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**Predictive and Preventive Measures for Covid-19 Pandemic** pp 231–249

# An Investigation on COVID 19 Using Big Data Analytics and Artificial Intelligence

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### Abstract

Big data application has found drastic growth in every field since it estimates an appropriate result, and it can handle any volume of data. Data analytics models predict the target through which rise or fall of each data can be identified. Big data, when combined with data analytics, overcomes all the traditional technology and provides the best solution. COVID-19, a disease that came into the picture as it emerged from Wuhan city, China, made a complete change throughout the world. Curing this disease became a significant challenge yet. Big Data and data analytics through the

COVID-19 data have predicted and found the recovery and mortality rate in many hospitals of many countries. The aim of this paper is discussed in Section IV by comparing three different data analytic models—logistic regression, Kaplan—Meier analysis and SIR model, used for prediction of COVID-19 using myocardial injury dataset. This paper also has a literature study on big data analytics. It concludes with a favourable result on the SIR model. The challenges so far faced by big data and data analytics add a recommendation for other countries to get involved with big data and data analytics on COVID-19.

## Keywords

Big data Data analytics COVID-19

Logistic regression Kaplan-meier analysis

SIR model

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### References

- Phan LT, Nguyen TV, Luong QC et al (2020)
   Importation and human-to-human transmission of a novel coronavirus in Vietnam. N Engl J Med
- 2. Xu Z, Shi L, Wang Y et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. Lancet, pp 420–422
- 3. Gao GF (2020) From A to Z: attacks from emerging and re-emerging pathogens. Cell 1157–1159
- 4. Stahl K, Bode C, David S (2020) First do no harm-beware the risk of therapeutic plasma exchange in severe COVID-19. Critical Care
- 5. Chae S, Kwon S, Lee D (2018) Predicting Infectious disease using deep learning and big data. Int J Environ Res Public Health 15(8)
- 6. Huang X, Clements ACA, Williams G, Milinovich G, Hu W (2013) A threshold analysis of dengue transmission in terms of weather variables and

imported dengue cases in Australia. Emerg Microbes Amp Infect 2:e87

- 7. Gansekaran K, Abdulrehman SA (2020) Artificial intelligence applications in tracking health behaviours during disease epidemics. Springer International Publishing, pp 141–155
- 8. Lew TWK, Kwek TK, Tai D et al (2003) Acute respiratory distress syndrome in critically ill patients with severe acute respiratory syndrome. JAMA 374–380
- Peng L, Yang W, Zhang D, Zhuge C, Hong L (2020) Epidemic analysis of COVID-19 in China by dynamic modelling. arXiv preprint:2002.06563
- 10. https://www.researchgate.net/deref/http%3A% 2F%2F, www.nhc.gov.cn%2F
- 11. Ouidit GY, Kassiri Z, Jiang C et al (2009) SARScoronavirus modulation of myocardial ACE2 expression and inflammation in patients with SARS. Eur J Clin Invest
- **12.** Zhao X, Liu X, Li X (2020) Tracking the speed of novel coronavirus (2019-ncov) based on big data. medRxiv

- 13. Hu Z, Ge Q, Jin L, Xiong M (2020) Artificial intelligence forecasting of COVID-19 in China. arXiv preprint <a href="mailto:arXiv:2002.07112">arXiv:2002.07112</a>
- **14.** Castorina P, Iorio A, Lanteri D (2020) Data analysis on coronavirus spreading by macroscopic growth laws. arXiv: 2003.00507
- 15. Wang S, Kang B, Ma J, Zeng X, Xiao M, Guo J, Cai M, Yang J, Li Y, Meng X et al (2020) A deep learning algorithm using CT images to screen for coronavirus disease (COVID-19). medRxiv
- **16.** Yi-Cheng C, Ping-En L (2020) A timedependent SIR model for COVID-19 with undetectable infected persons, April
- 17. Hastie T, Tibshirani R, Friedman J (2001)
  Elements of statistical learning: data mining,
  inference and prediction. Springer, Berlin
- 18. Rong-Hui D, Li-Rong L, Cheng-Qing Y, Wen W, Ming L et al (2020) Predictors of mortality for patients with COVID-19 pneumonia caused by SARS-CoV-2: a prospective cohort study. Eur Respiratory J
- 19. Mittal M, Kaur I, Pandey SC, Verma A, Goyal LM (2019) Opinion mining for the Tweets in healthcare sector using fuzzy association rule.

EAI Endorsed Trans Pervasive Health Technol 4(16)

- 20. Jiang S, Li Q (2020) Mathematical models for devising the optimal SARS-COV-2 eradication in China, South Korea, Iran and Italy, Lancet
- 21. Baesens B et al (2005) Neural network analysis for personal loan data. J Oper Res Soc 1089– 1098
- 22. Bauch CT, Lloyd-Smith JO, Coffee JO, Galvani AP (2005) Dynamically modelling SARS and other newly emerging respiratory illnesses: past present and future. In: Epidemiology, pp 791–801, Nov 2005
- 23. Huang C, Wang Y, Li X et al (2020) Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 395:497–506
- **24.** Dong Y, Mo X et al (2020) Epidemiology of COVID-19 among children in China. Pediatrics
- 25. Chawla S, Mittal M, Chawla M, Goyal LM (2020)
  Corona virus—SARS-CoV-2: an insight to
  another way of natural disaster. EAI Endorsed
  Trans Pervasive Health Technol 6(22)

- 26. Chen C-J (1999) Epidemiology: principles and methods. Linking Publishing Company
- 27. Wang L, He W, Yu X, Liu H, Zhou W, Jiang H (2020) Effect of myocardial injury on the clinical prognosis of patients with new coronavirus pneumonia. Chin J Cardiovascular Dis 48
- 28. Ruan Q, Yang K, Wang W, Jiang L, Song J (2020) Clinical predictors of mortality due to COVID-19 based on an analysis of data of 150 patients from Wuhan, China. Intensive Care Med 641–643
- 29. Report of the WHO-China Joint Mission on Coronavirus Disease [EB/OL] [2020–03–05] (2019)
- 30. Majumder M, Mandl KD (2020) Early transmissibility assessment of a novel coronavirus in Wuhan, China. SSRN J
- 31. Mittal M, Balas VE, Goyal LM, Kumar R (eds) (2019) Big data processing using spark in cloud. Springer, Heidelberg
- 32. Dayal BS, MacGregor JF (1996) Identification of finite impulse response models: methods and

robustness issues. Ind Eng Chem Res 35(11):4078–4090

33. Gao H, Liu CH, Wang W, Zhao J, Song Z, Su X, Crowcroft J, Leung KK. A survey of incentive mechanisms for participatory sensing. IEEE Commun Surv Tutorials 17:2

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