Fairness and Regulation of Violence in Technological Design

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ABSTRACT

The purpose of this article is to explore how the design of technology relates to the fairness of the distribution of violence in modern society. Deliberately or not, the design of technological artifacts embodies the priorities of its designers, including how violence is meted out to those affected by the design. Designers make implicit predictions about the context in which designs will perform, predictions that will not always be satisfied. Errors from failed predictions can affect people in ways that designers may not appreciate. In this article, several examples of how artifacts distribute violence are considered. The Taylor-Russell diagram is introduced as a means of representing and exploring this issue. The role of government regulation, safety, and social role in design assessment is discussed.

Keywords: Artificial Morality, Driving, Packaging, Policing, Technoethics and Fairness, War

1. INTRODUCTION

Hybrid cars are applauded primarily because of their fuel efficiency and the reduced amount of pollution that they produce. Besides these advantages, hybrid cars such as the Toyota Prius are also quieter than conventional cars. This difference results from their reliance on electric instead of gas or diesel engines. In the absence of internal combustion and the vibrations that it causes, cars like the Prius can move through city streets in relative silence.

The quiet operation of hybrid and electric cars might be thought of as an added bonus. Mostly, it is. However, it has been noted that quiet cars like the Prius could pose a danger to the blind. That is because, when blind persons walk near cars or cross streets in traffic, they use the sound made by the engines of the cars in traffic to estimate their speed, location, and direction of travel. Since the Prius is so quiet, this information is diminished. Without this information, blind pedestrians might be unable to detect an oncoming hybrid and so step out in front of one, resulting in a collision.

This situation illustrates a significant connection between technological design and violence: The design of a piece of technology can, in effect, act to regulate the distribution of violence within a society. The violence, in this case, consists of collisions between pedestrians and cars, in addition to the health threats posed by pollutants, greenhouse gases, and noise. The design of the hybrid car affects how these harms are distributed between the two constituencies involved here, namely blind pedestrians and residents of areas where the cars operate.

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This problem raises an issue of fairness. Here, fairness refers to what is termed “distributive justice” (Aristotle, 1998), that is, the distribution of burdens and benefits amongst the members of a society. Shelley (in press) shows that fairness is a common issue relating technological design to society. That is, the design of technologies often has implications for the distribution of benefits or harms between different constituencies within a society. In the case of quiet hybrid cars, the harms are threats of injury through collision versus through emissions or noise, and the constituencies are blind pedestrians and local residents, respectively. The concern becomes problematic because the design of the cars effectively pits the two constituencies against one another: The more that blind pedestrians face a threat from Priuses, the less that residents face a threat from emissions and noise pollution.

Of course, the danger is not yet acute because electric hybrids and electric cars are relatively rare so far. However, the threat is being taken seriously. The US government recently passed the Pedestrian Safety Enhancement Act of 2010, requiring the Secretary of Transportation to study methods for protecting vulnerable pedestrians. In response to this Act, Nissan has decided to design its electric Leaf car to emit recorded sounds when it is put in gear (Eaton, 2010). In that way, it is hoped that blind pedestrians will be alerted to the approach of the car. In assessing this law, and Nissan’s response to it, we must address the issue of how fairly this design treats the competing interests of pedestrians and residents.

The purpose of this article is to explore further the role of fairness in the regulation of violence in technological design, as illustrated by the electric car example. In particular, I wish to demonstrate how such issues can be identified and clarified through the use of the Taylor-Russell diagram (T-R). In the remainder of this paper, I provide an overview of the T-R diagram and how it applies to further examples in which the design of technologies serve to regulate the distribution of violence in societies. The impact and resolution of fairness issues can then be addressed.

2. THE TAYLOR-RUSSELL DIAGRAM

The Taylor-Russell (T-R) diagram was invented by the psychologists Taylor and Russell to help analyze the validity of scholastic aptitude tests, such as the modern SAT (Taylor & Russell, 1939). This section provides a brief overview of the T-R diagram using the analysis of the SAT as an illustration.

The basic purpose of a SAT is to predict which applicants would successfully complete their degrees if admitted to university. Prediction is important in this context because there are fewer places available than there are applicants for them, so that it is not possible to offer admission to all. The best solution would be to know in advance which applicants would be successful. However, since such foreknowledge is hardly possible, the next best solution is to generate a prediction. In the United States, predictions are made on the basis of standardized tests.

The result of testing and then educating students is, among other things, a pair of data points. The first point is the student’s score on the SAT while the second point is the students graduating average. These points can be paired and plotted in a scatterplot, such as those in Figure 1. In each plot, the predictions, that is, the SAT scores, lie along the x-axis. The actual events or outcomes lie along the y-axis. When enough data points are accumulated, the plots begin to reveal the accuracy of the prediction system. In the first plot (a), the prediction system is not especially accurate; the points fall across a wide area of the scatterplot. The width of the smallest ellipse, with its major axis along the main diagonal of the plot, illustrates how broadly the points fall in the plot. The correlation between predictions and actual events is low, roughly 0.2. In Figure 1(b), the accuracy of the system is higher, with a correlation of 0.5, and the width of the ellipse is smaller. In Figure 1(c), the accuracy of the system is high,
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