A STUDY ON PUBLIC HEALTH SURVEILLANCE USING BIG DATA ANALYTICS

A. RONALD DONI

Faculty of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai The Research Monograph Series in Computing, Electrical & Communication Networks

A Study On Public Health Surveillance Using Big Data Analytics

Author: A. Ronald Doni

Published by BOHR Publishers, Chennai, India

Old Door No. 4, New Door No. 3, Rishilaya Building, 2nd Street, Golden Avenue, Devi Karumariamman Nagar, Velachery, Chennai – 600 042, India

©2024 BOHR Publishers

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or storage in any information or retrieval system, without the prior permission of the copyright owner.

ISBN: 000-00-00000-00-0

Typeset and Cover designed by Chennai Publishing Services Pvt. Ltd., Chennai, India Printed by Thoorigai Prints, Royapettah, Chennai

TABLE OF CONTENTS

Al	BSTRA	CT		1	
1	INTRODUCTION				
	1.1	ORIGIN AND IMPACT OF PANDEMIC			
		1.1.1	_		
			Nature and Features	4	
		1.1.2	Impact of Pandemic – Economical		
			and Psychological	5	
		1.1.3	Early Warning Systems		
	1.2	MOT	IVATION		
	1.3	METHODOLOGY - A SCIENTIFIC APPROACH			
	1.4	ORG	ANISATION OF THESIS	8	
2	REVIEW OF LITERATURE				
	2.1	CON'	TAGIOUS DISEASES AND PANDEMIC STUDII	ES10	
	2.2	PRED	OICTION MODELS	15	
	2.3	RESE	ARCH GAP	23	
	2.4	PROF	BLEM DEFINITION	23	
	2.5	OBJE	CTIVES OF THE RESEARCH WORK	26	
3			ON MODELS BASED ON MACHINE		
	LEARNING APPROACH				
	3.1	ARTIFICIAL NEURAL NETWORKS – DEEP			
			LEARNING ALGORITHMS		
	3.2	DEEP LEARNING ALGORITHMS			
		3.2.1	0011,01001011011 1.00110110110110111011101110		
		3.2.2			
		3.2.3	Bi-directional Recurrent Neural Networks		
		3.2.4	Long Short-Term Memory Networks	33	
		3.2.5	Bidirectional Long Short- Term Memory and		
			Deep Belief Networks	34	

4	DATA	A ANALYSIS AND INTERPRETATIONS	35
	4.1	DATA ANALYSIS	35
	4.2	INTERPRETATIONS	36
	4.3	CONCLUSION AND FUTURE SCOPE	38
		4.3.1 Future Scope	39
RI	EFEREI	NCES	41

LIST OF SYMBOLS AND ABBREVIATIONS

SYMBOLS

 $\beta_{_{p}} \quad \ \ \, \text{--} \quad \, \text{Coefficient of the lag p for model estimation}$

Dc - Dengue Cases

Dd - Dengue Deaths

ε - Error Rate

Hh - Humidity

α - Intercept

 Y_{t-p} - Lag p of the series

A, - Model A (number of infected cases)

B_d - Model B (number of deceased cases)

D - Number of deceased cases as on 22nd July 2020

I - Number of infected cases as on 22nd July 2020

Pi - Population

Rr - Rainfall

Tt - Temperature

γ - The rate of change of dew factor

 β - The rate of change of humidity

 α - The rate of change of temperature

T_p - Total population in the Indian subcontinent

 ϵ - Training epoch of the neural network

ABBREVIATIONS

ACE2 - Angiotensin-Converting Enzyme 2

ACO - Ant Colony Optimization

ADHD - Attention Deficit Hyperactivity Disorder

AHC - Acute Hemorrhagic Conjunctivitis

ANN - Artificial Neural Networks

BLSTM - Bidirectional Long Short-Term Memory
BRNN - Bidirectional Recurrent Neural Networks

CNN - Convolutional Neural Network

CNN-MDRP - Convolutional Neural Network based Multimodal

Disease Risk Prediction

CoV - Coronaviruses

DKS - Dense k-Subgraph
EWS - Early Warning System
GRU - Gradient Recurrent Unit
LDA - Linear Discriminant Analysis

LSTM - Long Short-Term Memory
PCR - Polymerase Chain Reaction

PHS - Public Health Surveillance PSO - Particle Swarm Optimization

RER - Renewable Energy Resources
ResNet - Residual Neural Network
RNN - Recurrent Neural Network

SVM - Support Vector Machine

UIDAI - Unique Identification Authority of India

WHO - World Health Organization