MIT Technology Review

46 COMMENTS

FEATURED STORY

October, 2013

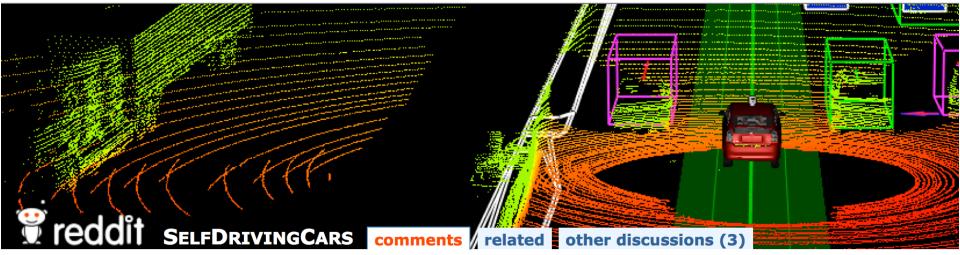
Driverless Cars Are Further Away Than You Think

By Will Knight on October 22, 2013

Before traveling to Germany, I visited John Leonard, an MIT professor who works on robot navigation, to find out more about the limits of vehicle automation. Leonard led one of the teams involved in the DARPA Urban Challenge, an event in 2007 that saw autonomous vehicles race across mocked-up city streets, complete with stop-sign intersections and moving traffic. The challenge inspired new research and new interest in autonomous driving, but Leonard is restrained in his enthusiasm for the commercial trajectory that autonomous driving has taken since then. "Some of these fundamental questions, about representing the world and being able to predict what might happen – we might still be decades behind humans with our machine technology," he told me. "There are major, unsolved, difficult issues here. We have to be careful that we don't overhype how well it works."

http://www.technologyreview.com/featuredstory/520431/driverless-cars-are-further-away-than-you-think/

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A Test Drive of the Most Advanced Driverless Cars (technologyreview.com) submitted 14 days ago by walky22talky 21 comments share

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[-] walky22talky [S] 7 points 14 days ago

MIT's John Leonard, for one, does not believe total autonomy is imminent. "I do not expect there to be taxis in Manhattan with no drivers in my lifetime,"

Talk about a Debby downer. He is not even 50 years old.

permalink

[-] ShadowRam 6 points 14 days ago

MIT's Leonard, for one, does not believe total autonomy is imminent. "I do not expect there to be taxis in Manhattan with no drivers in my lifetime," he said, before quickly adding, "And I don't want to see taxi drivers out of business. They know where they're going, and—at least in Europe—they're courteous and safe, and they get you where you need to be. That's a very valuable societal role."

Sounds more like someone that is afraid of the technology and has trust issues with machines.

permalink parent

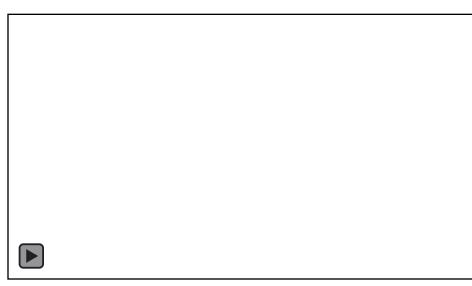
http://www.reddit.com/r/SelfDrivingCars/

Difficult Situations for Self-Driving Vehicles





Left turn across traffic

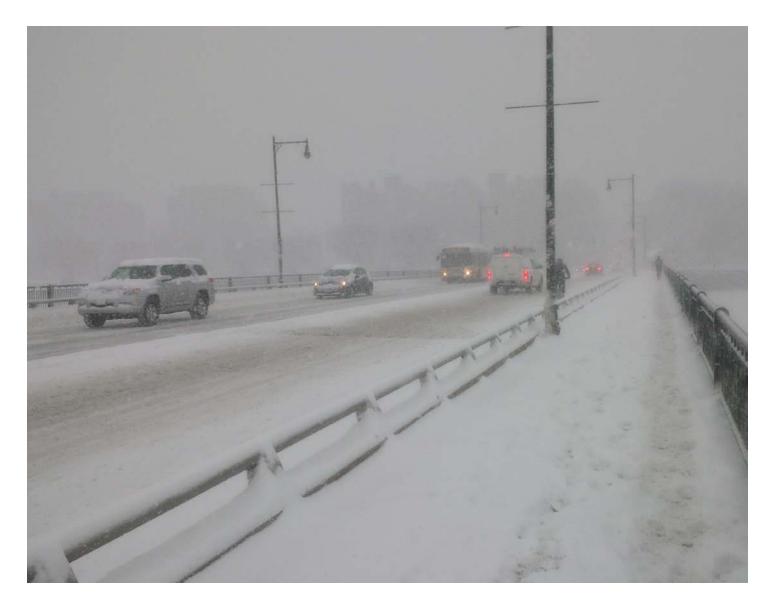


Traffic cops, crossing guards, police/fire



Changes to road surface markings

Difficult Weather Conditions



What do you see in this Picture?



