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INTERNET OF THINGS APPLICATION RANKING USING ARCHITECTURE AND USAGE

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ABSTRACT

*The phrase **Internet of Things** (IoT) heralds a vision of the future Internet where connecting physical things, from banknotes to bicycles, through a network will let them take an active part in the Internet, exchanging information about themselves and their surroundings. This will give immediate access to information about the physical world and the objects in it—leading to innovative services and increase in efficiency and productivity. This paper studies the art of IoT Architecture and usages of various applications in various field. Finally some major usages in IoT are identified and discussed briefly.*

I INTRODUCTION

The **Internet of things** (stylized **Internet of Things** or **IoT**) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to ...

1.1 What Is IoT?

Internet of Things represents a general concept for the ability of network devices to sense and collect data from the world around us, and then share that data across the Internet where it can be processed and utilized for various interesting purposes.Some also use the term industrial Internet interchangeably with IoT. This refers primarily to commercial applications of IoT technology [1]in the world of manufacturing. The Internet of Things is not limited to industrial applications, however.

1.2 What the Internet of Things Can Do for Us

Some future consumer applications envisioned for IoT sound like science fiction, but some of the more practical and realistic sounding possibilities for the technology include:

- receiving warnings on your phone or wearable device when IoT networks detect some physical danger is detected nearby
- self-parking automobiles
- automatic ordering of groceries and other home supplies

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- automatic tracking of exercise habits and other day-to-day personal activity including goal tracking and regular progress reports

Potential benefits of IoT in the business world include:

- location tracking for individual pieces of manufacturing inventory
- fuel savings from intelligent environmental modeling of gas-powered engines
- new and improved safety controls for people working in hazardous environments

II NETWORK DEVICES AND THE INTERNET OF THINGS

All kinds of ordinary household gadgets can be modified to work in an IoT system. Wi-Fi network adapters, motion sensors, cameras, microphones and other instrumentation can be embedded in these devices to enable them for work in the Internet of Things. **Home automation systems** already implement primitive versions of this concept for things like light bulbs, plus other devices like wireless scales and wireless blood pressure monitors *t*hat each represent early examples of IoT gadgets. **Wearable computing** devices like watches and glasses are also envisioned to be key components in future IoT systems.The same wireless communication protocols like Wi-Fi and **Bluetooth** naturally extend to the Internet of Things also.[2]

2.1 Issues around IoT

Internet of Things immediately triggers questions around the privacy of personal data. Whether real-time information about our physical location or updates about our weight and blood pressure that may be accessible by our health care providers, having new kinds and more detailed data about ourselves streaming over wireless networks and potentially around the world is an obvious concern.Supplying power to this new proliferation of IoT devices and their network connections can be expensive and logistically difficult. Portable devices require batteries that someday must be replaced. Although many mobile devices are optimized for lower power usage, energy costs to keep potentially billions of them running remains high.

Numerous corporations and start-up ventures have latched onto the Internet of Things concept looking to take advantage of whatever business opportunities are available. While competition in the market helps lower prices of consumer products, in the worst case it also leads to confusing and inflated claims about what the products do.IoT assumes that the underlying network equipment and related technology can operate semi-intelligently and often automatically. Simply keeping mobile devices connected to the Internet can be difficult enough much less trying to make them smarter. People have diverse needs that require an IoT system to adapt or be configurable for many different situations and preferences. Finally, even with all those challenges overcome, if people become too reliant

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on this automation and the technology is not highly robust, any technical glitches in the system can cause serious physical and/or financial damage.

III ARCHITECTURE ANALYSIS

The architecture is like the backbone of IoT if it is not robust and flexible, deploying IoT will take more time than required. Thus, our research is prominent as it makes IoT easier to deploy. Although a number of architectures are present, it is important that any architecture be accepted universally addressing the several issues faced by IoT. Standardization has many benefits such as easy deployment, manageability, troubleshooting, etc. Our research includes solutions to various issues such as interoperability, performance and security issues.[3] Security has also been one of the concerns of IoT. By improving security within the architecture, IoT would be installed smoothly without any skepticism.

The architecture of Internet was developed in late 70's to use that architecture for IoT, which has billions of devices sharing data with each other, will not be practical. The amount of data produced by IoT cannot be handled by the current Internet architecture The new architecture of IoT should address several issues such as reliability, quality of service (QoS), security, and interoperability. The new architecture also needs to be universal i.e. it must be adopted by everyone so that it can be used for any application. The architecture must also be flexible so that it can be modified to change according to the future needs [4]

What are the design goals and the design principles that enable to achieve these goals?
The following are the design goals that I have identified for an ideal IoT architecture.

