

# Study on Predicting Disease Outcomes with Machine Learning in Healthcare Analytics

Govind Mohanlal Poddar<sup>1</sup> and Dr. Satish Kumar N<sup>2</sup>

Research Scholar, Department of Computer Science<sup>1</sup>

Research Guide, Department of Computer Science<sup>2</sup>

Sunrise University, Alwar, Rajasthan, India

**Abstract:** *Healthcare is undergoing a transformative paradigm shift driven by advancements in data analytics and machine learning. Predictive healthcare analytics has emerged as a promising tool for early diagnosis, prognosis, and treatment recommendation. This paper provides an in-depth exploration of the application of machine learning techniques to predict disease outcomes in healthcare settings. It discusses the challenges, opportunities, and real-world applications of predictive analytics, highlighting the potential to revolutionize patient care and improve healthcare outcomes.*

**Keywords:** Machine learning, Healthcare Analytics, Predictive Modeling.

## REFERENCES

- [1]. Carvalho, T.P.; Soares, F.A.; Vita, R.; Francisco, R.D.; Basto, J.P.; Alcalá, S.G. A systematic literature review of machine learning methods applied to predictive maintenance. *Comput. Ind. Eng.* 2019, 137, 106024.
- [2]. Lu, Yang. "Industry 4.0: A survey on technologies, applications and open research issues." *Journal of Industrial information integration* 6 (2017): 1-10.
- [3]. Stock, T., & Seliger, G. (2016). Opportunities of sustainable manufacturing in industry 4.0. *Procedia Cirp*, 40, 536–541.
- [4]. Abidi, M.H.; Alkhalefah, H.; Umer, U. Fuzzy harmony search based optimal control Strategy for wireless cyber physical system with industry 4.0. *J. Intell. Manuf.* 2021.
- [5]. Maddikunta, P.K.R.; Pham, Q.-V.; Prabadevi, B.; Deepa, N.; Dev, K.; Gadekallu, T.R.; Ruby, R.; Liyanage, M. Industry 5.0: A survey on enabling technologies and potential applications. *J. Ind. Inf. Integr.* 2021, 26, 100257.
- [6]. Baruah, P.; Chinnam, R.B. HMMs for diagnostics and prognostics in machining processes. *Int. J. Prod. Res.* 2005, 43, 1275–1293.
- [7]. Prytz, R.; Nowaczyk, S.; Rögnvaldsson, T.; Byttner, S. Predicting the need for vehicle Com-pressor repairs using maintenance records and logged vehicle data. *Eng. Appl. Artif. In Tell.* 2015, 41, 139–150.
- [8]. Aremu, O.O.; Hyland-Wood, D.; McAree, P.R. A Relative Entropy Weibull-SAX frame-work for health indices construction and health stage division in degradation modeling of Multivariate time series asset data. *Adv. Eng. Inform.* 2019, 40, 121–134.
- [9]. Susto, G.A.; Schirru, A.; Pampuri, S.; McLoone, S.; Beghi, A. Machine Learning for Pre-dictive Maintenance: A Multiple Classifier Approach. *IEEE Trans. Ind. Inform.* 2015, 11, 812–820.
- [10]. Malhi, A.; Yan, R.; Gao, R.X. Prognosis of Defect Propagation Based on Recurrent Neural Networks. *IEEE Trans. Instrum. Meas.* 2011, 60, 703–711.
- [11]. Yuan, M.; Wu, Y.; Lin, L. Fault diagnosis and remaining useful life estimation of aero Engine using LSTM neural network. In *Proceedings of the 2016 IEEE International Conference on Aircraft Utility Systems (AUS)*, Beijing, China, 10–12 October 2016; pp. 135–140.
- [12]. Li, Z., Wang, Y. & Wang, KS. Intelligent predictive maintenance for fault diagnosis and prognosis in machine centers: Industry 4.0 scenario. *Adv. Manuf.* 5, 377–387 (2017). [https:// doi.org/10.1007/s40436-017-0203-8](https://doi.org/10.1007/s40436-017-0203-8).

- [13]. Erfani, S. M., Rajasegarar, S., Karunasekera, S., & Leckie, C. (2016). High-dimensional and large-scale anomaly detection using a linear one-class svm with deep learning. *Pattern Recognition*, 58, 121–134.
- [14]. Yu, W., Dillon, T., Mostafa, F., Rahayu, W., & Liu, Y. (2019). A global manufacturing big data ecosystem for fault detection in predictive maintenance. *IEEE Transactions on Industrial Informatics*, 16(1), 183–192.
- [15]. Kanawaday, A., & Sane, A. (2017). Machine learning for predictive maintenance of industrial machines using iot sensor data. In *2017 8th IEEE international conference on software engineering and service science (ICSESS)* (pp. 87–90). IEEE.
- [16]. Wang, J., Zhang, L., Duan, L. et al. A new paradigm of cloud-based predictive maintenance for intelligent manufacturing. *J Intell Manuf* 28, 1125–1137 (2017). <https://doi.org/10.1007/s10845-015-1066-0>.
- [17]. Amruthnath, N., and Gupta, T. (2018). A research study on unsupervised machine learning algorithms for early fault detection in predictive maintenance. In *2018 5<sup>th</sup> International Conference on Industrial Engineering and Applications (ICIEA)* (pp. 355–361). IEEE.
- [18]. Ansari, Fazel, Robert Glawar, and Wilfried Sih. “Prescriptive maintenance of CPPS by integrating multimodal data with dynamic bayesian networks.” In *Machine learning for cyber physical systems*, pp. 1–8. Springer Vieweg, Berlin, Heidelberg, 2020.
- [19]. Sarazin, Alexandre, Sébastien Truptil, Aurélie Montarnal, and Jacques Lamothe. “Toward information system architecture to support predictive maintenance approach.” In *Enterprise interoperability viii*, pp. 297–306. Springer, Cham, 2019.
- [20]. Cheng, Jack CP, Weiwei Chen, Keyu Chen, and Qian Wang. “Data-driven predictive maintenance planning framework for MEP components based on BIM and IoT using machine learning algorithms.” *Automation in Construction* 112 (2020): 103087.7
- [21]. Calabrese, Matteo, Martin Cimmino, Francesca Fiume, Martina Manfrin, Luca Romeo, Silvia Ceccacci, Marina Paolanti et al. “SOPHIA: An event-based IoT and machine learning architecture for predictive maintenance in industry 4.0.” *Information* 11, no. 4 (2020): 202.
- [22]. Uhlmann, E.; Pontes, R.P.; Geisert, C.; Hohwieler, E. Cluster identification of sensor data for predictive maintenance in a Selective Laser Melting machine tool. *Procedia Manuf.* 2018, 24, 60–65.
- [23]. Markiewicz, M.; Wielgosz, M.; Bocheński, M.; Tabaczyński, W.; Konieczny, T.; Kowalczyk, L. Predictive Maintenance of Induction Motors Using Ultra-Low Power Wireless Sensors and Compressed Recurrent Neural Networks. *IEEE Access* 2019, 7, 178891–178902.