

INTERNET OF THINGS (IOT) PHYSICAL AND DIGITAL ENTITY CONVERGENCE

IoT in Smartphones

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Abstract

Since the commencement of the Internet of Things (IoT), it has transformed the smart appliance and consumer's field. IoT integrated within smartphones facilitates human-machine and machine-machine interaction. Smartphones can communicate and exchange data between each other or with other things. Things can detect the ambient environment through measuring properties such as sensors and compute data for optimal performance. The global accessibility and effectiveness of smartphones weave into people's daily lifestyle fabric.

Introduction

The Internet is like a globular connection of networks that allows information and communication to exchange between humans. The first graphical browser (Mosaic) for the world Internet was created and released to the public in 1993; gave rise to a transformative exchange of data between users (TED, 2012). In such a short time, the internet has taken massive and futuristic steps. The Internet of Things (IoT) first coined in 1999 by Kevin Ashton, has gained massive traction in technology by weaving physical and digital entities to facilitate human-human, human-machine, and even machine-machine interactions (Zhang, 2020). IoT is the network between physical entities (things) or digital entities (Internet devices or systems) that communicate through software, sensors, and other measuring properties for the primary purpose of data exchange. An aspect of the smart appliance and consumer field that is woven into daily lifestyles and is practically undistinguishable is a smartphone.

Smartphone

A smartphone is a combination of cellular networking and computing applications that are downloadable through a service platform. Our mobile phones are integrated with applications, software, and sensors that can control or exchange information with other things (TED, 2014). Information travels through networks into a vast digital cloud of intangible information that is computed and analyzed for optimal performance. The shared data from things inter-communicate under the same machine language constituted of 0's and 1's (1 byte= 8 bits unit of measurement for data). IoT combined with artificial intelligence is embedded in our smartphones, thus human-machine interaction is more frequent. Although IoT has many intangible impediments to overcome, wireless is close to being perfectly applied, thus, converting the Earth into a huge brain (smartphone) where all particles (things) of a real and rhythmic whole will communicate instantaneously, irrespective of distance (Novak, 2015).

Research smartphone accessibility

Smartphones were created in the early 1990s, but IoT spawned a new transformative and period of accessibility in the late 2000s with technological

advancements. That technological boost gave rise to massive smartphone manufacturing companies like Nokia, Apple, Samsung, Google, etc. IoT stimulated the economy of several countries and due to the uprise of technological giants, smartphone competition skyrocketed. Due to the business nature of supply and demand, it made smartphones are less cost-effective and more accessible to the population. A new trend that seems to be adopted by companies in the manufacture of smartphones with smaller bezels and more integrated sensors, thus increasing the selling price. Due to IoT immaturity and obstacles (perhaps financial hurdles), the smartphone penetration rate is still lower than 70% in many highly populated countries, in particular China and India (Statista, 2021).

Results

Figure 1.1 Global number of smartphone users: The figure below illustrates a linear increase of bars as the time measured in years elapses in response to the global number of smartphones users measured by smartphone subscriptions.

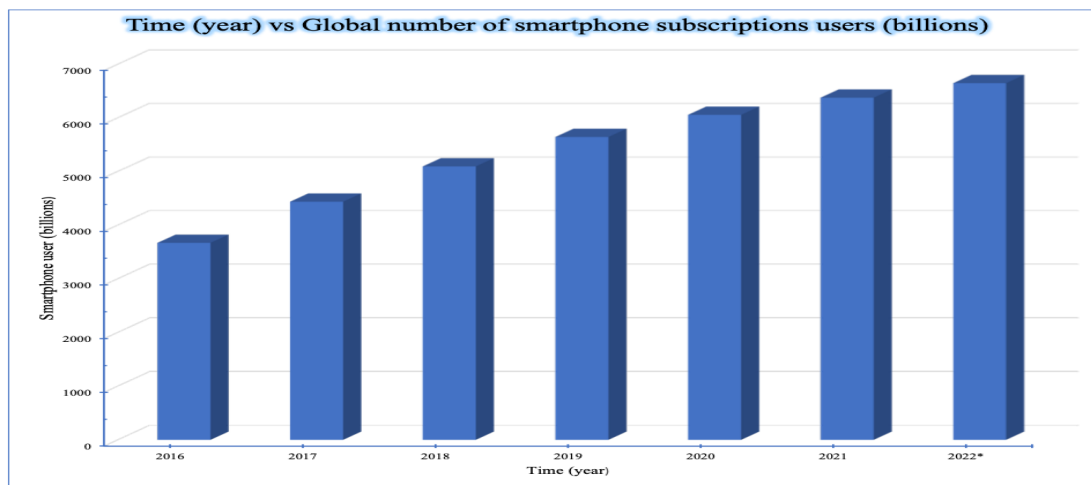


Figure 1.2 Smartphone data table: corresponds to the graph visualization of increasing smartphone users measured in billions.

| SMARTPHONE USERS | | | | | | | |
|------------------|------|------|------|------|------|------|-------|
| Time (year) | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022* |
| User (billions) | 3668 | 4435 | 5095 | 5643 | 6055 | 6378 | 6648 |

According to the retrieved data, the number of smartphone subscriptions worldwide today surpasses six billion and is forecast to further grow by several hundred million in the next few years (Statista, 2021). The retrieved data accounted for projected years (2016-2026*) not shown in the graphical visualization. The projected number of smartphone users was based on the revenue of the global smartphone market and other markers such as unit sales. The only shown projected year is 2022* and is forecasted at a billion behind the ~7.7 billion of Earth's population. Within a few years of IoT transforming the smartphone, usage has drastically increased over the last decade. The graph gives a clear visualization of the smartphone device almost being accessible to the whole population on Earth.

Conclusion

The link to perfect synchronization of physical and digital entities where the Earth is converted into a "smart" phone is close to perfectly being applied. The creation of the Internet revolutionized the world and now IoT has or is on the verge of repeating the course. The application of sensors in smartphones combined with IoT and artificial intelligence practically opens the door to infinite technological possibilities. In such a short time, thanks to IoT things can communicate and share data to increase performance. Downloadable applications in smartphones optimize performance in response to ambient detection and shared information from other things. Smartphones with the implementation of IoT have extended as an operative control and data analysis into healthcare, research, agriculture, fitness, and several other fields. Research supports the presented thesis, that smartphones are practically undistinguishable and woven into an individual's daily lifestyle.

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