A Study the Impact of household air pollution on human health using Machine Learning Techniques.

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Abstract: Due to the rapid development of technology, urbanization and increased population, air pollution has become a hot topic, in particular because of the effects on health. However, much of the focus has been on outdoor air pollution as well as indoor air pollution , Some of the most important sources of indoor air pollution are Volatile Organic Compounds (VOCs) and Particulate Matter (PM). There are a variety of VOCs emitted from modern household products (e.g., paints, lacquers, cleaning liquids, furnishings, copiers, printers, glues, adhesives or permanent markers). Air pollution is a major environmental health threat. Exposure to fine particles in both the ambient environment and in the household causes about seven million premature deaths each year. The main indoor air pollutants are Volatile Organic Compounds (VOCs) and Particulate Matter (PM). PM sources included smoking, cooking, heating, candles, and insecticides, whereas sources of coarse particles were pets, housework and human movements. VOC sources included household products, cleaning agents, glue, personal care products, building materials and vehicle emissions. This public health crisis is receiving more attention, but one critical aspect is often overlooked: how air pollution affects children in uniquely damaging ways. Recent data released by the World Health Organization (WHO) show that air pollution has a vast and terrible impact on child health and survival. In this study we take secondary data of India was taken from git hub. Analyses the data by using machine learning models like Random search CV, Bagging Classifier, Linear regression, logistic regression, XG Boost . for comparing the all the factors of AQI values useing linear regression ,logistic regression and XG Boost models .it is observed that XG Boost has high accuracy than linear regression ,logistic regression and logistic shows better performance as compared to linear regression and it is shows that for PM2.5 values randomized search CV and for AQI values of all factors XG Boost and logistic regression are fitted good.

Keywords: Bagging Classifier, Randomized Search CV, Linear regression, logistic regression, XG Boost ,Public Health, Air Quality Index, and Household Air Pollution.

Introduction: Pollution is becoming an alarming threat to our planet day after day. Food pollution has been the focus of national and international public health organisations, particularly pesticide residues and bioaccumulating substances. They have also focused on reducing outdoor air pollution caused by cities, factories, and automobile exhaust emissions. Meanwhile, whereas people in high-income countries (HICs) spend much of their lives indoors, the pollution of the indoor environment still needs to be addressed [1–3]. Indeed, domestic air and indoor pollution can be traced back to prehistory, when humans first moved to temperate climates, started building shelters, and used fire for cooking, heating, and lighting. Indoor pollution is a global health issue. Today, all over the world, about 2.4 billion people still make food with solid stuff (like wood, farm leftovers, coal, and animal poop). Many of these individuals are impoverished and reside in low- and middle-income nations, with a significant gap between urban and rural settings. In 2020, just 14% of people living in urban areas depended on dirty fuels and outdated technologies, in sharp contrast to the 52% rate of the global rural population.[4]. Despite transitioning from biomass fuels to petroleum products and electricity accompanying modernisation in developed countries, pollution remains a persistent threat to public health [5]. Although inhalation is the primary way indoor pollutants are exposed, it is important to consider cutaneous and oral exposure, especially for children who frequently interact with their hands and frequently participate in activities that involve contact with floors [6][7]. According to Wilson's research, kids touch their mouths, eyes, and noses more often than adults do. In particular, hand-to-mouth contact may be