1. Manageability : Manageability describes the existence of intelligence in the architecture. The common types of manageability include centralized and distributed based control.

2. Security and Privacy : Security and privacy deal with the ability of how immune the architecture would be to outside attacks. It deals with various issues such as authentication, encryption, etc.

3. Mobility : Mobility should be considered in the architectures when the end nodes move from one place to another.

4. Cost-effectiveness : Cost-effectiveness determines the affordability of the architecture.

5. Efficiency : Efficiency is described in terms of power management of the different devices connected to the architecture.

6. Quality of Service (QoS) : QoS is a performance management technique for the prioritization of different data traffic from devices.

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V USAGES OF INTERNET OF THINGS

1. Smart home

Smart Home clearly stands out, ranking as highest Internet of Things application on all measured channels. More than 60,000 people currently search for the term "Smart Home" each month. This is not a surprise. The IoT Analytics company database for Smart Home includes 256 companies and startups. More companies are active in smart home than any other application in the field of IoT. The total amount of funding for Smart Home startups currently exceeds $2.5bn. This list includes prominent startup names such as Nest or AlertMe as well as a number of multinational corporations like Philips, Haier, or Belkin.

2. Wearables

Wearables remains a hot topic too. As consumers await the release of Apple's new smart watch in April 2015, there are plenty of other wearable innovations to be excited about: like the Sony Smart B Trainer, the Myo gesture control, or LookSee bracelet. Of all the IoT startups, wearables maker Jawbone is probably the one with the biggest funding to date. It stands at more than half a billion dollars!

3. Smart City

Smart city spans a wide variety of use cases, from traffic management to water distribution, to waste management, urban security and environmental monitoring. Its popularity is fueled by the fact that many Smart City solutions promise to alleviate real pains of people living in cities these days. IoT solutions in the area of Smart City solve traffic congestion problems, reduce noise and pollution and help make cities safer.

4. Smart grids

Smart grids is a special one. A future smart grid promises to use information about the behaviors of electricity suppliers and consumers in an automated fashion to improve the efficiency, reliability, and economics of electricity. 41,000 monthly Google searches highlights the concept's popularity. However, the lack of tweets (Just 100 per month) shows that people don't have much to say about it.

5. Industrial internet

The industrial internet is also one of the special Internet of Things applications. While many market researches such as Gartner or Cisco see the industrial internet as the IoT concept with the highest overall potential, its popularity currently doesn't reach the masses like smart home or wearables do. The industrial internet however has a lot going for it. The industrial internet gets the biggest push of people on Twitter (~1,700 tweets per month) compared to other non-consumer-oriented IoT concepts.

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6. Connected car

The connected car is coming up slowly. Owing to the fact that the development cycles in the automotive industry typically take 2-4 years, we haven't seen much buzz around the connected car yet. But it seems we are getting there. Most large auto makers as well as some brave startups are working on connected car solutions. And if the BMWs and Fords of this world don't present the next generation internet connected car soon, other well-known giants will: Google, Microsoft, and Apple have all announced connected car platforms.

7. Connected Health (Digital health/Telehealth/Telemedicine)

Connected health remains the sleeping giant of the Internet of Things applications. The concept of a connected health care system and smart medical devices bears enormous potential, not just for companies also for the well-being of people in general. Yet, Connected Health has not reached the masses yet. Prominent use cases and large-scale startup successes are still to be seen. Might 2015 bring the breakthrough?

8. Smart retail

Proximity-based advertising as a subset of smart retail is starting to take off. But the popularity ranking shows that it is still a niche segment. One LinkedIn post per month is nothing compared to 430 for smart home.

9. Smart supply chain

Supply chains have been getting smarter for some years already. Solutions for tracking goods while they are on the road, or getting suppliers to exchange inventory information have been on the market for years. So while it is perfectly logic that the topic will get a new push with the Internet of Things, it seems that so far its popularity remains limited.

10. Smart farming

Smart farming is an often overlooked business-case for the internet of Things because it does not really fit into the well-known categories such as health, mobility, or industrial. However, due to the remoteness of farming operations and the large number of livestock that could be monitored the Internet of Things could revolutionize the way farmers work. But this idea has not yet reached large-scale attention. Nevertheless, one of the Internet of Things applications that should not be underestimated. Smart farming will become the important application field in the predominantly agricultural-product exporting countries.

