

# When is it beneficial to perform a lane change?

Silvia Magdici

Technische Universität München

July 7, 2016

- **Motivation:**

- Unsafe lane changes are one of top causes of car accidents;<sup>1</sup>

- **Description:**

- Set a target position and a cost function (e.g. penalize the number of lane changes, jerk);
- Based on the current traffic scenario, decide if a lane change should be performed or not (e.g. rule-based, utility-based, probability-based algorithms);
- Provide driving decisions compliant with the traffic rules (e.g. when possible, drive on the right-most lane).

---

<sup>1</sup><https://seriousaccidents.com/legal-advice/top-causes-of-car-accidents/unsafe-lane-changes/>

- **Tasks:**

- Literature survey;
- Determine whether a lane change is desirable or not;
- Determine the inter-vehicle traffic gap and time to start the manoeuvre;
- Implement, test, and compare the algorithm with the human-driving behavior.

**Interested? Contact me!**

Silvia Magdici

[silvia.magdici@tum.de](mailto:silvia.magdici@tum.de)

## References

- [1] J. Nilsson, J. Silvin, M. Brnnstrm, E. Coelingh, J. Fredriksson, *If, when, and how to perform lane change manoeuvres on highways*, IEEE Intelligent Transportation Systems Magazine, 2016;
- [2] M. Ardelt, C. Coester, N. Kaempchen, *Highly Automated Driving on Freeways in Real Traffic Using a Probabilistic Framework*, IEEE Transactions on Intelligent Transportation Systems, 2012;
- [3] A. Furda, L. Vlacic, *Enabling Safe Autonomous Driving in Real-World City Traffic Using Multiple Criteria Decision Making*, IEEE Intelligent Transportation Systems Magazine, 2011;