Prediction of urban pollution particles and nutritional safety monitoring of protein food based on image processing

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Abstract
Atmospheric particles mainly include particles with large diameter in the air, which are solid or liquid. Some data show that the surface area of small particles is larger than that of large particles, so more harmful substances can be attached to the surface. This will make the chemical composition of these fine particles more. At the same time, the existence time of small particles in the air is significantly more than that of large particles, and the spread distance is also wider, thus causing greater harm to the human body. This paper mainly analyzes the data application of urban pollution particles and protein nutrition detection through image processing. Protein nutrition has been made to describe the standards expected to appreciate the impact of checking food from various component systems. Even more fundamentally, there is no conscious evaluation of the activity of the managerial structure in the dynamic cycle of the food analysis system. In the proposed method, protein food nutrition safety monitoring based on variance component test and statistical model and various factors of children’s food behavior in work regarding their physical endurance, cognitive ability, and the primary purpose of nutrition education are discussed. Such an examination repositions the food security watching structure to meet the changing needs of its customers.

Keywords Atmospheric particulate matters · Image processing · Protein food nutrition safety · Statistical model

Introduction
Studies have shown that due to the different formation conditions and mechanisms of particles of different sources and sizes, their chemical composition is quite different, and there are also considerable differences in the impact on human health. For example, particles with a particle size of < 100 μm can enter the nasal cavity and then deposit in the nasal cavity. The nasal mucosa and upper respiratory tract and particles < 2.5 μm can follow the airflow into the alveoli, deposit at the end of the respiratory tract, and cause lung and other organ damage. Therefore, it is currently internationally recognized that PM10 and PM2.5 are air particulate pollutants that are more harmful to human health and have been studied more.

Improving food and measure prosperity and sustenance plans and activities requires a strong confirmation base and the ability to evaluate results. There is a strong enthusiasm for food and maintenance watching systems for conservative prosperity to meet these necessities. Components related to potential food threats join wrong cultivating rehearses, the characteristic hierarchy, nonappearance of preventive controls while taking care of and food arranging, compound abuse, and contamination. Unrefined materials and food are unsanitary, water, or less than the ideal limit at any stage.

Previous research work
The chemical composition, generation, and change of atmospheric particulate matter are very complicated. Therefore, the origin and attachment of atmospheric particulate matter are not a simple linear relationship. Many of them contain aerosol components (Falge et al. 2001). In other words, when some particles spread in the air, a series of changes have taken place, which makes the structure of the material more complex. The
research and analysis of these changes can also show the main components of haze in the air to a certain extent, so as to analyze the generation and spread of haze.

The thinking rules of food culture planned to actualize thinking and sanitation information recovery. Under the direction of the center of the library philosophy, our objective is for self-adjusted sanitation recognizable proof and recovery techniques (Ganjurjav et al. 2016). Web hotspot famous conclusion is gathered and prepared from the Internet through a tweaked crawler program. In eliminating commotion, the sanitation issue is because of the change of the new financial nation to turn out to be progressively significant in the inn business, because of the unexpected crumbling of item quality and administration relations and the globalization. The fast advancement of the Internet of Things has prompted applications in the field of food quality and security observing. This article presents the engineering of food quality and safety following a framework dependent on the Internet of Things.

The trademark structure and key innovation are presented in detail. The use of the Internet of Things in food quality and wellbeing observing can successfully acknowledge multichannel, precise forecast, and sanitation occasion capacities (Amini 2006). Because of the continuous event of sanitation occurrences, for example, hydrochloride, sullied cones, plasticizers, and poisonous cucumbers, the results are intense, social effects, and critical financial misfortunes. Food keeps away from or limits the dangers of this sanitation.

Food data occasion-based hazard early admonition innovation has pulled in expanding consideration. This innovation needs to rapidly discover data about these occasions, measure the data, and issue alarms in time. Getting pertinent data here is the key and wellspring of the crisis taking care (Liu et al. 2015). Because of radiofrequency identity and square chain innovation, the foot ring is structured dependent on the honest chain and radiofrequency identity. Utilizing blockchain innovation to record all information from chicken culture, deals, information sharing, and radio recurrence innovation, high security, against duplicate capacity, cannot be altered (Bonan 2008). By filtering the recognizable QR code of the savvy gadget and the foot ring, you can acquire all the information data of every hub in the existing pattern of the food. Food safety decreases the unwavering quality of the genuine part and customers’ trust in sanitation, and sanitation review organizations are feeling the squeeze. More consideration should just be paid at the earliest opportunity to improve the sanitation condition the adequately ensure food quality and security. This innovation practically adds the idea of food quality. From the present circumstance, young people such as gear can identify the nature of food.