10/8/2014

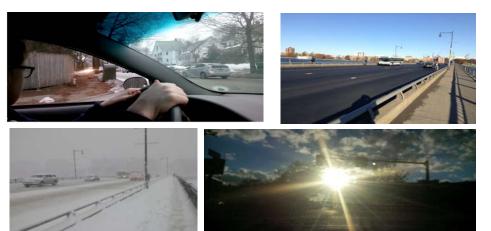
Localization Using a High Definition Map



Courtesy: https://plus.google.com/+GoogleSelfDrivingCars/videos

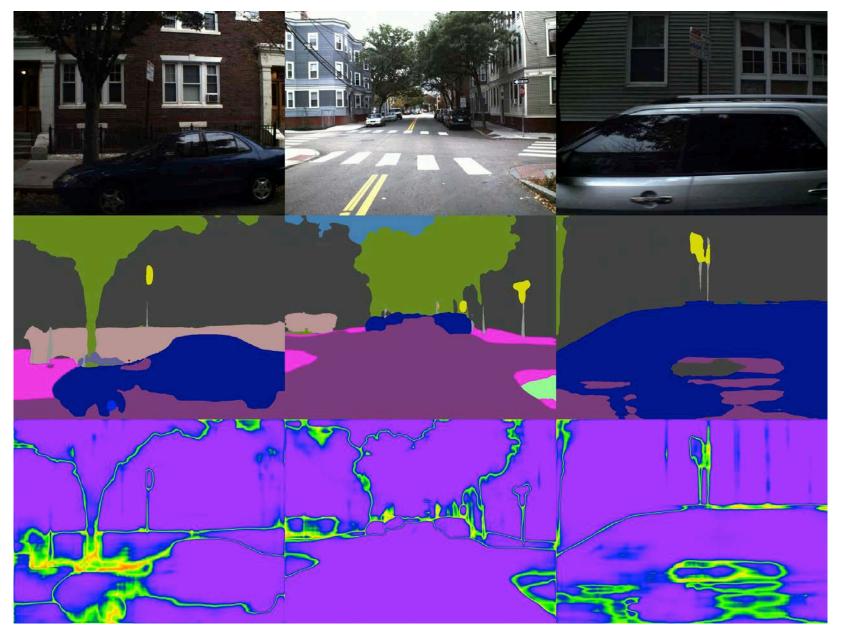
Technical Challenges:

- Maintaining Maps
- Adverse Weather
- Interacting with People



• Robust Computer Vision (towards PD=1.0, PFA = 0.0)?

2017: Computer Vision Has Made Amazing Progress



Simon Stent, TRI

However Computer Vision is Still Really Hard

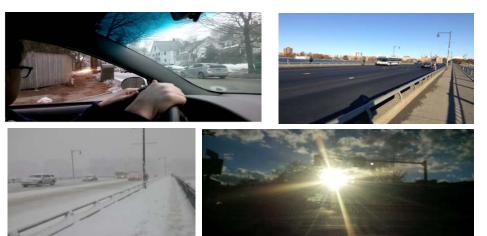


Simon Stent, TRI

Multi-Scale Context Aggregation by Dilated Convolutions. Yu and Koltun https://arxiv.org/1511.07122

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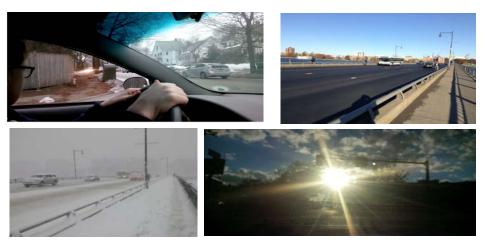
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- The big question for Level 2 and Level 3 approaches?
- Can humans be trusted to take control when necessary?

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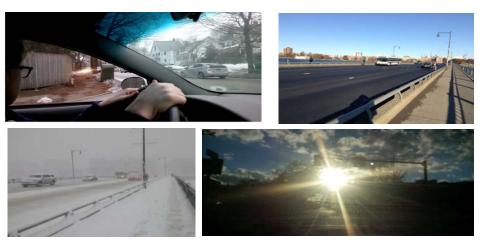
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The big question for Level 4 approaches?

 Can near-perfect ROC curves be obtained in a wide variety of demanding settings?

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The big question for Level 4 approaches?

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Can we deploy Autonomous Vehicle technology sooner?

(Human must pay attention, but autonomy will jump in to prevent accidents)

Conclusion

Opportunities

- Excited by the opportunity to save lives with autonomous vehicle technology
- Pursuing both Chauffeur (full autonomy) and Guardian (parallel autonomy) strategies
- Can we use the tech to design safer cities? (i.e. massive sim)
- Can we predict the future mix of vehicles and costs/benefits?
 Challenges
- Need an open dialog with policy makers and the public about the technical and human interaction difficulties of SDVs
- For Level 2 and Level 3, how does the SDV community overcome vigilance decrement (over trust of the system)?
- For Level 4 and Level 5, how does the SDV community achieve sufficiently robust perception and decision making in complex situations?
- How can we better educate the public about the technology?