BOOK REVIEW

Autonomous Vehicles and the Law: Technology, Algorithms and Ethics BY HANNAH YEE FEN LIM, ed; [Massachusetts: Edward Elgar Publishing, 2018. ix + 147 pp. Hardcover: US$76.14]

Of all the technologies that are wrought with the advent of artificial intelligence ("AI"), nothing captures both its potential and its dangers more than its use in autonomous vehicles ("AVs"). AVs have been touted as having the potential to radically transform a nation's transport system by addressing manpower challenges, easing traffic congestion and reducing traffic fatalities. The various trials of AVs in the form of cars and shuttles on public roads, parks and research institute grounds and the retail availability of self-driving Tesla vehicles have further captured the public imagination. Much has been made in the media about accounts where Teslas have saved their inattentive drivers from near fatal accidents and driven their incapacitated drivers to hospitals. Less, however, has been said about the accidents involving AVs that have caused driver and pedestrian fatalities.

Autonomous Vehicles and the Law, Technology, Algorithms and Ethics by Hannah Yee Fen Lim attempts to proceed on the path less travelled. It is one of the first books in academic literature that parks the dialogue on the issues of AVs squarely within a legal framework of tort law. In her 137 page monograph, the author takes the reader on a journey that starts with a description about the sensors like LIDAR, cameras, and radars in AVs, changes gears and discusses about the standard of care in negligence with reference to the various reported AV accidents, turns into a note about software and AI systems and the difficulties of verifying that they are working properly, accelerates through the scope and limitations of strict liability for product defects, and ends with an argument for active regulatory intervention for semi-autonomous and AVs.

Just as a medium sedan has more cargo space than a compact car, the strength of the author's monograph is that compared with journal articles, it is nicely adorned with rich technical chapters that describe in lay terms how sensors work and how machine learning algorithms, the basis for AI, function and are trained and deployed. No doubt these chapters will be useful primers for legal academics and practitioners to learn about AI. Indeed, the monograph in part feels like a mid-sized car: while it has fewer research ornamentations than a textbook on negligence and product liability, it is specific to the AV industry and gets the job done with fair economy.

However, like a planned road trip, the author opted to detour around discussions about insurance and criminal liability—issues which the reviewer would like to see

more of as they undoubtedly need to be resolved before AVs can receive popular acceptance. Instead, the author opted to focus attention primarily on the potential liability of the AV manufacturer in negligence. On the other hand, the AV developer (and its subcontractors), who are separate from the manufacturer, only appear like hitch-hikers in the discussions, when more could be said about the crucial role they play as architects of AVs by integrating the sensors, the exogenous maps, the vehicular drive train, and safety systems with the driving interfaces to enable an autonomous driving experience. In addition, the discussion seems to drive into a potential pothole by arguing that to meet the requisite standard of care, there should be "more" of everything, for example, different and larger quantities of sensors, greater use of exogenous HD maps, and more training data. But a car with more gadgets and add-ons and options is not necessarily better than one without. More devices and more information will introduce more *noise*—in statistical terms: unwanted, unexplained, or undesired variability—that will degrade *useful* data, and further complicate the probabilistic calculations and the integration process. After all, there are already inherent limitations in getting AI systems to perform well in open environments and deal in real-time with the so-called "corner cases" (Andrew Ng, "Andrew Ng: When will self-driving cars be on roads?" (2016)). For instance, if the second LIDAR detects an unclassifiable object in the distance, but the main LIDAR and exogenous HD maps show that there is nothing ahead, should the car be programmed to drive on, to slow down, to stop or to seek human intervention? If so, under what circumstances should the AV be programmed to do any of these, such as to gracefully and safely exit from autonomous mode, alert the driver to the potential 'danger', and do so while not endangering its passengers, other vehicular traffic and possible pedestrians?

Actually, these sampled thought processes are not a critique of the book but represent where the reviewer thinks the book really shines. By bringing together the considered technical and legal perspectives under one sunroof, the author has provided a platform to enable academicians, philosophers, policy makers, engineers, and practitioners to air the issues that really matter. Because the book is a compact but thought-provoking read that weaves together a broad range of disciplines, it definitely has a place on my bookshelf, and my e-book collection. But the one thing I will not do is to read this book while driving my AV. After all, as *Autonomous Vehicles and the Law, Technology, Algorithms and Ethics* has reminded us: we need to all keep our eyes on the road and our hands on the wheel to steer the law and technology relating to AVs in the right direction.

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