Popular Science Summary

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The humanity witnessed several great revolutions that changed people's daily life. First, the steam and the machines brought to the automation of some old hand works. Subsequently, the electricity, the assembly line, and the mass production led the revolution for many decades. More recently, the third era of industry began with the advent of computer systems and more sophisticated automation.

Today, we are experiencing the Industry 4.0 revolution, characterised by a society in which smart devices (also dubbed "things") are strongly interconnected and exchange data over the Internet without human intervention. This plethora of interconnected smart "things" is commonly identified as the *Internet of Things* (IoT). The aim of the IoT is to optimise and automate current manual tasks, evolving the resulting services. In the IoT revolution, *Cloud computing* plays a crucial role since each new service tends to be provided by a "cloud" made of information systems located anywhere and reachable through the Internet. In this context, the concept of *Fog computing* emerged as an extension of Cloud computing that allows applications to run closer to the users and the IoT devices. Fog computing bridges the gap between Cloud and IoT and merges the benefits of Cloud computing with the mobility of the Internet of Things.

However, the increasing connectivity of smart devices arise severe privacy and security implications. This plethora of devices is extremely poorly secured and often exploited by malware to perpetrate powerful cyber-attacks.

In this PhD project, we investigate the use of Fog computing as a possible solution to tackle the security issues introduced by the IoT revolution. First, we analyse Fog computing, Cloud computing, and IoT, focusing on their security aspects. Then, we use this knowledge to design, implement, and evaluate a new security solution for the IoT. The result is AntibIoTic 2.0, a distributed security system that relies on Fog computing to secure the IoT.