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A Review and Analysis of Data Science During lockdown in Pandemics

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***Abstract*--During the COVID-19 pandemic, more than ever, data science has become a powerful weapon in combating an infectious disease epidemic and arguably any future infectious disease epidemic. Computer scientists, data scientists, physicists and mathematicians have joined public health professionals and virologists to confront the largest pandemic in the century by capitalizing on the large-scale 'big data' generated and harnessed for combating the COVID-19 pandemic. In this paper, we review the newly born data science approaches to confronting COVID-19, including the estimation of epidemiological parameters, digital contact tracing, diagnosis, policy-making, resource allocation, risk assessment, mental health surveillance**

I. INTRODUCTION

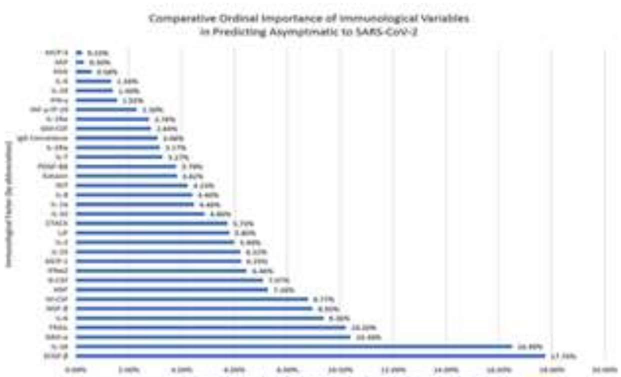

Figure 1: Use of Data Science in Pandemic.

Data science is an interdisciplinary field that uses scientific methods, processes, algorithms and systems to extract or extrapolate knowledge and insights from noisy, structured and unstructured data,[1][2] and apply knowledge from data across a broad range of application domains.

Data science is related to data mining, machine learning, big data, computational statistics and analytics.Data science is a "concept to unify statistics, data analysis, informatics, and their related methods" in order to "understand and analyse actual phenomena" with data.[4] It uses techniques and theories drawn from many fields within the context of mathematics, statistics, computer science, information science, and domain knowledge.[3] However, data science is different from computer science and information science. Turing Award winner Jim Gray imagined data science as a "fourth paradigm" of science (empirical, theoretical, computational, and now data-driven) and asserted that "everything about science is changing because of the impact of information technology" and the data deluge.

History:Data science is an interdisciplinary field[8] focused on extracting knowledge from typically large data sets and applying the knowledge and insights from that data to solve problems in a wide range of application domains.[9] The field encompasses preparing data for analysis, formulating data science problems, analyzing data, developing data-driven solutions, and presenting findings to inform high-level decisions in a broad range of application domains. As such, it incorporates skills from computer science, statistics, information science, mathematics, data visualization, information visualization, data sonification, data integration, graphic design, complex systems, communication and business.[10][11] Statistician Nathan Yau, drawing on Ben Fry, also links data science to human–computer interaction: users should be able to intuitively control and explore data.[12][13] In 2015, the American Statistical Association identified database management, statistics and machine learning, and distributed and parallel systems as the three emerging foundational professional communities

