Standards, AI & Healthcare

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ERIC NIILER SCIENCE 01.25.2020 07:00 AM

An AI Epidemiologist Sent the First Warnings of the Wuhan Virus

The BlueDot algorithm scours news reports and airline ticketing data to predict the spread of diseases like those linked to the flu outbreak in China.



TRANSPORTATION

THE LANCET

CORRESPONDENCE | VOLUME 387, ISSUE 10016, P335-336, JANUARY 23, 2016

Anticipating the international spread of Zika virus from Brazil

Isaac I Bogoch • Oliver J Brady • Moritz U G Kraemer • Matthew German • Marisa I Creatore • Manisha A Kulkarni • John S Brownstein • Sumiko R Mekaru • Simon I Hay • Emily Groot • Alexander Watts • Kamran Khan 🖾 • Show less

Published: January 14, 2016 • DOI: https://doi.org/10.1016/S0140-6736(16)00080-5

THE LANCET Global Health

ARTICLES | VOLUME 3, ISSUE 12, E776-E784, DECEMBER 01, 2015

Symptoms and medical conditions in 204 912 patients visiting primary health-care practitioners in India: a 1-day point prevalence study (the POSEIDON study)

Dr Sundeep Salvi, MD $\stackrel{\sim}{\sim}$ $\stackrel{\Box}{\simeq}$ • Komalkirti Apte, MBBS • Sapna Madas, MSc • Monica Barne, MBBS • Sushmeeta Chhowala, MSc • Tavpritesh Sethi, PhD • et al. Show all authors

Open Access • Published: December, 2015 • DOI: https://doi.org/10.1016/S2214-109X(15)00152-7 •





THE NEW NORM



Growth in the digital age

SAFE-ICU, AIIMS, NEW DELHI



Sethi T and Lodha R. Early Detection of Sepsis in Paediatric Intensive Care Units through Integration of Clinical and Big Data. Wellcome Trust/DBT India Alliance Grant No. JA/CPHE/14/1/501504

Sepsis Advanced Forecasting Engine (SAFE-PICU)

~1,000,000 patient-hours of vitals data at 1-second resolution (and counting)

Integrate Machine Learning, Clinical Knowledge to address gaps in critical care

Automated Big-data extraction using in-house pipeline



Sethi T, Nagori A, Bhatnagar A, Gupta P, Fletcher R, and Lodha R.

Validating the Tele-diagnostic Potential of Affordable Thermography in a Big-data enabled ICU. *Proceedings of the Special Collection on eGovernment Innovations in India.* 2017. p. 64–9.

Information-Extraction through visualization and models



The in-house developed dashboard ingests raw data from monitors, treatment charts to display quality metrics, antibiotic-use spiderplot, and SpO2 histograms.

Sivanandan S, Sethi T, Lodha R, Thukral A, Sankar MJ, Agarwal A, Paul VK, Deorari AK. Target Oxygen Saturation Among Preterm Neonates on Supplemental Oxygen Therapy: A Quality Improvement Study. *Indian Pediatr. (Forthcoming)*

PREDICT AND NOT JUST DETECT

- Often confused
- Detection ~ Phenotyping
- Prediction ~ Forecasting



ARTIFICIAL INTELLIGENCE MODELS

Overview of the ML Pipeline



Thermal Image Recording





Model using manually extracted gradient



Forecasting of shock 0hr, 3hr, 6hr, 12 hr



Machine learn gradient and automate shock prediction

Nagori A, Dhingra LS, Bhatnagar A, Lodha R and Sethi T. Predicting Hemodynamic Shock from Thermal Images using Machine Learning. Scientific Reports

Computer Vision + Machine Learning



GENERALIZATION & PROSPECTIVE VALIDATION

 $\mathcal O$ Comment on this paper

Generalized Prediction of Hemodynamic Shock in Intensive Care Units

Aditya Nagori, Pradeep Singh, Sameena Firdos, Vanshika Vats, Arushi Gupta, Harsh Bandhey, Anushtha Kalia, Arjun Sharma, Prakriti Ailavadi, Raghav Awasthi, Wrik Bhadra, Ayushmaan Kaul, Rakesh Lodha, Tavpritesh Sethi **doi:** https://doi.org/10.1101/2021.01.07.21249121

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

https://www.medrxiv.org/content/10.1101/2021.01.07.21249121v4



COMMUNITY DATA



Covid-19 Data Commons Toolkit

COVID-19 DATA COMMONS TOOLKIT

This is a collection of approximately 6000 datasets (after preprocessing) related to covid-19. The T-SNE plot is presented to visualize the BioBert embeddings created using the abstracts of the datasets. There are multiple interesting clusters formed in the dataset related to keywords like vaccine, icu, etc which we are exploring.



