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The Internet of Things

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Анотація

В данній роботі розглядається Internet of Things (Інтернет речей), мережа, що складається із взаємозв'язаних фізичних об'єктів (речей) або пристроїв, які мають вбудовані датчики, а також програмне забезпечення, що дозволяє здійснювати передачу і обмін даними між фізичним світом і комп'ютерними системами. Інтернет речей дозволяє реалізовувати такі концепти як «розумний будинок» чи «розумне місто», тим самим суттєво зменшуючи витрати ресурсів та оптимізуючи велику кількість систем.

Ключові слова: Інтернет речей, розумний будинок, розумне місто, глобальна мережа, віддалене управління.

Abstract

The Internet of Things is considered in this paper; a network that consists of interconnected physical objects (things) or devices having built-in sensors and software which allows to transfer and exchange data between physical world and computer systems. Internet of Things allows us to implement such concepts as a "smart house" or "smart city", thus significantly reducing costs and optimizing resources of a great amount of systems.

Keywords: Internet of things, smart home, smart city, global network, remote control.

The Internet of Things is a network of connected devices communicating over the Internet autonomously, machine-to-machine, often without the need for human intervention. The first reference to the IoT was in 1982, when researchers at Carnegie Mellon University developed the worlds first IoT-enabled Coke Machine. Mark Weiser developed the concept further in the early 90s; and Kevin Ashton coined the term Internet of Things around 1999 [1].

Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a smart grid, and expanding to the areas such as smart cities [2]. The analyst firm Gartner says that by 2020 there will be over 25 billion connected devices [3].

Internet of things allows us to control all devices at home using just a smartphone. Utilizing clever functions we can turn on heating remotely, set it to turn down the temperature if it is a sunny day, or even turn off when there is no-one home. The data can be obtained from motion-sensing cameras, or simply by seeing that owner’s smartphone (and therefore owner) has left the premises.

Also it can be used a broader scale. Nowadays, big cities have a very big problem with traffic. Using IoT we are going to have traffic flow optimization, because instead of just having stoplights on fixed timers, we’ll have smart stoplights that can respond to changes in traffic flow.

The IoT can be applied to things like transportation networks: "smart cities" can help us to reduce waste and improve efficiency for things such as energy use. Monitoring and controlling operations of urban and rural infrastructures like bridges or railway tracks is a key application of the IoT. The IoT can be used for monitoring any changes in structural conditions that can compromise safety and increase risk [4].

Environmental monitoring applications of the IoT typically use sensors to assist in environmental protection by monitoring air or water quality, atmospheric or soil conditions, and can even include areas like monitoring the movements of wildlife and their habitats [5]. The development of resource constrained devices connected to the Internet also means that other applications like earthquake or tsunami early-warning systems can also be used by emergency services to provide more effective aid.

Healthcare is the area where more data has the potential to save lives by preventing disease, monitoring it, and by analysing the creation of new ways of treatment. Smart pills and connected monitoring patches are already available highlighting the life-saving potential of IoT, and many people are already strapping smart watches or fitness bands to their wrists to track their steps or heartbeat while on a run [6].

Security experts argue that not enough is being done to build security and privacy into IoT at these early stages, and to prove their point have hacked a host of devices, from connected baby monitors to automated lighting and smart fridges, as well as city wide systems such as traffic signals. Hackers haven't put much attention to IoT; there is likely not enough people using connected appliances for an attack against them to be worth the effort, but as ever, as soon as there is a financial benefit to hacking smart homes, there will be a cyber criminal working away at it.

Of all the technology trends that are taking place right now, perhaps, the biggest one is the Internet of Things that is considered to be life-changing and energy-saving. The internet of things is a concept with the potential to redefine everything about the way we live on this small blue planet.

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