Road Lane Detection using Convolutional Neural Network

Farjana Farvin S[1], Sowndarya S V[2]
Assistant Professor, Computer Science and Engineering[1]
Student, Computer Science and Engineering[2]
Anjalai Ammal Mahalingam Engineering College, Thiruvarur, India

Abstract: *Road Lane detection is necessary in autonomous driverless vehicle that is used to automatically detect lane lines in a road. With the increase in the modern day's population, which has in turn increased the number of vehicles in the road, people are more prone to accidents. Increase in the number of vehicles, human errors towards traffic rules and the difficulty to oversee situational dangers by drivers are contributing to the majority of accidents on the road. Therefore, in this paper we have designed a methodology to detect road lane lines which, helps our drivers from causing life damage and contributes to safe driving. Here we have used deep leaning algorithm which has shown a quiet good accuracy rate.*

Keywords: Deep Learning, Image Pre-processing, Convolution Neural Network, Max Pooling, Filtering, Flattening, Feature extraction, Hidden Layer, etc.

REFERENCE

[1] Junfeng Li, Dehai Zhang, Yu Ma and Qing Liu. Lane Image Detection Based on Convolution Neural Network Multi-Task Learning, by the authors, by the authors. by the authors. Licensee MDBI, Basel, Switzerland, Published: 27 September 2021.

[2] Xining Yang, Dezhi Gao, Jianmin Duan, and Lei Yang. Research on Lane Detection Based on Machine Vision. Intelligent Measure & Control Laboratory, Beijing University of Technology, Beijing, China.

[3] Wei Wang1, Hui Lin2 and Junshu Wang3,4. CNN based lane detection with instance segmentation in edge-cloud computing. https://doi.org/10.1186/s13677-020-00172-z.

[4] Nima Khairdoost, Steven S. Beauchemin and Michael A. Bauer. Road Lane Detection and Classification in Urban and Suburban Areas based on CNN. Department of Computer Science, The University of Western Ontario,London, ON, N64-5B7, Canada. 10.5220/0010241004500457.

[5] Jihun Kim and Minho Lee. Robust Lane Detection Based on Convolutional Neural Network and Random Sample Consensus. School of Electronics Engineering, Kyungpook National University. 1370 Sankyuk-Dong, Puk-Gu, Taegu 702-701, South Korea.

[6] Othman Omran Khalifa, Sheroz Khan, Md. Rafiqul Islam. Vision Based Road Lane Detection System for Vehicles Guidance. Article in Australian Journal of Basic and Applied Sciences · May 2011. https://www.researchgate.net/publication/228958566.

[7] Jiyoung Jung 1 ID and Sung-Ho Bae 2. Real-Time Road Lane Detection in Urban Areas Using LiDAR Data. 6 September 2018; Accepted: 24 October 2018; Published: 26 October 2018.

[8] Toan Minh Hoang, Hyung Gil Hong, Husan Vokhidov and Kang Ryoung Park, Road Lane Detection by Discriminating Dashed and Solid Road Lanes Using a Visible Light Camera Sensor. Received: 26 April 2016; Accepted: 15 August 2016; Published: 18 August 2016.

[9] Zhou, S.; Jiang, Y.; Xi, J.; Gong, J.; Xiong, G.; Chen, H. A Novel Lane Detection Based on Geometrical Model and Gabor Filter. In Proceedings of the IEEE Intelligent Vehicles Symposium, San Diego, CA, USA, 21–24 June 2010; pp. 59–64.

[10] Shin, J.; Lee, E.; Kwon, K.; Lee, S. Lane Detection Algorithm Based on Top-View Image Using Random Sample Consensus Algorithm and Curve Road Model. In Proceedings of the 6th International Conference on Ubiquitous and Future Networks, Shanghai, China, 8–11 July 2014; pp. 1–2. Shin, J.; Lee, E.; Kwon, K.; Lee, S. Lane Detection Algorithm Based on Top-View Image Using Random Sample Consensus Algorithm and Curve Road Model. In

Impact Factor: 6.252

Proceedings of the 6th International Conference on Ubiquitous and Future Networks, Shanghai, China, 8–11 July 2014; pp. 1–2.

[11] Benligiray, B.; Topal, C.; Akinlar, C. Video-Based Lane Detection Using a Fast-Vanishing Point Estimation Method. In Proceedings of the IEEE International Symposium on Multimedia, Irvine, CA, USA, 10–12 December 2012; pp. 348–351.

[12] Li, Z.; Cai, Z.-X.; Xie, J.; Ren, X.-P. Road Markings Extraction Based on Threshold Segmentation. In Proceedings of the International Conference on Fuzzy Systems and Knowledge Discovery, Chongqing, China, 29–31 May 2012; pp. 1924–1928.

[13] Jordan, B.; Rose, C.; Bevly, D. A Comparative Study of Lidar and Camera-based Lane Departure Warning Systems. In Proceedings of the ION GNSS 2011, Portland, OR, USA, 20–23 September 2011.

[14] Jordan, B.; Rose, C.; Bevly, D. A Comparative Study of Lidar and Camera-based Lane Departure Warning Systems. In Proceedings of the ION GNSS 2011, Portland, OR, USA, 20–23 September 2011.

[15] Qi, H.; Moore, J. Direct Kalman filtering approach for GPS/INS integration. IEEE Trans. Aerosp. Electron. Syst. 2002, 38, 687–693.

[16] Zhang Z, Schwing AG, Fidler S, Urtasun R (2015) Monocular object instance segmentation and depth ordering with cnns. In: Proceedings of the IEEE International Conference on Computer Vision. pp 2614–2622. https://doi.org/10.1109/iccv.2015.300

[17] Yang S, Wu J, Shan Y, Yu Y, Zhang S (2019) A novel vision-based framework for real-time lane detection and tracking. Technical report. SAE Technical Paper. https://doi.org/10.4271/2019-01-0690

[18] Liu, T., Chen, Z., Yang, Y., Wu, Z., and Li, H. (2020). Lane detection in low-light conditions using an efficient data enhancement: Light conditions style transfer. arXiv preprint arXiv:2002.01177.

[19] John V, Liu Z, Guo C, Mita S, Kidono K (2015) Real-time Lane estimation using deep features and extra trees regression. In: Image Video Technol. Springer. pp 721–733. https://doi.org/10.1007/978-3-319-29451-3_57

[20] Qi L, Zhang X, Dou W, Ni Q (2017) A distributed locality-sensitive hashing-based approach for cloud service recommendation from multi-source data. IEEE J Sel Areas Commun 35(11):2616–2624

[21] Ganin AA, Mersky AC, Jin AS, Kitsak M, Keisler JM, Linkov I (2019) Resilience in intelligent transportation systems (its). Transp Res Part C Emerg Technol 100:318–329.