PROJECT REVIVE

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Abstract

Background Pandemic outbreaks can cause a huge impact on employee and public health management, as well as on global economies since companies struggle to steer their operations during such times. Studies suggest that the occurrence of pandemics is predicted to expand in the future. The current COVID-19 pandemic is the finest example testified.

Purpose and Aim Purpose of this study is to analyze the inefficiencies in continuing business as usual in workplaces during viral pandemics and to design the system architecture with identified requirements, develop a progressive web-based prototype that provides risk-based predictions and decision support tools to assist employers to safeguard employee health and to evaluate it with the help of industry experts and non-experts.

Methods For the provision of this research, a pilot study was conducted by sharing a survey among a sample of 32 employees in Sri Lanka along with literature research, to understand the difficulties faced by employees and employers in the Return-to-Work process during the viral pandemics. Custom machine learning models derived from analysis and comparison of similar research and applications were developed to predict the future risk of having an infected employee or a visitor in a workplace, which uses daily COVID-19 self-assessment test results of employees and visitors as input parameters to a statistical ARIMA time series model. If the predicted risk exceeds a threshold of 0.8 on a certain date, the model will suggest closing the office premises on that day to minimize viral risk in-office.

Results Pilot study proves that 71.9% of employees show moderate to very low confidence in RTW during the pandemic due to poor risk mitigative measures followed by their employers. Also, 63.3% of them believe that there's a high to very high complexity for employers to assess organization-wide risk and make informed future decisions on time to protect employee health, safety, and wellbeing, due to lack of data. The future viral prevalence risk prediction provides 2-line graphs for employees and visitors, with actual infections reported over the past 1 month against the predicted infections in-office for upto 1 week. A suggested office closure date is given based on the in-office viral risk prediction. If the viral risk prediction in-office increase 0.8,

model will suggest to close the office. The risk prediction of employees is also broken-down into department-wise risk in ascending and descending order.

Conclusion This study definitively answers many inefficiencies in managing the workplace and continuing to work during and post-pandemic. While some recommendations are given, further studies are required to automate viral assessment processes and to personalize the system for any other viral pandemic than COVID-19.

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