HuDA_COVID Human Disposition Analysis During COVID-19 Using Machine Learning

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ABSTRACT

Coronavirus has greatly impacted various aspects of human life, including human psychology and human disposition. In this paper, the authors analyzed the impact of the COVID-19 pandemic on human health. In the proposed work, human disposition analysis during COVID-19 using machine learning (HuDA_COVID), where factors such as age, employment, addiction, stress level are studied. A mass survey is conducted on individuals of various age groups, regions, and professions, and the methodology achieved varied accuracy ranges from 87.5% to 98%. The study shows people are worried about lockdown, work, and relationships. Furthermore, 23% of the respondents have not had any effect. Forty-five percent and 32% have had positive and negative effects, respectively. HuDA_COVID is a novel study in human disposition analysis in COVID-19 where a weighted assignment indicating the health status is also proposed. HuDA_COVID clearly indicates a need for a methodical approach towards the human psychological needs to help the social organizations formulating holistic interventions for affected individuals.

KEYWORDS

ANN, Coronavirus, Data Classification, Decision Tree, Human Psychology, Machine Learning, Random Forest, SVM

1. INTRODUCTION

In today's techno-savvy world, machines and computers have replaced humans for most of the routine tasks. However, in the current situation of a global pandemic, COVID-19 pushed the world within the confines of their homes. It has struck the entire human race really hard, thus impacting health and has twisted the world's economy. To avoid the promulgation of this disease, many countries worldwide announced a complete lockdown, which is an important step but an adamant one for the global economy. For the past many decades, civilization has not faced such a locus situation when most people have not been acquainted with before. People cannot move out of their homes due to the disease's contagious nature. As a result, this virus disturbed the day to day lifestyle completely and caused a huge imbalance in everyone's life financially and psychologically. This virus affected individuals' routine lives and hampered human development in a broader sense concerning trade, economy, and research. One important question that is still not touched much, how COVID-19 is

affecting people of different regions' mental status? (Roma P. *et.al*, 2020, Muhammad, L. J. *et.al,* 2020) The abrupt lockdown did dire repercussions on the overall health of the people. Predictably, quarantined people are very likely to develop a wide range of psychological stress symptoms, including insomnia, anxiety, and emotional exhaustion (Barkur & Vibha, 2020) (Kochhar *et al.*, 2020). The merciful paradox of crises like this is to bring so many new changes and duties. In China, expected mental health effects are already being reported in the first research papers about the lockdown (Ahmed *et al.,* 2020, Zhang & Ma, 2020).COVID-19 caused universal psychosocial impact by causing mass hysteria, economic burden, and financial losses along with its high infectivity and fatality rates (Dubey *et al.*, 2020, (Chakraborty, C. *et. al*, 2015). Corona phobia (a mass fear of COVID-19) generated a plethora of psychiatric manifestations across society's different strata. No remarkable research has been carried out to study human psychology considering different aspects of the human race in diverse regions during the pandemic.

Motivation: The main motivation behind HuDA_COVID is to observe the impact of lockdown on human mental health (human disposition) by predicting a person's mental state using machine learning models (Uhrig, 1995, Flesia *et. al*, 2020). The need for such a model arises as there are increasing number of cases suffering from depression, frustration and other anxiety related disorders. This study will help all those people in understanding the effect of such pandemic and will urge them to handle the cases with great efficiency and accuracy. The proposed methodology proves very helpful in predicting an individual's health status; therefore, further research can be done by contacting the respondents via email and letting them know whether their health status is negative or positive. This will help in self-building and find ease in the middle of such a traumatic situation. This initiative can reduce the huge cost implications for society.

Contribution: The main purpose of this research is to find out the impact of lockdown on Indians. This study can help many researchers and readers who want to carry out their research in understanding the human disposition analysis during COVID-19 (Garg, L., *et. al,* 2020) using machine learning models (Chakraborty, C. *et. al*, 2017) of ANN (Bircanoglu & Arica, 2018, Agostinelli et. al, 2014), SVM (Demidova et. al, 2015), DT (Tu & Chung, 1992), RF (Liaw & Wiener, 2002). The main contribution of HuDA_COVID model is:

- We prepared a questionnaire (reference material) consisting of specially curated 33 questions to collect the responses from users of seven Indian states: Delhi, Jammu & Kashmir, Haryana, Uttar Pradesh, Tamil Nadu, Maharashtra, and Punjab.
- We designed the questions in the questionnaire in two languages: Hindi and English, to make the homogeneous reach among people of different age groups, professions (from a farmer to an engineer).
- We identified 12 most relevant parameters (*Addition to smoking, drinking and social media, whether a respondent feels the undue pressure of being productive or not, Stressed before lockdown, Adapting to the situation of lockdown, Concerned about the impact of lockdown on various aspects, Feeling isolated during lockdown etc.*) and filtered them out of a total 30 parameters to understand the human disposition.
- We introduced a collective weighting function W_i_C19 for health status assignment to each collected data.
- We proposed an algorithm for the HuDA_COVID model which follows an empirical, systematic and controlled study of observations collected from mass surveys.
- We analysed the proposed HuDA_COVID model to predict the mental health prediction of any individual.

Outline: The paper is structured as follows. Section 2 highlights related work. Section 3 discusses the proposed methodology demonstrating the proposed algorithm along with data engineering, ML

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