Our framework utilizes pH sensors, temperature sensors, and outside sensors to check food quality. Online occasion recognition innovation is generally used with a solitary information source. The data-based reports examine occasion discovery from numerous information sources. Food culture, allied with the utilization of occasion observing and first admonition, recognizes experiences from the news (Sun et al. 2019). Food security likewise improves the capacity determination technique for occasion recognition from various information sources. The location of numerous information sources and their occasions end up being essential and significant.

The technique is relevant to the aftereffects of sanitation occurrence discovery and exploration. Difficult food issues, extending from loose bowels to different types of malignant growth, prompt awful sicknesses in people and keep on increasing. The globalization of food creation is one reason for exchanging various nourishments, hazardous food courses, and ill-advised removal of food.

The identification of this sort of controller will utilize the Internet of Things to advise you that it is conceivable to make the right move. Its wide-scale application is in the food business where food assessment is done physically. Food analysis becomes familiar with this model by machine; supposing that the food originates from a specific provider, it very well may be assessed to be ruined and at what period will it be arranged. Wheat allergy is the most common among children. About two-thirds of them are relatively young. Many wheat allergy sufferers can eat other grains, but this is not for everyone—some signs of wheat allergy are stomach cramps, diarrhea, and other gastrointestinal symptoms (Wu et al. 2019). In inappropriate circumstances, for example, due to low temperature, chicken food will be turned upside down. If humans eat structure, the effect of the food will be worse, and bacteria are prone to be produced. In a warm and humid environment, due to the rapid changes in food spoilage bacteria, they spoil, and these modified foods can cause food poisoning.

This article introduces the design of a wearable radio frequency identification patch used for smart packaging to monitor food spoilage. The patch can read temperature information through a device that supports near-field communication technology through the identification and connection of a circular antenna. Discover food quality issues in a proficient creation measure; food organizations must build up a quality checking framework. Luckily, blockchain is a promising innovation that is sealed and decentralized. Furthermore, smart contracts are executable codes on the blockchain stage that can direct exchanges between parties that do not confide in one another, cannot execute themselves, and are not confirmed by joining keen agreements and quality evaluation models (Liu et al. 2012).

The data assortment gear and investigation framework are presented in detail. The framework has two significant segments. The people’s genuine information on the improvement of inhabitants’ food utilization and expectations for everyday comforts, and measurements and regulatory divisions
experience issues in acquiring sanitation guidelines and substantial eating regimen prerequisites (Xiao et al. 2020). For food care of this issue, kindly structure this framework. High-throughput sequencing innovation curated and embraced sequencing, quick improvement of bacterial strain library, and new informatics innovation, just as an adaptable registering stage that can be utilized for framework food sector accreditation all over and its variations.

Food analysis prepared to give unique the arrangement was extended to cover our flexible chain. Individuals from the Sequential Food Supply Chain Association are attempting to describe and evaluate the microbiome at standard and in the wake of preparing (Mu et al. 2006). “Last mile” food conveyance utilizes an assortment of transportation strategies that allude to the last phase of the food conveyance measure from the undertaking of the previous objective—vehicles, trucks, bikes, and so on. The people have considered everyday online takeaway conveyance arrangements. They initially make orders accessible. Conveyance and a resulting assortment of the request by the messenger are put away in the vehicle and partake and transport clients. A precise, persistent, distant, and savvy food newness observing framework, straightforwardly thinking about the necessities, and the item bundling have an uninvolved RF telemetry circuit and can insert it in the small perusing item mark (Osipov 2016).

The newness list empowers our inquiry about the pH estimation of food distinctly understanding an adaptable pH sensor tag. Dynamic bundling or altered environment bundling utilizes such temperature control, oxygen searching oxygen scavenger, and including synthetic concoctions, dampness retentive cushions, or desiccants to change the inward boundaries of the food (Burba and Verma 2005). The techniques embraced, for example, ingestion and iridescence, mugginess control. Food value estimation of carbon dioxide control and comparative utilization of antimicrobial coatings hinder the development of microorganisms in the embodiment.