Data Exchange using NDHM Compliant APIs



IFHP

AI DRIVEN SOLUTIONS FOR COVID-19





EvidenceFlow



IFHP

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Opportunities with Agile Data Early Predictions

StrainFlow: Reading the Genomic Sequences like a Book



Predictive Models on the Platform for COVID-19 Surveillance MACHINE LEARNING TO FORECAST COVID-19 SURGES



Data are from GISAID, JHU CSSE





I



Country	Pearson Correlation	p value	Spearman's Correlation	p value
USA	0.97	8·41 x 10 ⁻⁹	0.94	0.00
India	0.91	6·13 x 10 ⁻⁶	0.97	0.00
Germany	0.91	6·78 x 10 ⁻⁶	0.87	7.57 x 10 ⁻⁶
France	0.86	7·35 x 10 ⁻⁵	0.97	0.00
England	0.82	2.89 x 10 ⁻⁴	0.66	1·22 x 10 ⁻²
Japan	0.71	$4.38 \ge 10^{-3}$	0.63	1.92 x 10 ⁻²
Brazil	0.48	8.61 x 10 ⁻²	0.45	1.12×10^{-1}



AGA

3 4 12 13 15 16

Dimensions of Concern

25 28

30 32

2.25 - 2.00 1.75 1.50 - 1.25 - 1.00 - 0.75 0.50 - 0.25

- 0.00

Front. Genet., 08 April 2022 | https://doi.org/10.3389/fgene.2022.858252



Genomic Surveillance of COVID-19 Variants With Language Models and Machine Learning

Sargun Nagpal^{1†}, Ridam Pal^{1†}, Ashima^{1‡}, Ananya Tyagi^{1‡}, Sadhana Tripathi^{1‡}, Aditya Nagori¹, Saad Ahmad¹, Hara Prasad Mishra¹, Rishabh Malhotra¹, Rintu Kutum^{1,2*} and Tavpritesh Sethi^{1,3*}

¹Indraprastha Institute of Information Technology Delhi, New Delhi, India

²Ashoka University, Sonipat, India

³All India Institute of Medical Sciences, New Delhi, India

The Hindu, April 24, 2022

Genome-based approach to predict COVID-19 surges

Delta and the Omicron surges highlight the crucial need to use genomic features to predict surges

 Most of the currently available models predict the future trends based upon the reported infections and deaths

 These models do not incorporate features from the virus sequences in a predictive manner

 The Strainflow model plugs this gap by taking a sequence-driven approach to predict future surges using a novel AI pipeline

The three-base codons in these sequences were treated as words in the document with each



Strainflow model can predict whether there is a likely surge with a two-month lead time.

 The best model compressed the viral sequences in 36 dimensions, and the authors proposed that some of these may make the virus spread faster

The models were trained to extract the dimensions that predicted the number of cases in the 17 countries with a two-month lead time

 These models were accurate in predicting the surges during the Delta, Omicron, and the current surges we are seeing in India

The Strainflow model does not predict the actual number of cases but we do get an accurate sense of how

Right Information to the Right People in the Right Format at the Right Time.

Countries ~



Coronavirus disease (COVID-19) technical guidance: Infection prevention and control / WASH

Newsroom v



Health Topics ~

World Health Organization

Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected

Emergencies ~

About Us v

This is the first edition of guidance on infection prevention and control (IPC) strategies for use when infection with a novel coronavirus (2019-nCoV) is suspected. It has been adapted from *WHO's Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus* (MERS-CoV) infection, based on current knowledge of the situation in China and other countries where cases were identified and experiences with severe acute respiratory syndrome (SARS)-CoV and MERS-CoV.

- Access the publication

WASHKARO ENGINE



Online Learning

OnAIr Performance





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nature > scientific reports > articles > article

Article Open Access Published: 17 January 2022

A machine learning application for raising WASH awareness in the times of COVID-19 pandemic

Rohan Pandey, Vaibhav Gautam, Ridam Pal, Harsh Bandhey, Lovedeep Singh Dhingra, Vihaan Misra, Himanshu Sharma, Chirag Jain, Kanav Bhagat, Arushi, Lajjaben Patel, Mudit Agarwal, Samprati Agrawal, Rishabh Jalan, Akshat Wadhwa, Ayush Garg, Yashwin Agrawal, Bhavika Rana, Ponnurangam Kumaraguru & Tavpritesh Sethi 🖂

Scientific Reports 12, Article number: 810 (2022) Cite this article

SUMMARY

- Heterogeneous Data are still the norm in healthcare
- Standards enable a plug 'n play approach with data
- Need to evolve standards around processing layers
- Sandboxes and Real World Testing Environments are Key!

Thank you.