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Automation in Cars: Voice Controlled Car Assistant System and Automatic Breaking System – A Review

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Abstract: *The purpose of this project is to build a Voice Controlled Car Assistant System and Automatic Breaking System. A Voice Controlled Car is an advanced robotic vehicle that can be operated by the power of voice commands. It is based on an Arduino microcontroller, motor drivers, and a Bluetooth module. The Arduino hardware is an open-source micro-controller kit used to build digital devices. In our project, we will design the hardware of the Voice Controlled Robotic Car first, then use our previous knowledge of programming to code the entire work. The code will then be simulated on IDE software, and then interfaced with the hardware. An android device with a Bluetooth application is used to control the control unit in coordination with the Bluetooth device, and a Bluetooth module is used to capture and read the voice commands. We choose this project because automation has become a significant part of our lives and also has a broad range of applications in the engineering field. Automation plays a vital role in the development of new technology.*

Keywords: Automation, Arduino, IDE Software, Micro-controller, Car Assistant System, ABS.

REFERENCES

[1]. Kodre, A., Tikone, K., Sonawane, M., Jare, P., & Shinde, P. (2018, August). Smart and efficient personal car assistant system. In 2018 2nd International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC) I- SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC), 2018 2nd International Conference on (pp. 12-17). IEEE.

[2]. Park, D., Park, H., & Song, S. (2020, July). A method for increasing user engagement with voice assistant system. In International Conference on Human-Computer Interaction (pp. 146-157). Springer, Cham.

[3]. Yang, J. Y., Jo, Y. H., Kim, J. C., & Kwon, D. S. (2013, June). Affective interaction with a companion robot in an interactive driving assistant system. In 2013 IEEE intelligent vehicles symposium (IV) (pp. 1392-1397). IEEE.

[4]. Patel Harsh, S., Vora Rudri, K., Shah Daivik, B., & Pawar Pranay, R. Android Phone Based Assistant System for Handicapped/Disabled/Aged People.

[5]. Malagi, M. (2019). Voice control personal assistant using Raspberry PI.

[6]. Shah, A., & Gusikhin, A. (2020). Integration of Voice Assistant and SmartDeviceLink to Control Vehicle Ambient Environment. In VEHITS (pp. 522-527).

[7]. Vignesh, B. R., Kumar, D. S., Gokul, V., & Priya, R. (2021, May). Object detection YOLO-v4 based smart car system with an integrated Virtual Assistant. In Journal of Physics: Conference Series (Vol. 1916, No. 1, p. 012047). IOP Publishing.

[8]. Schmidt, M., Bhandare, O., Prabhune, A., Minker, W., & Werner, S. (2020, August). Classifying cognitive load for a proactive in-car voice assistant. In 2020 IEEE Sixth International Conference on Big Data Computing Service and Applications (BigDataService) (pp. 9-16). IEEE.

[9]. Ortmanns, S., & Haiber, U. (2018). The Mobile Cognitive Assistant: Bridging the Gap between In-Car and Outside-the-car Experiences. Studientexte zur Sprachkommunikation: Elektronische Sprachsignalverarbeitung 2018, 1-6.

[10]. Hong, S., Doi, S. I., & Min, B. (2014). Study of safety driving assistant system using audio-visual alert. International Journal of Vehicle Safety, 7(1), 54-69.

[11]. Bazilinskyy, P., & de Winter, J. (2015). Auditory interfaces in automated driving: an international survey. PeerJ Computer Science, 1, e13.

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[12]. Gupta, V. K., Pandey, S., Khandelwal, Y., & Nikhil, N. (2020). Vision Assisted Anti-braking System For Two Wheelers (vaabs) (Doctoral dissertation, CMR Institute of Technology. Bangalore).

[13]. Meyer, D., Krakau, J., & Fruhner, D. (2018). Comparison of the product structure of the conventional and digitalised car. In Dortmund International Research Conference 2018: Conference proceedings-29-30 June 2018 (pp. 164-174). Fachhochschule Dortmund.

