How can bicyclists prevent accidents with vehicles by maximizing their visibility at night?

In 2014 in the U.S., over 900 bicyclists were killed and an estimated 494,000 were injured.

Centers for Disease Control and Prevention, National Center for Injury Prevention and Control

Visor LEDs
Two small LEDs under visor periodically provide system feedback

LEDs
LED strips improve visibility and communicate rider intention (e.g., turning and braking) to nearby vehicles

Mic Amplifier
Three small electret mic amplifiers continually monitor wind noise

Lasers
Laser diodes enhance visibility ‘footprint’ with on-road projections ahead of rider

Brake
User Action
Press brake lever
Helmet Response
LED strips and visor LEDs blink for 10 seconds

Turn
User Action
Tap on left or right side of helmet
Helmet Response
LED strips and visor LEDs blink red for 10 seconds

Over 50 ideas were generated and evaluated against key criteria: potential utility, cost, feasibility, and desirability. We landed on two concepts, road projection and self-illumination, that attempted to solve issues of poor visibility and bad roads. These ideas received the most promises, as they were relatively simple and addressed the two top concerns for users.

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Explore

Assess

Learn

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How might we maximize rider visibility while minimizing technical complexity for cyclists? With a clear vision and a new round of research, we put our noses to the grindstone to understand how this challenge mapped to specific features. Given that the majority of fatal accidents occur in intersections, our approach focused on this scenario and how to maximize visibility around related cyclist behaviors (e.g., turning and stopping).