**Research Paper Summary**

**Citation:** T. -Y. Tseng and J. -J. Ding, "Vehicle Distance Estimation Method Based on Monocular Camera," 2020 International Symposium on Computer, Consumer and Control (IS3C), Taichung City, Taiwan, 2020, pp. 102-105.

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**Title: Vehicle Distance Estimation Method Based on Monocular Camera**

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**Link to paper:** [**https://github.com/albud187/ELG5163\_project/blob/main/literature%20review/finished\_reading/Vehicle%20Distance%20Estimation%20Method%20Based%20on%20Monocular%20Camera.pdf**](https://github.com/albud187/ELG5163_project/blob/main/literature%20review/finished_reading/Vehicle%20Distance%20Estimation%20Method%20Based%20on%20Monocular%20Camera.pdf)

Section 1 - Overall Idea

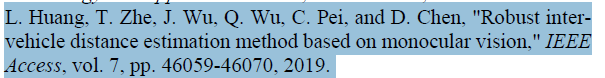
* Monocular-vision based methods are more practical, however, their performance needs to be improved.
* Propose two stage algorithms: feature point extraction and vehicle distance estimation.

Section 2 – Methodology

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* Method is based on geometric relationship to calculate the absolute distance of the car ahead.
* Inadvertent tilt of the camera is considered by using the reference road marking lines and the shadow region around the tired according to brightness.
* Harris corner detection is used to detect the feature points of the four corners of the lane and the crossing points of the tire and the road.
* A mask is designed to filter out unwanted feature points. A polygon approximation method is used to get the four corners of the road lane; and a left down and right down feature points for the crossing points of the road and tires.
* Absolute distance using geometric relationships can then be determined.

Section 3 - Applications

* Compared to other methods, this technique has the smallest absolute error than any other methods presented in both short (0-10 m) and long distance (10-20 m)
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Section 4 - Future Development

1. Applying lane adjustment can be used with other relevant markers other than lanes (stop sign, light post, cones)

Section 5 - Questions

1. How can the plate and shadow detection be modified for autonomous robots?

Section 6 - Anything Else

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