Chapter 9

Artificial Intelligence:
A Tool for Detection of Pandemics

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ABSTRACT

The spread of the COVID-19 pandemic made us rethink the need for integrating modern scientific algorithms in decision support as well as medical systems. This chapter focuses on the on-going efforts throughout the world for tackling the COVID-19 pandemic with the use of artificial intelligence and machine learning algorithms. The chapter also compiles the various efforts made internationally for providing solution to this disease. The examples of use of algorithms like artificial neural network, fuzzy clustering, and support vector machines for both the disease recognition as well as in medical aid have been stated. Finally, the chapter also reiterates the need for developing even more advanced algorithms and prediction systems in case of future pandemic outbreaks due to ever mutating microorganisms and other lifestyle problems. More than just scientific and governmental endeavors, prudent handling of any emergency health situation requires awareness as well as self-discipline exercised by inhabitants of any country.

INTRODUCTION

The unexpected, unprecedented global fire of COVID-19 pandemic is the best explanation for practically experiencing a pandemic at large. While a pandemic

breaks all the boundaries of nations on the globe, epidemic is the spread of a disease within a particular localized geographical area (Centre for Disease Control, 2012). Yellow fever and small pox are few examples. The third category is endemic where the disease outbreak is confined to a particular geographical location but is consistent in its presence. The best example is malaria endemically found in tropical African nations as well as central and South America (Columbia Mailman School of Public Health, 2022). Few other significant pandemics from yesteryears are summarized in Table 1 (Columbia Mailman School of Public Health, 2022; Piret & Boivin, 2021).

Table 1. Major pandemic outbreaks of the world

S. No.	Details of the Epidemics/ Pandemics	Causative Organism	Duration of the Most Severe Effect	Time Period in Years
1.	The black death (Bubonic Plague)	Yersinia pestis	Four (4) years	1346-1353
2.	American Plague, Small Pox	Small pox virus		16th Century
3.	1st Cholera Pandemic (CP) 2nd CP 3rd CP 4th CP 5th CP 6th CP 7th CP	Vibrio cholera	Seven (7) years Eight (8) years Seventeen (17) years Twelve (12) years Five (5) years Twenty four (24) years Ongoing	1817-1824 1827-1835 1839-1856 1863-1875 1881-1886 1899-1923 1961- Currently Ongoing
4.	The Russian Flu	Influenza virus Influenza A/H3N8	One (1) year	1889-1893
5.	The Spanish Flu	Influenza virus Influenza A/H1N1	Two (2) years	1918-1920
6.	The Asian Flu	Various Avian Flu Viruses specially Influenza virus Influenza A/H2N2	One (1) year	1957-1959
7.	The Hong Long Flu	Influenza virus Influenza A/H3N2	Two (2) years	1968-1970
8.	AIDS	HUMAN Immunodeficiency Virus (HIV)	Still going on	1981-Currently ongoing
9.	Severe Acute Respiratory Syndrome	SARS-CoV	One (1) year	2002-2003
10.	Swine flu	Influenza virus Influenza A/H1N1	ONE (1) YEAR	2009-2010
11.	Middle East Respiratory Syndrome	MERS Virus	Ongoing	2015- Currently Ongoing
12.	COVID-19	SARS-CoV-2	Ongoing	2019-Currently Ongoing

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