II. METHODOLOGY

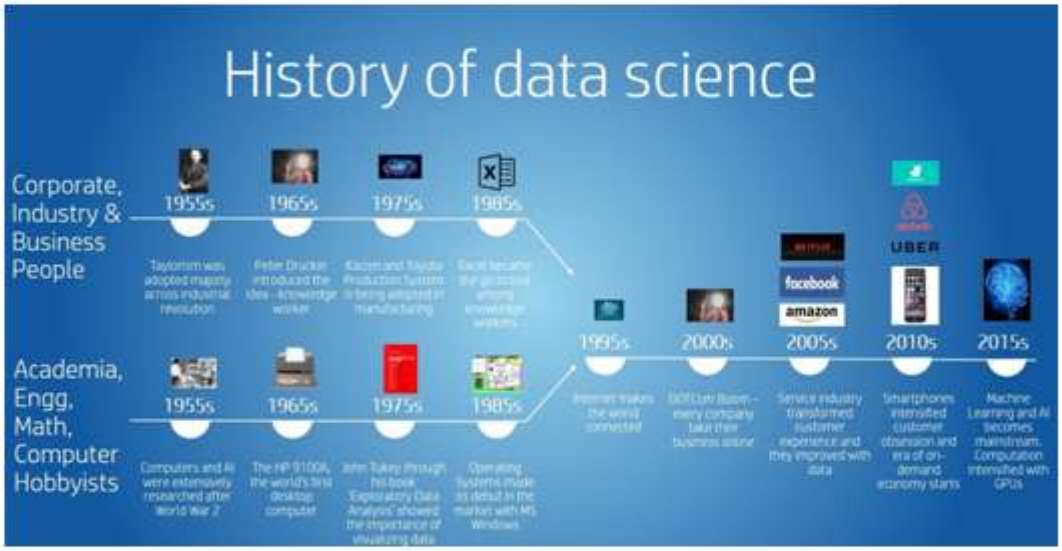

Figure 2: History of Data Science in Graph

An important distinction is between verbal communication, which happens through the use of a language, and non-verbal communication, for example, through gestures or facial expressions. Models of communication try to provide a detailed explanation of the different steps and entities involved. An influential model is given by Claude Shannon and Warren Weaver, who argue that communicative motivation prompts the sender to compose a message, which is then encoded and transmitted. Once it has reached its destination, it is decoded and interpreted by the receiver.[8][9][10] Communication is studied in various fields. Information theory investigates the quantification, storage, and communication of information in general. Communication studies is concerned with human communication, while the science of biocommunication is interested in any form of communication between living organisms.good performance for large codebases. Frappé represents node types with a string property, but it does not support different types (subtyping polymorphism). A call dependency graph is provided, connecting function nodes through *calls* relationships.Some theorists give very broad definitions of communication that encompass unconscious and non-human behavior.[17] In this regard, many animals communicate within their own species and even plants like flowers may be said to communicate by attracting bees.[14] Other researchers restrict communication to conscious interactions among human beings.[17][14]

Some definitions focus on the use of symbols and signs while others emphasize the role of understanding, interaction, power, or transmission of ideas. Various characterizations see the communicator's intent to send a message as a central component. On this view, the transmission of information is not sufficient for communication if it happens unintentionally.[17] An important version of this view is given by Paul Grice, who identifies communication with actions that aim to make the recipient aware of the communicator's intention.[19] One question in this regard is whether only the successful transmission of information should be regarded as communication.[17] For example, distortion may interfere and change the actual message from what was originally intended.[15] A closely related problem is whether acts of deliberate deception constitute communication.

III. DEPLOYMENT RESULT

1. It can help discover the need for this hour; discovery technology can be uplifted using machine learning and deep learning.
2. It can help decide the red zone, orange zone, and green zone based on the density of the infected patient.
3. It can do the feature extractions from the images of covid19 patients to understand the virus's behavior.
4. It can also justify the source from where the virus originated; that will help estimate the next significant outbreak.

