

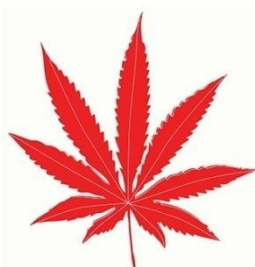


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Conference Abstract

INNOVATIVE WAY OF DETECTING AND ANALYSIS OF FOODBORNE PATHOGENS VIA SMART DEVICES

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Abstract

Foodborne disease, also called foodborne illness is any sickness that is caused by the consumption of foods or beverages that are contaminated with certain infectious or non-infectious agents [1]. We have focused on sustainable Goals 2: Zero Hunger, Goal 3: Good Health and Well-being, and Goal 8: Decent Work and Economic Growth which target food security, that is the access to sufficient, safe, and nutritious food meeting needs for an active and healthy life [2], as on-site early detection of disease-causing bacteria before the consumption can lead to a nutritious and healthy life with no disease and economy stability from not spending a bunch of amount on health issue occurring from contaminated food ingestion. Our targeted pathogens are Salmonella typhi and Staphylococcus aureus, which are two of the top five food borne pathogenic bacteria. To identify these pathogenic bacteria present in a food sample, datasets were prepared of each bacteria. The images for the datasets were captured with a Smartphone camera through a portable optical microscopic device that we designed and created. The device is easy to use, compact, and portable and can transform any smartphone into a High-Resolution Microscope. These datasets are then manipulated or enhanced with image processing so that bacteria can be accurately identified. Further, a machine learning model is developed which is trained, tested, and evaluated by the augmented datasets. The algorithm of the model learns from the images in the dataset and provides an outcome based on the dataset. A Tensor Flow lite model is then created in the teachable machine website which is then exported into the android studio for application development. Finally, a

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smartphone app that is user-friendly and can identify accurate foodborne pathogens has been developed on the Android operating system. Early pathogen detection can determine the specific pathogenic bacteria present in the food sample, enabling the appropriate steps to be taken to prevent the food from spoiling and ensure that it is safe for consumption. Otherwise, consuming infected food and disposing of it will cause health and environmental issues, such as groundwater and surface water pollution from bio-hazardous waste disposed on land or/and dumped in water bodies.

Keywords: Foodborne, Pathogens, Smart Devices

Declaration

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