[14]. Hecker, F., & Wrede, J. (2004). Driver assistance systems for commercial vehicles. ATZ worldwide, 106(9), 24-27.

[15]. Wong, P. N., Brumby, D. P., Babu, H. V. R., & Kobayashi, K. (2019, September). Voices in Self-Driving Cars Should be Assertive to More Quickly Grab a Distracted Driver's Attention. In Proceedings of the 11th International Conference on Automotive User Interfaces and Interactive Vehicular Applications (pp. 165-176).

[16]. Khandelwal, Y., Pandey, S., Nikhil, N. M., Gupta, V. K., & Sridevi, S. (2020, June). Automatic braking system for two-wheeler with object detection and depth perception. In 2020 5th International Conference on Communication and Electronics Systems (ICCES) (pp. 1196-1201). IEEE.

[17]. Leen, G., & Heffernan, D. (2002). Expanding automotive electronic systems. Computer, 35(1), 88-93.

[18]. Martinez, F. J., Toh, C. K., Cano, J. C., Calafate, C. T., & Manzoni, P. (2010). Emergency services in future intelligent transportation systems based on vehicular communication networks. IEEE Intelligent Transportation Systems Magazine, 2(2), 6-20.

[19]. Khan, M. Q., & Lee, S. (2019). A comprehensive survey of driving monitoring and assistance systems. Sensors, 19(11), 2574.

[20]. Hasegawa, I., & Uchida, S. (1999). Braking systems. Japan Railway and Transport Review, 20, 52-59.

[21]. Fletcher, I., Arden, B. J. B., & Cox, C. S. (2003, October). Automatic braking system control. In Proceedings of the 2003 IEEE International Symposium on Intelligent Control (pp. 411-414). IEEE.

[22]. Milanés, V., González, C., Naranjo, J. E., Onieva, E., & De Pedro, T. (2010). Electro-hydraulic braking system for autonomous vehicles. International Journal of Automotive Technology, 11(1), 89-95.

[23]. Chopra, P., & Dange, H. (2007). Voice controlled robot. Graduation Project, Department of Electronics Engineering, KJ Somaiya College of Engineering, Vidyavihar, Mumbai.

[24]. Bhattacharjee, A., Khan, A. I., Haider, M. Z., Fattah, S. A., Chowdhury, D., Sarkar, M., & Shahnaz, C. (2016, November). Bangla voice-controlled robot for rescue operation in noisy environment. In 2016 IEEE Region 10 Conference (TENCON) (pp. 3284-3288). IEEE.

[25]. Chaudhry, A., Batra, M., Gupta, P., Lamba, S., & Gupta, S. (2019, October). Arduino Based Voice Controlled Robot. In 2019 International Conference on Computing, Communication, and Intelligent Systems (ICCCIS) (pp. 415-417). IEEE.

[26]. [26] Matarneh, R., Maksymova, S., Lyashenko, V., & Belova, N. (2017). Speech recognition systems: A comparative review.

[27]. Gao, Y., & Ehsani, M. (2001). Electronic Braking System of EV And HEV---Integration of Regenerative Braking, Automatic Braking Force Control and ABS. SAE transactions, 576-582.

[28]. Fletcher, I., Arden, B. J. B., & Cox, C. S. (2003, October). Automatic braking system control. In Proceedings of the 2003 IEEE International Symposium on Intelligent Control (pp. 411-414). IEEE.

[29]. Broggi, A., Cerri, P., Ghidoni, S., Grisleri, P., & Jung, H. G. (2009). A new approach to urban pedestrian detection for automatic braking. IEEE Transactions on intelligent transportation systems, 10(4), 594-605.

[30]. Basjaruddin, N. C., Kuspriyanto, K., Suhendar, S., Saefudin, D., & Azis, V. A. (2016). Hardware simulation of automatic braking system based on fuzzy logic control. Journal of Mechatronics, Electrical Power, and Vehicular Technology, 7(1), 1-6.

[31]. Chen, S., & Springer, T. A. (1999). An automatic braking system that stabilizes leukocyte rolling by an increase in selectin bond number with shear. The Journal of cell biology, 144(1), 185-200.

