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The Center for Education and Research in Information Assurance and Security

Regulations and Requirements for Autonomous Vehicles

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Problem Statement

Fully autonomous vehicles are becoming closer to being a reality – their benefit is maximized only when the benefits clearly outweigh the costs and risk to human life are minimized if not mitigated.

Considerations about how these things will be regulated will need to be implemented before these types of vehicles are allowed on the open road.

Safety

- Safety directly related to level of autonomy
- Depends on road, weather, and other natural conditions
- Data-driven process dependent on input sources
- Integrate encryption and standardize communication protocols

Ethics

- Determining best course of action during potential crashes
- Need to define legal responsibility
- Enormous number of data points about drive and passenger habits
- More data may mean better safety but lesser privacy
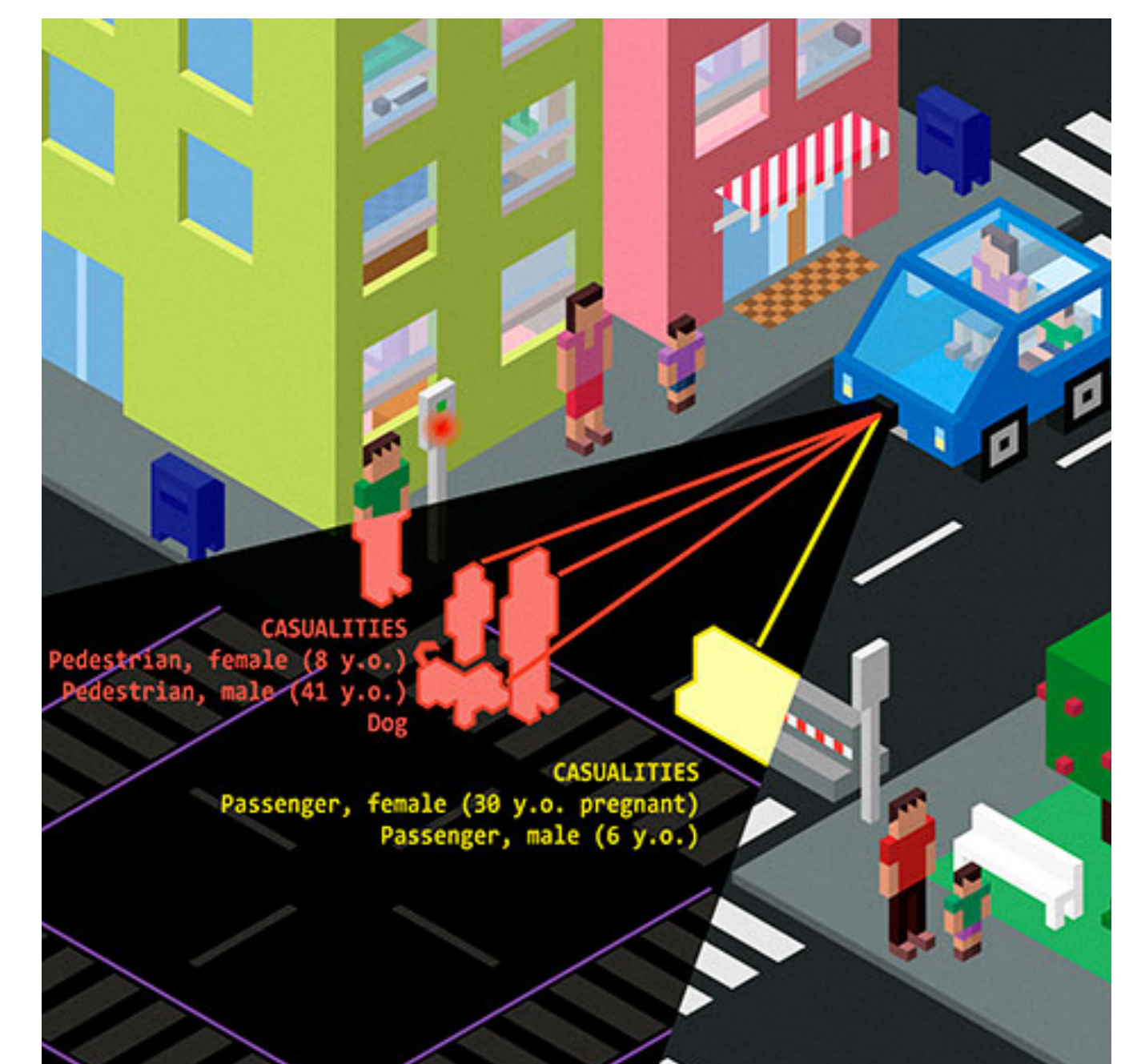
Potential Issues

- Factors related to the loss of human-operated vehicles
- Transportation deserts and limits of data
- Potential limitations in travel flexibility
- Consumer acceptance
- Affordability of cars and supporting infrastructure

Tradeoffs

- Initial adoption cost vs. prolonged benefit
- Convenience vs. privacy
- Legal allowance vs. technological capability
- Driver engagement vs. provided capability

Benefits

- Ownership distributed between public sector entities (such as DoT) and the private sector
- Less congestion on roads - making them safer
- Reduces road deaths and crashes
- Complete elimination of human driver error
- Significant reduction in carbon footprint and adverse environmental impacts

Costs

- Change in legal framework at a government level to match advancements
- Manufacturing overheard and vehicle operation costs
- Economic impacts of changing automobile markets
- Updating physical infrastructure to support autonomy
- Challenges of mass production and scaling to match demand

Discussion and Conclusions

The current administration supports voluntary compliance and self-reporting as they claim it helps to improve safety, and has been proven to work through the aviation sector. Experts argue since private companies are in the preliminary phases of testing, this is not be an effective method to achieving practical autonomy. For wide scale customer acceptance, early adopters would need to test new technology and use crowd-sourced data to improve accuracy and efficiency. Overcoming the fear of rare failures would be critical to changing U.S. policy and public support. It is would be critical to the success of self-driving cars to establish ownership of ethics and provide legal backing who clarify responsibility incase of accidents. From a computing standpoint, having cybersecurity implemented at the development level would be important for consumer privacy. Companies would have to reach a balance between data collection and aggregation, and keeping individual records private.