Automated Visual Inspection

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Abstract: *In manufacturing, where satisfying increasing customer demands is critical, quality is of the utmost importance for any organization. Evaluating the quality of a product may be tedious and error-prone, even for skilled operators. Though computer vision automates visual evaluation, it provides temporary solutions. The Lean manufacturing method has been created to overcome this. Statistical pattern recognition, image processing, object identification, and other activities are integrated and automated by computer vision, a branch of artificial intelligence. Though computational limitations now restrict its application, it has potential to spread to other domains such as product design, defect diagnostics, automation of manufacturing procedures, and material property identification. In the future, this discipline may hold answers to a myriad of problems thanks to the ongoing advancement of research and development, which includes reinforcement learning*

Keywords: Artificial Intelligence Computer Vision, Reinforcement Learning, Statistical Pattern Recognition

REFERENCES

[1] Ge C, Wang J, Wang J, Qi Q, Sun H, Liao J. Towards automatic visual inspection: A weakly supervised learning method for industrial applicable object detection. Computers in Industry. 2020 Oct 1;121:103232.

[2] Rožanec JM, Trajkova E, Dam P, Fortuna B, Mladenić D. Streaming Machine Learning and Online Active Learning for Automated Visual Inspection. IFAC-Papers On Line. 2022 Jan 1;55 (2): 277 -82 .

[3] Napoletano P, Piccoli F, Schettini R. Semi-supervised anomaly detection for visual quality inspection. Expert Systems with Applications. 2021 Nov 30;183:115275.

[4] Ravikumar S, Ramachandran KI, Sugumaran V. Machine learning approach for automated visual inspection of machine components. Expert systems with applications. 2011 Apr 1;38(4): 3260 - 6.

[5] Yun JP, Shin WC, Koo G, Kim MS, Lee C, Lee SJ. Automated defect inspection system for metal surfaces based on deep learning and data augmentation. Journal of Manufacturing Systems. 2020 Apr 1;55: 317 -24.

[6] Shaikh V. Decision Support System for Pull Requests Review Using Path-Based Network Portrait Divergence and Visualization. University of Missouri-Kansas City; 2022.

[7] Tao Y, Hu C, Zhang H, Osman A, Ibarra-Castanedo C, Fang Q, Sfarra S, Dai X, Maldague X, Duan Y. Automated defect detection in non- planar objects using deep learning algorithms. Journal of Nondestructive Evaluation. 2022 Mar;41(1):14.

[8] Torkzadeh V, Toosizadeh S. Automatic Visual Inspection System based on Image Processing and Neural Network for Quality Control of Sandwich Panel. Journal of AI and Data Mining. 2022 Apr 1;10(2):217 -31.

[9] Park JK, Kwon BK, Park JH, Kang DJ. Machine learning-based imaging system for surface defect inspection. International Journal of Precision Engineering and Manufacturing- Green Technology. 2016 Jul;3:303 -10.

[10] García Pérez A, Gómez Silva MJ, de la Escalera Hueso A. Automated defect recognition of castings defects using neural networks. Journal of Nondestructive Evaluation. 2022 Mar;41(1): 11.

[11] Hussain N, Khan MA, Sharif M, Khan SA, Albesher AA, Saba T, Armaghan A. A deep neural network and classical features based scheme for objects recognition: an application for machine inspection. Multimedia Tools and Applications. 2020 Apr 2:1 -23.

[12] Mishra M, Barman T, Ramana GV. Artificial intelligence-based visual inspection system for structural health monitoring of cultural heritage. Journal of Civil Structural Health Monitoring. 2022 Oct 31:1 -8.

[13] Trajkova E, Rožanec JM, Dam P, Fortuna B, Mladenić D. Active learning for automated visual inspection of manufactured products. ar Xiv preprint ar Xiv:2109 .02469. 2021 Sep 6 .

[14] Bezuglov D, Zelemskii A. Automated visual inspection of fabric image using deep learning approach for defect detection. In Automated Visual Inspection and Machine Vision IV 2021 Jun 20 (Vol. 11787, pp. 174 -180). SPIE.

[15] Mansuri LE, Patel DA. Artificial intelligence-based automatic visual inspection system for built heritage. Smart and Sustainable Built Environment. 2022 Nov 22; 11 (3):622 - 46 .

[16] Jalayer M, Jalayer R, Kaboli A, Orsenigo C, Vercellis C. Automatic visual inspection of rare defects: A framework based on gp- wgan and enhanced faster R-CNN. In2021 IEEE International Conference on Industry 4.0, Artificial Intelligence, and Communications Technology (IAICT) 2021 Jul 27 (pp. 221 -227). IEEE.

[17] Lian J, Wang L, Liu T, Ding X, Yu Z. Automatic visual inspection for printed circuit board via novel Mask R-CNN in smart city applications. Sustainable Energy Technologies and Assessments. 2021 Apr 1; 44:101032.

[18] Kumar DD, Fang C, Zheng Y, Gao Y. Semi-supervised transfer learning-based automatic weld defect detection and visual inspection. Engineering Structures. 2023 Oct 1;292:116580.

[19] Liu Z, Tang R, Duan G, Tan J. Truing Det: Towards high-quality visual automatic defect inspection for mental surface. Optics and Lasers in Engineering. 2021 Mar 1;138:106423.