[32]. Isermann, R., Schorn, M., & Stählin, U. (2008). Anticollision system PRORETA with automatic braking and steering. Vehicle System Dynamics, 46(S1), 683-694.

[33]. Milanés, V., González, C., Naranjo, J. E., Onieva, E., & De Pedro, T. (2010). Electro-hydraulic braking system for autonomous vehicles. International Journal of Automotive Technology, 11(1), 89-95.

IJARSCT
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[34]. Brindha, G. M., Karishma, K. K., Mukhesh, A., Veeramani, K. N., Faizal, M. M., Shankar, B. M., & Vidhya, B. (2020). Accident prevention by automatic braking system and multisensory. International Journal of Advanced Science and Technology, 29(8s), 873-879.

[35]. Sankar, G., & Kumar, S. S. (2006, December). Fuzzy logic based automatic braking system in trains. In 2006 India International Conference on Power Electronics (pp. 383-387). IEEE.

[36]. Lucci, C., Marra, M., Huertas-Leyva, P., Baldanzini, N., & Savino, G. (2021). Investigating the feasibility of motorcycle autonomous emergency braking (MAEB): Design criteria for new experiments to field test automatic braking. Methods, 8, 101225.

[37]. Keller, C. G., Dang, T., Fritz, H., Joos, A., Rabe, C., & Gavrila, D. M. (2011). Active pedestrian safety by automatic braking and evasive steering. IEEE Transactions on Intelligent Transportation Systems, 12(4), 1292-1304.

[38]. Wada, T., Hiraoka, S., Tsutsumi, S., & Doi, S. I. (2010, August). Effect of activation timing of automatic braking system on driver behaviours. In Proceedings of SICE Annual Conference 2010 (pp. 1366-1369). IEEE.

[39]. Wada, T., Doi, S. I., Tsuru, N., Isaji, K., & Kaneko, H. (2008, August). Formulation of braking behaviours of expert driver toward automatic braking system. In 2008 IEEE International Conference on Mechatronics and Automation (pp. 89-94). IEEE.

[40]. Ariyanto, M., Haryadi, G. D., Munadi, M., Ismail, R., & Hendra, Z. (2018, October). Development of low-cost autonomous emergency braking system (AEBS) for an electric car. In 2018 5th International Conference on Electric Vehicular Technology (ICEVT) (pp. 167-171). IEEE.

[41]. Maciuca, D. B., Gerdes, J. C., & Hedrick, J. K. (1995). Automatic braking control for IVHS. JSAE Review, 2(16), 219.

[42]. Koli, G., Patil, A., Patil, P., & Sokashe, S. (2017). Intelligent braking system using the IR sensor. India: Sanjeev an Engineering and Technology Institute.

[43]. Cicchino, J. B. (2019). Real-world effects of rear automatic braking and other backing assistance systems. Journal of safety research, 68, 41-47.

[44]. Tang, B., Chien, S., Huang, Z., & Chen, Y. (2016). Pedestrian protection using the integration of V2V and the Pedestrian Automatic Emergency Braking System.

[45]. Anja, R., Markus, L., & Franz, F. (2011). Method to estimate the field effectiveness of an automatic braking system in combination with an adaptive restraint system in frontal crashes. In Proceedings of 22nd International Technical Conference on the Enhanced Safety of Vehicles (pp. 11-0281).

[46]. Aliyu, A., Kolo, J. G., Mikail, O. O., Agajo, J., Umar, B., & Aguagba, O. I. (2017, November). An ultrasonic sensor distance induced automatic braking automobile collision avoidance system. In 2017 IEEE 3rd International Conference on Electro-Technology for National Development (NIGERCON) (pp. 570-576). IEEE.

[47]. Azqueta-Gavaldon, M., Azqueta-Gavaldon, I., Woiczinski, M., Bötzel, K., & Kraft, E. (2017, June). Automatic braking system and fall detection mechanism for rollators. In Proceedings of the 6th International Conference on Bioinformatics and Biomedical Science (pp. 158-161).

