

Chapter 5

Citizen Science, Air Quality, and the Internet of Things

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ABSTRACT

This chapter discusses the emergence of the Internet of Things, using a case study of a citizen science initiative, focusing in particular on issues involved in measuring air quality. The core of the citizen science initiative was formed by a world-wide network of early adaptors of the Internet of Things who, motivated by public health issues, set out to create widely available tools for air quality measuring. With these tools, they established a global, citizen-led, air quality measurement network. Besides highlighting a number of social and technological issues which are involve any such enterprise, this chapter engages with the discourse surrounding the use of IoT in collective sensing projects. Two questions are salient here. Firstly, can IoT technology be used in a citizen science context to monitor air quality? And secondly, does the construction of these devices lead to a successful mobilisation around issues of air quality?

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INTRODUCTION

The study of atmospheric pollution is admittedly an untidy science. (Meetham, 1952)

While there are many environmental factors that can affect our health and well being the air all around us is often perceived as a matter of lesser importance. It is only in the case of major incidents, such as leaks from chemical factories, the explosion at Bhopal, or radioactive fallout like that from Chernobyl or Fukushima that raise public concerns and demand action. This apparent contentedness might be due to two factors – as a major environmental matter air is seen as universal, shared and paramount. Invisible in its nature, it can be perceived as something that cannot be affected by ones individual actions. Second, despite the evidence and growing concerns over the effects of air quality, one could argue (even if incorrectly) that we are living in a much cleaner environment, when compared to the not so distant past. In recent years, however, there has been a growing interest in and concern about air quality. As this research will argue, the conversation about air quality has been renewed by recent developments in technology and citizen science.

The data in this study is drawn from ethnographic research conducted in physical and virtual spaces, primarily between 2011 and 2013, of a group of early Internet of Things (IoT) developers and an evolving community of air quality activists. It uses theoretically informed analysis of data from interviews, mailing list exchanges and comments on online platforms. We augment the methods of traditionally qualitative approach, with its desire to understand the social world and its meaning for its participants, with elements of discourse analysis in order to uncover the ways in which this world is produced. It is from such a viewpoint that this chapter will address the relation between the citizen science, IoT and the complexities involved in measuring the air quality.

AIR POLLUTION AND SOCIAL AWARENESS

The discourse around air pollution is centuries old, while the legislative process is slow and most often ineffective. In Britain, the first recorded effort to combat air pollution dates back to the reign of King Edward I in the year 1272, when at the request of some noblemen and clergy, the king banned the use of sea-coal. “Anyone caught burning or selling the stuff was to be tortured or executed” (Urbionato, 1994). The ban seemed to have little effect, as in the 14th and 15th centuries, other measures to regulate the use of sea-coal were introduced by subsequent kings (Kotin & Falk, 1964). In 1661, John Evelyn, a notable diarist of the days of King Charles II, published the anti-coal pamphlet: *Fumifungium: or the Inconvenience of the*

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