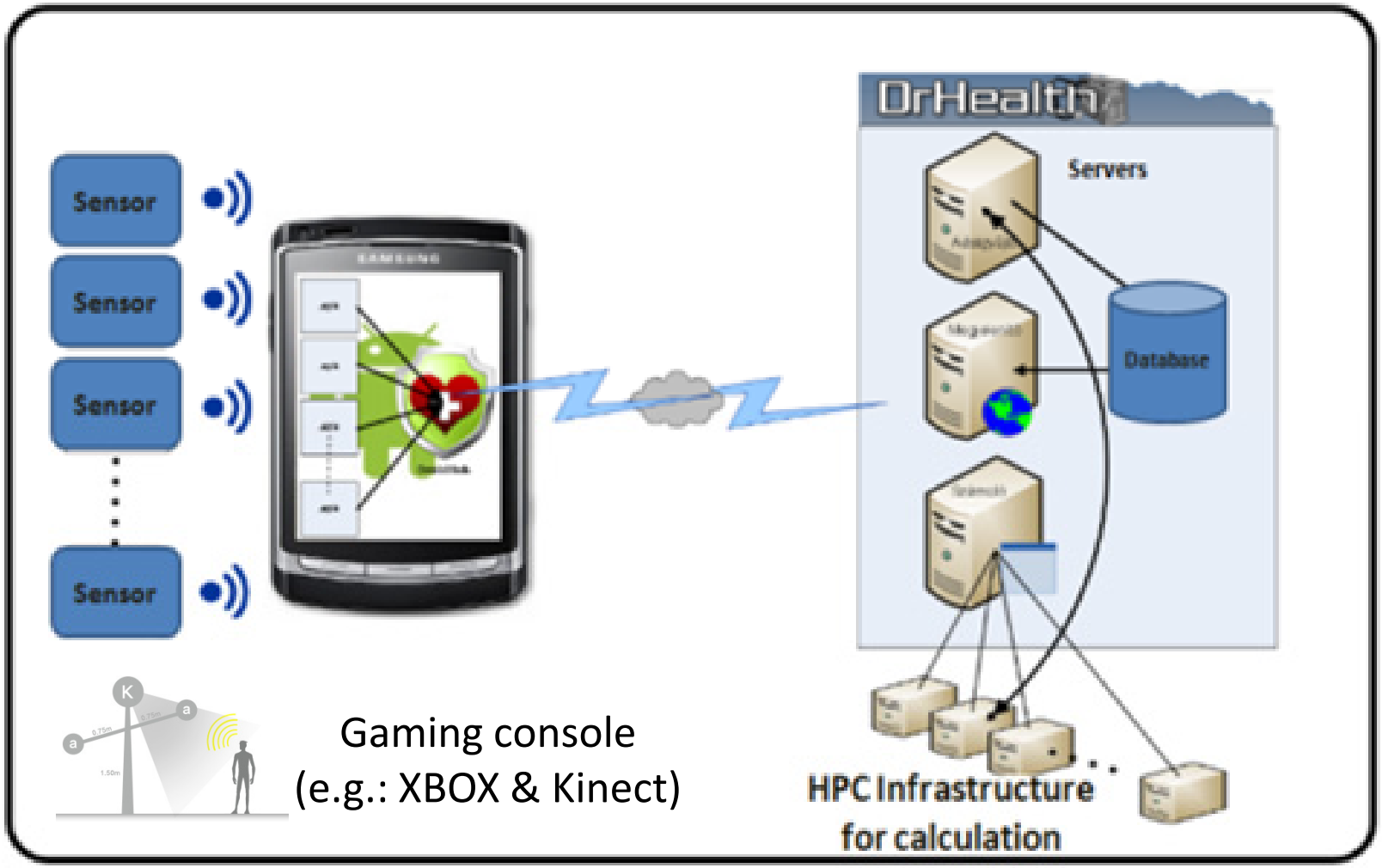
High-level system overview



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Pre - filtered games

XBOX 360	Target audience	Type
Kinect Rush: A Disney Pixar Adventure	Everyone (4+)	adventure game
Kinect Adventures	Everyone (4+)	adventure game
Kinect Sports	Everyone (10+)	sport
Kinect Sports: Season 2	Everyone (10+)	sport
Kinect Sports Ultimate	Everyone (10+)	sport
Dance Central	Everyone (12+)	dance
Just dance x	Everyone (12+)	dance

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DAQit - Mobile DAQ framework

- Connect small, portable DAQ devices to the data center
- Silent sensor DAQ mode at client side (automatic sensor data collection)
- Automatic sensor data pre-evaluation (if needed)
- Automatic data compression and encryption during data transmission towards the data center (if needed)
- DAQ mode via USB or Bluetooth
- Compatibility with large number (about 90%) of available Android based mobile devices (Android version 2.1+)
- Health status visualization (if needed)

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DroidHUB - Sensor set

- Modular system
- Basic setup:
  - Pulse
- Additional sensors
  - Activity monitors
  - ECG

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DrHealth - Data management center

- Automatic energy consumption calculation
- Internet/Web based access
- Data archive
- Activity/Training plans
- Activity/training log with sensor data
- Data sharing professionals/trainers vs. patients

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Future plans

- More console game evaluation → calorimetry tables
- Integrated decision support system (at client and server side)
- Increase existing number of facilities → 20

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Conclusions

- We have built up an obesity monitoring solution with our DAQit framework for children.
- We use games (console systems as training devices) for motivation and training
- We have integrated the DAQit framework with MS XBOX indoor game console system.
- We have evaluated available movement controlled games
- Gaming/training efficiency and health status can be monitored
- First monitoring facility at a medical service provider launched in February

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