**Internet of Things Robert Mooney 19278772**

**Github Repository:** <https://github.com/rmooney633/CS4182_Project>

The Internet of Things (often referred to as IoT) is a very broad concept overall. It is the interconnection of everyday devices, such as home appliances and vehicles, and is the way that machines communicate with each other (without requiring human to human or human to computer interaction) for the purpose of improving automation and therefore increasing efficiency.

This definition of Internet of Things has evolved throughout the years due to the rapid development, improvement and innovation in technology as developers are coming up with innovative ways for people’s lives to become more convenient through the use of interconnected internet devices. Before it had the name of Internet of Things, the first use of a network of smart devices was in early 1982, where a team at Carnegie Mellon University created the first Internet-connected appliance with a modified Coca-Cola vending machine. The vending machine had an implemented sensor that tracked the information useful for a vending machine, such as the current stock of each specific drink, which would be sent to the development team’s computer. Although this is standard and looks simplistic to today’s standards, this was a massive breakthrough that many didn’t think would spiral into what it is today. For the time, it allowed for a slight technological advantage to the companies that implemented it, getting over some of their rivals.

It wasn’t until later in 1999 that the name Internet of Things came about. It is not known for definite who came up with the name, but it was likely Kevin Ashton who worked for the prestigious company Procter & Gamble. Although at this time the definition was very basic, he said it was “simply the point in time when more ‘things or objects’ were connected to the Internet than people”. The “point in time” was between 2008 and 2009 with the things/people ratio growing from 0.08 in 2003 to 1.84 in 2010. In 1999 the essential component to the Internet of Things was radio-frequency identification (RFID), this uses electromagnetic fields to automatically identify and tracks tags attached to objects (similar to a bar code).

A reliable and massive Internet of Things network will require a compatible standard for all the connected devices as they need to able to communicate with each other to transfer the data that each device is storing. Multiple different standards would make the communication between the devices more complicated. In 2016 this problem was made less of a problem, with the introduction of the Hypercat standard. It is now supported by major firms, such as ARM, Intel and Accenture, which have agreed on a format that will allow for a broader range of products to compatible with each other. Matthew Evans, the IoT programme head at TechUK, said “there is a high cost of not intervening” (Burgess 2018), this was in the thought of creating a world wide standard sooner will be more beneficial than allowing for an increase in the number devices using different standards. Microsoft has tried to introduce their own system that helps businesses a managed central platform for setting up their IoT devices, called IoT Central. Microsoft claim that the IoT Central will help simplify the creation of IoT networks.

Two of the biggest technological advancements in terms of Internet of Things is with automobiles and people’s homes. The advancements in home appliances has allowed for the present “smart homes”. The Internet of Things has allowed home owners to have automatic heating through devices such as the ‘Nest learning thermostat’, and it also allowed for increased security and convenience through the use of the ‘Ring doorbell’ which allows the owner to use a security camera when the doorbell rings which is connected to the internet. The vehicle manufacturer Tesla has also had an innovative breakthrough as it was the first car to update its Tesla model x through the use of the internet. This has allowed for companies to constantly improve a current car instead of waiting to implement the improvement to the next future car, most people would agree that this has allowed for the industry to be more consumer friendly. However, people have had worries about the security issues and possible errors that these Internet of Things devices could bring. The Internet connectivity has made it possible for the threat of potential hackers interfering with your devices, such as when a hacker got into a couple’s Google Nest in Wisconsin, USA and started to talk to them and increased their heat (Peterson 2019). On the other hand, this has been a pretty isolated incident with very few instances of a hacker being able to get into people’s devices being reported and Google claimed that there was not a breach on their half, but rather a fault on the couple’s password strength. Another major concern with a growth in Internet of Things is the fact that humans can be out of the equation if IoT continues to grow. Bill Gates stated that lower end of skill set jobs such as drivers and factory workers may soon see their jobs be taken over by robotics that can be self sufficient without the need of human interaction (Bort, 2014).

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