Ethical issues in Big Data analytics for time critical mobility forecasting

Gemma Galdon Clavell and Victoria Peuvrelle

Abstract Big Data analytics for time critical mobility forecasting involves the use of large amounts of data from different sources, which are combined to gather new insights and foresee potential needs and developments. Due to this intensive use of data and the sensitivity of projects involving critical infrastructures and technologies, the use of Big Data analytics for time critical mobility forecasting has legal and ethical impacts and risks that need to be addressed and mitigated. While this may not be obvious at first glance in some cases, as the presence of personal data and direct impacts on individuals may be minimal, ethics issues are still relevant. These are related to the possible privacy- and security-related consequences, as well as potential misuse and "function creep", both during product development and testing and in the actual use of the final product. This chapter thus seeks to tackle those ethical challenges as they were addressed by an expert ethics team in the EC-funded datAcron project. We start by explaining the efforts made at the EU level to ensure the ethical development of publicly-funded technologies and the framework and risks all projects need take into account, and then we briefly go over the different insights and actions regarding the datAcron project to ensure the ethics compliance of the project. While the process and advice developed is specific to datAcron, we believe it holds lessons for other similar initiatives seeking to be aware of and comply with their ethics obligations.

Key words: Big Data Analytics, Mobility Analytics, Ethical Issues

Gemma Galdon Clavell
Eticas Research and Innovation, Barcelona, Spain
e-mail: gemma@eticasconsulting.com

Victoria Peuvrelle
Eticas Research and Innovation, Barcelona, Spain
e-mail: victoria@eticasfoundation.com

There is an increasing awareness of the need to combine investment in new, innovative technologies with a deeper understanding of their legal, social and ethical impacts. Recent controversies surrounding the legality, acceptability and unexpected impact of technological developments in the field of security have led to an increased interest and concern in addressing societal issues in the field of EU research and innovation, with a specific emphasis on legal compliance, longer-term phenomena and the need to better govern and exploit, at an early/conception stage, the negative and positive externalities of technological innovation processes and products in the short, medium and long term.

The chapter presents the efforts carried out at the European level to tackle ethics issues in research projects developing new technologies. These led to the ethics monitoring scheme developed by the European Commission in order to ensure that the projects it funds follow international standards in terms of ethics. This monitoring scheme is then used as a model to explain the actions to take when seeking to tackle ethics issues in Big Data analytics for time critical mobility forecasting. To this effect, the chapter explains the usefulness of the identification of certain factors which can lead to issues, followed by an explanation of the concept of Privacy by Design and of a data management plan. Finally, licensing options and their relevance are discussed. The implementation of these measures lead to the robust tackling of ethics issues both before and during the development of projects developing new data-driven technologies such as datAcron.

Specifically, in projects dealing with Big Data, responsible research is a particularly sensitive issue, as data from different sources and of different times is gathered/generated, mined, combined, shared and used to forecast future events in ways that are often unaccountable, or that render the information vulnerable. The positive impact of these innovations can nevertheless be maximized if the necessary legal, social and ethical precautions and mechanisms are put in place.

This chapter goes over the specific ethics issues that projects such as datAcron might encounter. The most relevant ones are the possible consequences of event recognition, trajectory analytics and misuse by end-users for privacy and security, which can arise when individually owned vessels and planes are included in the dataset, and potential misuse of the technology by end-users. Other potential issues are also discussed, such as subjective thresholds in defining terms, automated decision-making, accuracy of data, undesirables reuses of data and technological divide and discrimination. These, however, are more high-level and linked to data management.

The sections of this chapter thus go over the necessary steps to address the aforementioned ethical issues in a way that is consistent with the principles of responsible research and innovation, privacy and data protection rules and guidelines, and ethical safeguards, specifically in the handling of data, development of experiments and potential future use of the technology. First, existing methodologies to carry out ethical research at the European level are presented. Secondly, ethics issues in mobility forecasting are explored, focusing on the mobility of moving objects. Recommendations are made to tackle those ethics issues in the third and final part of this chapter.