Towards the Design of Ethics Aware Systems for the Internet of Things

Sahil Sholla*, Roohie Naaz Mir, Mohammad Ahsan Chishti

Computer Science and Engineering Department, National Institute of Technology Srinagar, Hazratbal 190006, India
* The corresponding author, email: sahilsholla@gmail.com

Abstract: The Internet of Things promises to offer numerous societal benefits by providing a spectrum of user applications. However, ethical ramifications of adopting such pervasive technology on a society-wide scale have not been adequately considered. Smart things endowed with artificial intelligence may carry out decisions that entail ethical consequences. It is assumed that the functioning of a smart device does not involve any ethical responsibility vis-a-vis its application context. Such a perspective may precipitate situations that endanger essential human values or cause physical or emotional harm. Therefore, it is necessary to consider the design of ethics within intelligent systems to safeguard human interests. In order to address these concerns, we propose a novel method based on Boolean algebra that enables a machine to exhibit varying ethical behaviour by employing the concept of ethics categories and ethics modes. Such enhancement of smart things offers a way to design ethically compliant smart devices and paves way for human friendly technology ecosystems.

Keywords: Boolean; ethics aware; ethical design; Internet of Things

I. INTRODUCTION

The Internet of Things (IoT) is a recent networking paradigm according to which apart from computers, smart phones and other high end devices, even ordinary things are connected to the global internet. This has been made possible due to the recent advances in miniaturization and communication technologies. Ordinary things like keys, furniture, buildings, home appliances, vehicles and numerous other devices are embedded with communication and processing capabilities to realise the vision of IoT. The idea is to achieve ubiquitous connectivity of devices that are able to sense their environment, upload the sensed data to a cloud where it is processed to provide novel user applications. IoT vision offers numerous promising applications that have the ability to transform the way we interact with the physical world. Application domains include smart transportation, smart grid, smart home, smart healthcare etc. In view of its strategic importance, IoT has promptly become an active area of research globally.

However, IoT applications also introduce some challenges that need to be addressed for a meaningful realisation of the promised benefits. Sensors embedded in home appliances, TVs, laptops, clothes, curtains etc. would have access to a plethora of confidential information. With the capability to sense environment, process data and exchange information, smart devices may endanger the privacy of individu-

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