IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Smart Vision Enabled Low Cost Autonomous Robot

Solai Raj Muralidaran[1], Nikil Sharan Prabahar Balasubramanian[2], Niharika Elangovan[3]
Students, Department of Computer Science and Engineering
SRM Valliammai Engineering College, Kattankulathur, Tamil Nadu, India

Abstract: *Need for security and human resources for monitoring are growing nowadays. Current security systems are static in nature, lack analysis and prone to several threats and attacks. Alternative proctoring robots are hardwired, cannot reuse and expensive to implement making it unfit for Industrial and Public uses. Therefore, we propose a low-cost, re-configurable autonomous robot system for security and monitoring purposes. The robot system architecture is inspired from cloud data centre architecture where the applications are sandboxed and virtualized for efficient utilization of resources. The AI Model, Source Code, Executable scripts, internal resources are contained as a docker container. These containers are called as modules which are connected in a loosely coupled format. Modules can be replaced, added, deleted, updated, scaled over within the robot. Modules are classified as functional and auxiliary where functional modules performs AI operations, analysis and auxiliary modules performs remote results streaming, recording data also backing up footage and data to private or public cloud. The autonomous machine's camera is virtualized for simultaneous camera access by modules and to reduce computational overhead. As the resource utilization is optimized the power consumption is also reduced with combined efficiency of ARM and RISC-V chipsets. Thus, with this configurable, power efficiency, autonomous robot we hope to improve the quality of life and standards in public and industrial work places.*

Keywords: Robot, Intelligent Guided Vehicle, Virtualization, Surveillance.

REFERENCES

[1]. S. M. Metev and V. P. Veiko, Laser Assisted Microtechnology, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.

[2]. H. Stavelin, A. Rasheed, O. San, and A. J. Hestnes, Marine life through You Only Look Once's perspective. arXiv, 2020. doi: 10.48550/ARXIV.2003.00836.

[3]. C. Diaz Alvarenga, N. Basilico, and S. Carpin, "Delayed and Time-Variant Patrolling Strategies against Attackers with Local Observation Capabilities," in Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems, 2019, pp. 1928–1930.

[4]. V. Premchandran, M. Karthikkumar, V. Thamizharasan, and E. Sathish, "Solar Powered Autonomous Robotic Car Using for Surveillance," in Intelligent Manufacturing and Energy Sustainability, 2022, pp. 249–256.

[5]. S. Meghana, T. V. Nikhil, R. Murali, S. Sanjana, R. Vidhya and K. J. Mohammed, "Design and implementation of surveillance robot for outdoor security," 2017 2nd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2017, pp. 1679-1682, doi: 10.1109/RTEICT.2017.8256885.

[6]. Nayyar, A., Puri, V., Nguyen, N.G., Le, D.N. (2018). Smart Surveillance Robot for Real-Time Monitoring and Control System in Environment and Industrial Applications. In: Bhateja, V., Nguyen, B., Nguyen, N., Satapathy, S., Le, DN. (eds) Information Systems Design and Intelligent Applications. Advances in Intelligent Systems and Computing, vol 672. Springer, Singapore. https://doi.org/10.1007/978-981-10-7512-4_23

[7]. Gaikwad, B., Karmakar, A. Smart surveillance system for real-time multi-person multi-camera tracking at the edge. J Real-Time Image Proc 18, 1993–2007 (2021). https://doi.org/10.1007/s11554-020-01066-8

[8]. H. R. Everett, A. M. Flynn, "A Programmable Near-Infrared Proximity Detector For Robot Navigation," Proc. SPIE 0727, Mobile Robots I, (25 February 1987); https://doi.org/10.1117/12.937800

[9]. Xinyu Wu, Haitao Gong, Pei Chen, Zhong Zhi and Yangsheng Xu, "Intelligent household surveillance robot," 2008 IEEE International Conference on Robotics and Biomimetics, 2009, pp. 1734-1739, doi: 10.1109/ROBIO.2009.4913263.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

[10]. G. Jocher et al., ultralytics/yolov5: v6.1 - TensorRT, TensorFlow Edge TPU and OpenVINO Export and Inference. Zenodo, 2022. doi: 10.5281/zenodo.6222936.

[11]. Martín Abadi, Ashish Agarwal, Paul Barham, Eugene Brevdo, Zhifeng Chen, Craig Citro, Greg S. Corrado, Andy Davis, Jeffrey Dean, Matthieu Devin, Sanjay Ghemawat, Ian Goodfellow, Andrew Harp, Geoffrey Irving, Michael Isard, Rafal Jozefowicz, Yangqing Jia, Lukasz Kaiser, Manjunath Kudlur, Josh Levenberg, Dan Mané, Mike Schuster, Rajat Monga, Sherry Moore, Derek Murray, Chris Olah, Jonathon Shlens,Benoit Steiner, Ilya Sutskever, Kunal Talwar, Paul Tucker, Vincent Vanhoucke, Vijay Vasudevan, Fernanda Viégas,Oriol Vinyals, Pete Warden, Martin Wattenberg, Martin Wicke, Yuan Yu, and Xiaoqiang Zheng. TensorFlow: Large-scale machine learning on heterogeneous systems, 2015. Software available from tensorflow.org.

BIOGRAPHY

I'm Solai Raj M from Chennai, India perusing my Bachelor's of Computer Science and Engineering in SRM Valliammai Engineering College. I develop Mobile, Linux applications including IoT and automation projects. Currently, am working on better usability on Linux devices and seamless home automation with robots.