[48]. Shimazaki, K., Ito, T., Fujii, A., & Ishida, T. (2018). The public's understanding of the functionality and limitations of automatic braking in Japan. IATSS research, 42(4), 221-229.

[49]. Suryana, A., & Familiana, H. (2019, November). Automatic Braking System on Motorbikes Using the Concept of Kinematics Non-Uniform Slowing Down Motion For Safety of Motorcycle Riders on the Highway. In 2019 International Conference on ICT for Smart Society (ICISS) (Vol. 7, pp. 1-6). IEEE.

[50]. Dhivya, P., & Murugesan, A. (2015). Intelligent car braking system with collision avoidance and ABS. International Journal of Computer Applications, 975, 8887.

[51]. Martorello, L., & Swanson, E. (2006). Effectiveness of an automatic manual wheelchair braking system in the prevention of falls. Assistive technology, 18(2), 166-169.

[52]. Ohno, H., Suzuki, T., Aoki, K., Takahasi, A., & Sugimoto, G. (1994). Neural network control for automatic braking control system. Neural Networks, 7(8), 1303-1312.

IJARSCT
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[53]. Balashanmugam, P., Balasubramaaniyan, K., Balasubramaniyan, G., & Vinoth, S. (2013). Fabrication of high-speed indication and automatic pneumatic braking system. International Journal of Engineering Trends and Technology, 5(1), 40-46.

[54]. Hassan, S. A., & Iqbal, S. (2019, November). Automatic car braking system using fuzzy logic controller with environmental factors. In 2019 22nd International Multitopic Conference (INMIC) (pp. 1-8). IEEE.

[55]. Sharma, Y., Singh, S. S., Nawaz, M., Kaushik, V., Sharma, S., Sindhwani, R., & Singh, P. L. (2021). Design, Analysis and Fabrication of Automatic Braking System. In Advances in Engineering Design (pp. 541-550). Springer, Singapore.

[56]. Geronimi, S., Abadie, V., & Becker, N. (2016). Methodology to assess and to validate the dependability of an advanced driver assistance system (ADAS) such as automatic emergency braking system (AEBS). In Energy Consumption and Autonomous Driving (pp. 125-131). Springer, Cham.

[57]. Rizianiza, I., & Shoodiqin, D. M. (2021, March). Automatic braking system using fuzzy logic method. In Journal of Physics: Conference Series (Vol. 1833, No. 1, p. 012005). IOP Publishing.

[58]. Bao, H., Wang, Z., Liu, Z., & Li, G. (2021). Study on Pressure Change Rate of the Automatic Pressure Regulating Valve in the Electronic-Controlled Pneumatic Braking System of Commercial Vehicle. Processes, 9(6), 938.

[59]. Aparow, V. R., Ahmad, F., Hudha, K., & Jamaluddin, H. (2013). Modelling and PID control of antilock braking system with wheel slip reduction to improve braking performance. International Journal of Vehicle Safety, 6(3), 265-296.

[60]. Rizianiza, I., & Djafar, A. (2017, October). Design car braking system using mamdani fuzzy logic control. In 2017 4th International Conference on Electric Vehicular Technology (ICEVT) (pp. 129-133). IEEE.

[61]. Stöckle, C., Utschick, W., Herrmann, S., & Dirndorfer, T. (2018, November). Robust design of an automatic emergency braking system considering sensor measurement errors. In 2018 21st International Conference on Intelligent Transportation Systems (ITSC). IEEE.

[62]. Flannery, J. B. (1974). Automatic braking by radar. SAE Transactions, 469-473.

[63]. Lucci, C., Huertas-Leyva, P., Marra, M., Pierini, M., Savino, G., & Baldanzini, N. (2020). Autonomous emergency braking system for powered-two-wheelers: testing end-user acceptability of unexpected automated braking events deployed in typical pre-crash trajectories. In 13th International Motorcycle Conference (IFZ). Cologne, Germany (Vol. 12).