Through the control innovation in the transitory food flexibly chain, joined with the close to continuous remote sensor arrangement for natural checking and other information preparing, the timeframe of the realistic usability of the item can be anticipated. This technique furnishes an adaptable and viable apparatus with minimal effort, tactile properties that can be constrained by utilizing three different sensors (temperature, light, and dampness) (Dinpashoh and Babamiri 2020) along these lines, essentially improving security and food accreditation.

Accordingly, in this article, the benefits of this technique will be clarified, and a contextual analysis will be given to help this strategy, just as a preparing case of a calculation for assessing the period of usability. As the agricultural division keeps on being influenced by environmental change and enduring, the momentum difficulties of troublesome atmosphere conditions increase the danger of bugs and sicknesses of boundary plants (Peng et al. 2015). This affects the creation of yields, yet additionally influences the food security of ranchers, and undermines some genuine misfortunes.

### Materials and method

#### Urban air pollution particles

Generally, the composition of atmospheric particles mainly includes various carbon elements and some water-soluble elements and substances. Organic elements play an important role in PM2.5. The harm degree of this kind of substance to people’s health and air environment pollution is relatively large. The main situation of air particles is shown in Figure 1. See Figure 2 for the specific conditions of atmospheric visibility.

#### Statistical model food testing

The purpose behind the structure is to measure data and points of view about food and sustenance, sterilization, food status, and food-related prosperity status, similarly as attitudes and practices about sound food and other lifestyle factors, for instance, physical activity and prosperity, and nature.

The model formula has a format like

\[
h = i1 + i2 + B*S
\]

where \( y \) is the explanatory, ~ means statistically modeled as function of \( h \) and \( i \). Arrange the essential markers related to food, sustenance, and prosperity needs. Envision designs in the headway of sustenance issues subject to current examinations, screen food plans, and surveys of their suitability. Before executing a sustenance checking system, a basic assessment should be directed to choose the sort, degree, and timing of food issues. Perceive and portray people at serious risk (Robinson 2002). The purposes behind debilitated wellbeing, moreover, are to recognize existing data sources that may be significant to the structure. This information can be established on data from similar countries, field surveys, organize outlines, facility reports, and data accumulated reliably. Food resource management is shown in Figure 3.

The intended food use, disinfection, is a never-ending test in the food chain effortlessly. Food creators at all levels in the entire creation chain, up to food organization affiliations, are liable for ensuring that extraordinary prosperity and security rules are followed to ensure the quality of customers. The essential point of convergence of food associations is the establishment of sterilization, the head system preventive measures, and particular structure (for instance, sterile apparatus setup, zoning) (Su et al. 2019), used to get the system checking cycle and complete the fundamental quality certification rules and
steps to oversee people in performing security endeavors. Regardless, existing structures cannot give disinfection assertion, and progressing assessments have exhibited that food impacts the affiliation’s food dealing with execution. This food analysis gives variables x and y; the analysis of linear regression y on x is described as

\[ h \sim x \]  
\[ f d < h \sim i \]  

The multifaceted fd is the nature of the association’s sanitation culture, since associations must think about the public estimations of laborers and their nations. The significance of public culture has been generally known. Food safety has been archived in the field of word-related security and wellbeing. However, the analytical writing on these components is restricted in the area of sanitation board.

\[ FSS = \sum_{i=1}^{n} (h - y)^2 \]  
\[ (5) \]

The statistical model FSS can be set \((h - y)^2\). Food analysis for this development is to research whether there are contrasts in public culture and sanitation administration, which is reflected in the distinctions in the general sanitation culture of food organizations. Health exercises incorporate testing which considers dependence on the recently evolved sanitation culture structure, field visits, and inside and out meetings to assess the organization’s sanitation culture in a particular nation/locale.

\[ FSS = \sum_{i=1}^{n} \sum_{n} (h(i - h))^2. \]  
\[ (5) \]

Several values of multiplication help measure deviation; \(h\) is the multiplication; \(n\) is the number of segment. The various segments add to the destruction of food tidiness. The sterile idea of the food is negative; buy unsatisfactory or old food; store the food under ill-advised conditions. From creation to usage, food will endanger the purification of dirtied food and mischief the temperature, sogginess, and pH assessment of its accumulating condition. As demonstrated by the value, a wrong technique should be used to prepare, cook, and store food, which may be dangerous to human prosperity (Zhang et al. 2018). Sickness and hurting achieved by eating corrupted food and rewards are called food tainting. The explanations behind food tainting are organized into microorganisms, parasites, engineered substances, ordinarily happening food harms, typically happening fish harms, metabolic issues, negatively defenseless
reactions, and radioactive substances. Food testing method is shown in Figure 4.