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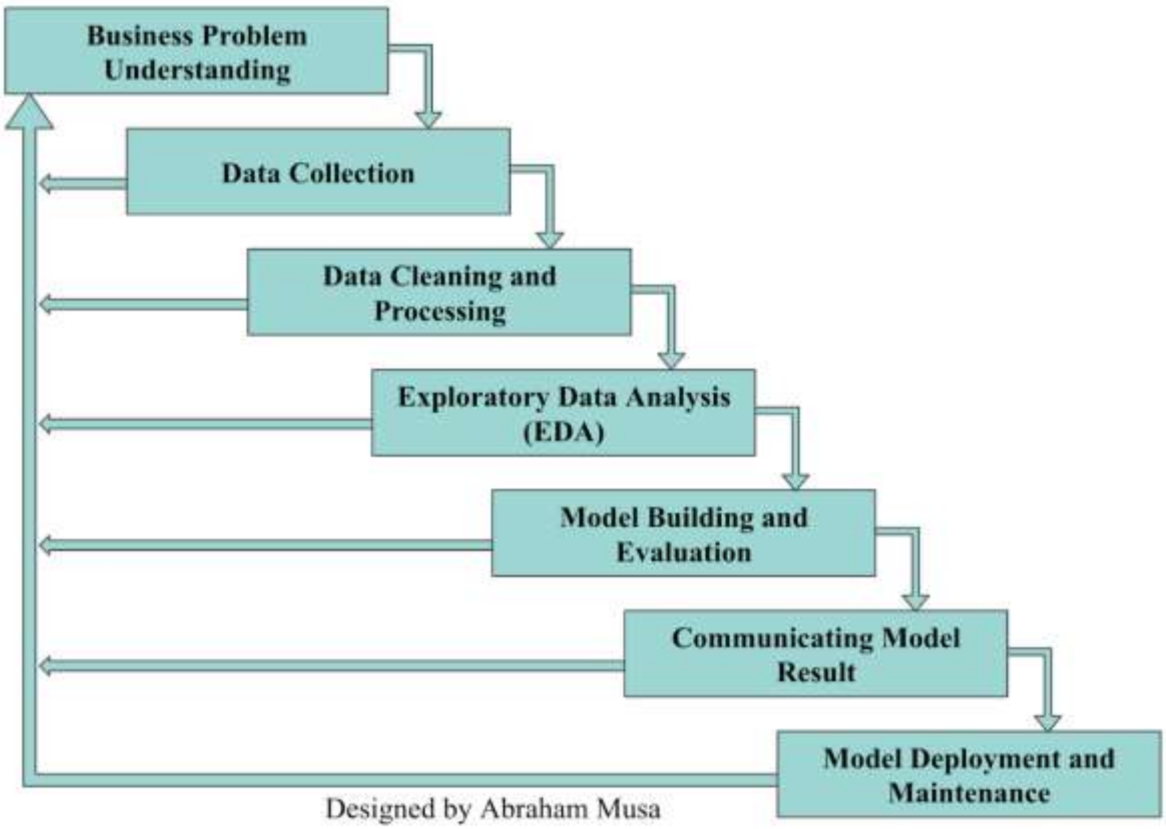

Figure 3:Life Cycle of Data Science

Figure 4: Digital technology in Public health Graph

COVID-19, a previously unknown respiratory illness caused by the coronavirus SARS-CoV-21,2, was declared a pandemic by the World Health Organization (WHO) on 11 March 2020, less than 3 months after cases were first detected. With now over 9.8 million confirmed cases and more than 495,000 deaths3 recorded worldwide, there are grave concerns about the global health, societal and economic effects of this virus, particularly on vulnerable and disadvantaged populations, and in low- and middle-income countries with fragile health systems4,5. At the time of this writing, 7.1 billion people live in countries that have had substantial travel and social restrictions6.

IV. Conclusion

COVID-19 prevention, a mission for public health practitioners globally, relies greatly on the deployment of big data solutions as data science evolves thanks to the ongoing construction of data infrastructures and evolution of data analysis tools. The extensive usage of health QR code as a digital tool to track people's physical movement and evaluate their exposure risk contributes a lot to cutting off the contagious chain of COVID-19. Its success relies on sophisticated collection, analysis, and visualization of data. Yet, as it has been gradually permeating into every aspect of people's daily life, it has led to concerns such as leakage of personal information, accountability of analytical errors, and unfair inscription of extra functions. After systematically reviewing data sources and relevant data processing techniques, the future study should lie in the dual missions that on the one hand data science has to be rendered more reliable and on the other hand ethical concerns of application of data science into public health have to be resolved.

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