Literature Review

Food contamination is a significant public health problem worldwide, causing millions of food poisoning cases and numerous deaths each year. Historical interest in food safety can be traced back to the German scientist Friedrich Akum, who wrote "A Treatise on the Adulterations of Food and Culinary Poisons" in 1820. This seminal work focused on the widespread food processing malpractice in London and laid the foundation for modern food safety regulations.

The scale of foodborne illness remains significant. The Centers for Disease Control and Prevention (CDC) reported more than 11,000 cases of foodborne illness in 2013, highlighting the ongoing risks posed by harmful microorganisms such as bacteria, viruses, and parasites that contaminate food during production. Callejon et al. (2015) further developed and identified multiple sources of food contamination, including toxins, metals, and other chemicals.

Recent technological advances have introduced innovative methods to improve food safety. These include the use of discoloration indicators to assess food freshness and blockchain technology to track the origin of food products. These technologies provide new means to prevent food contamination and ensure the integrity of the food supply chain.

Artificial intelligence (AI) and machine learning have emerged as pivotal tools in the fight against food contamination, and according to MIT Sloan Professor Thomas W. Malone, machine learning has become an important method for implementing AI in a variety of areas. Applications of AI in food safety include predictive modeling, real-time monitoring, and data analysis to identify and mitigate foodborne illness risks.

Several mobile applications, such as "Yuka - Food and Cosmetic Scan" and "Open Food Facts," already provide consumers with tools to detect food contamination. However, the proposed "Foodie" app aims to build on these foundations by incorporating additional capabilities to detect contamination of a broader range of foods, including liquids, grains, meats, and vegetables. The app will utilize technologies such as spectral and spectrum imaging, computer vision systems (CVS), and hyperspectral imaging (HSI) to enhance detection capabilities.

The development of Foodie will leverage the extensive research already conducted in this field. For example, Ishvarchandra Parmar et al. have explored various analytical techniques for detecting food adulteration. In addition, a study by Havva Tumey Tamiz and Berdan Ulas reviews recent studies employing HSI to detect food adulteration. Additionally, studies such as the one by Weiran Song et al. demonstrate the feasibility of using smartphones for adulteration detection and provide a practical basis for the proposed app.

The integration of AI in addressing food contamination issues has the potential to significantly enhance food safety in Bangladesh. By providing real-time monitoring and predictive capabilities, AI technology can revolutionize the identification and mitigation of foodborne illness risks; the Foodie app is a promising step toward a safer and more sustainable food supply chain, ultimately contributing to public health and community resilience The results of this study will be presented in the next section.

In conclusion, this literature demonstrates the pressing need for advanced solutions to combat food contamination. Historical insights, current data, and technological advances highlight the overall potential of AI and machine learning in transforming food safety practices. The proposed "Foodie" app builds on existing research and leverages cutting-edge technology to provide a comprehensive tool to detect and prevent food adulteration and ensure a healthier future for communities in Bangladesh and beyond.