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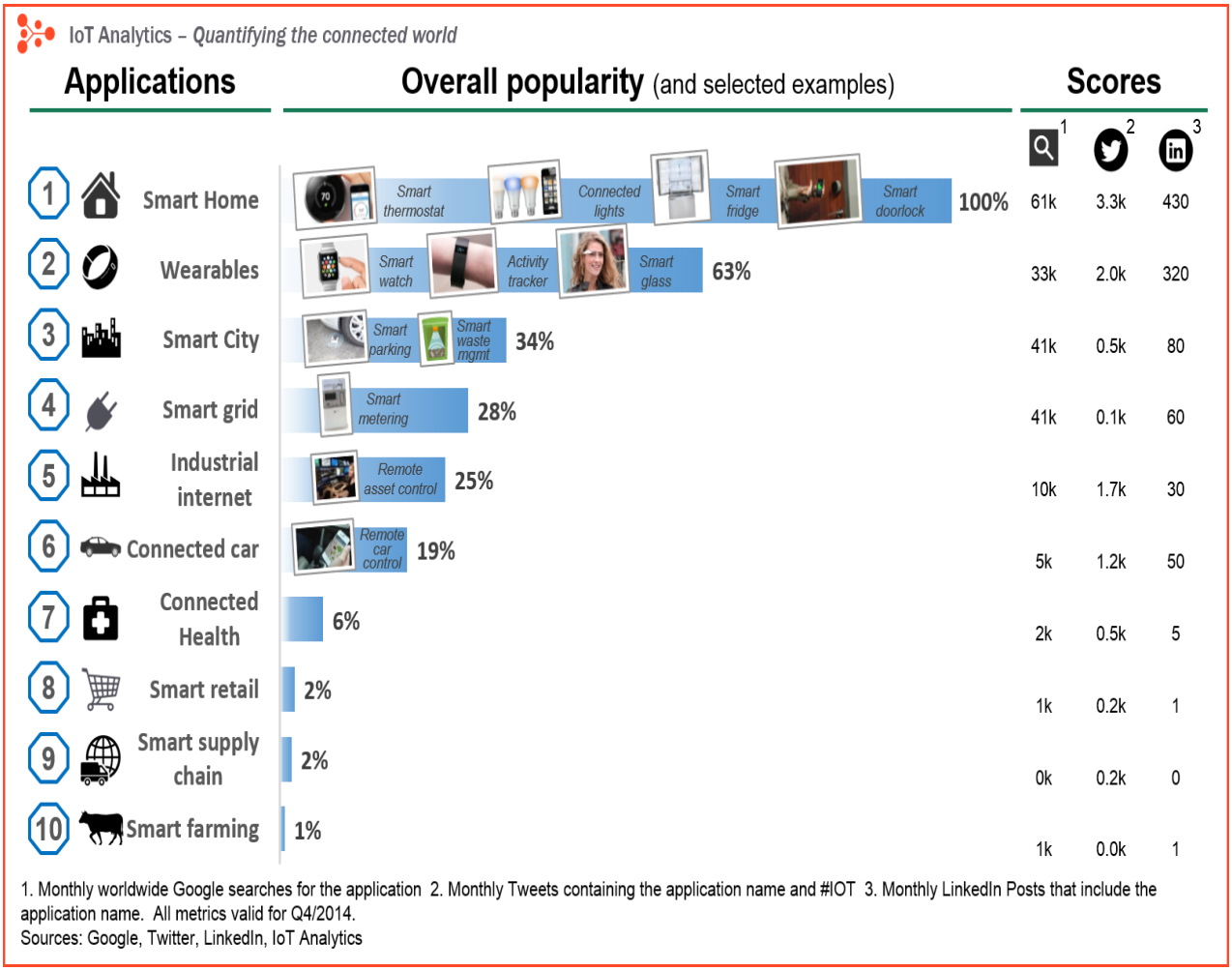
VI. FIGURES AND TABLES



VII CONCLSION

In conclusion, it is safe for that IoT is the inevitable future of the Internet. IoT connects billions of devices and enables machine-to-machine communication. It can transform daily life with everyday objects connected to each other and the Internet. We have identified the design principles for an ideal architecture from the shortcomings of other architectures and also the Usages of Internet things .This paper will produce the Overall Popularity of Internet things.

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