Foodborne afflictions are seen as illnesses by people who are polluted with the food they eat. These infections are a wide extent of general clinical issues and exorbitant treatments. Foodborne infections result from the use of dirtied food and things. Food polluting at any stage from creation to use finally conveys microorganisms, contaminations, parasites, manufactured inventions, and toxins that cause foodborne sicknesses. These disorders are endemic and are seen as interminable issues that can provoke passing and coincidental sickness. The negligence of individual and food neatness due to foodborne diseases is generally growing, especially in making countries

\[
FSS = \sum_{i=1}^{n} (e_{ij} - e_{ih})^2. \tag{6}
\]

The statistical model is the adjusting freedom and assumption of data under a certain limit. Food is the fundamental piece of living things; however, at this point and once more, they speak to a risk to human prosperity. There are such countless various people on the planet wherein the food they eat is cleared out. As such, ensure that purchasers have a shielded food deftly. The statistical model of food procedures is critical which aids in recognizing designs, exploring associations, and making judgments from test data. Regardless, the exception for individual investigators is to find that applying authentic does not at first check whether they are sensible for their arranged use.

\[
H(I | \beta) = \frac{e^{-x}}{h^\beta}, x > 0, \sigma, \beta > 0 \tag{7}
\]

Here, \(\beta\) is the gamma distribution with the parameter which is the methodology including a part of the huger unary \(h\) is for twofold limits, and non-parametric simple procedures and their applications are subject to genuine occasions of food science and development. For some quantifiable tests used, they together have their inclinations and drawbacks in practical applications. The necessities are similarly gotten from the relationship of inferred tests, in any event, two model get-togethers, and the normalization of the noteworthy variance, due to the need to attest homogeneity and homogeneity and backslide assessment, being discussed.

Data analysis model of statistical model

The statistical method needs to use the benefit quantifiable mechanical assemblies to isolate anyway much information as could sensibly be standard from experimental results.

Mean value

\[
x = \frac{\sum_{i=1}^{n} x_i}{n} \tag{8}
\]

Mean variance

\[
h^2 = \frac{1}{n-2} \sum_{i=1}^{n} (x_i - \bar{x})^2 \tag{9}
\]

Since \(x_i \sim x\) upon obscure boundaries, they cannot be figured by knowing just the example information; in this way, such capacities do not consider measurement. Regardless, for no food reason, many circulated articles need sufficient separated information about the real tests used to explain and inspect the disseminated results.

The data of the uncovered results are commonly confined to drawing in bits of knowledge (mean, center, least, most significant, standard deviation, or conceivably coefficient of assortment). These and other genuine tests (for instance, association, backslide, and mean assessment) are regularly established thoroughly with free use of “quantifiable programming groups,” which may conceivably be sensible for express purposes.

The mean of statistical observation is shown as follows:

\[
T_n = \frac{1}{n} \sum_{i=1}^{n} I(x) \omega^{-1} \tag{10}
\]
Before application, experts must consider the reason for actual deduction tests. Experts need to grasp the possible decisions of significant data examination to plan the exploratory work reasonably, fathom the results in the fused data structure, and arrive at judgments. These genuine reference segments are organized as a general manual for experiences for detailed evaluation. Food alerts alright with authentic thoughts, yet needs math aptitudes at the center school level. Regardless, for the people who are bewildered by past encounters, bits of knowledge are not obfuscated and boundless.

$$H = \sum_{i=1}^{n} (x_i - \bar{x})(x_i(n) - s)$$

A $(x_i - x)^2$ part of our certifiable convictions is disseminated in formal converses, where $s$ enables real customers to appreciate essential philosophical data and the curiosity of these gadgets. Experience is a massive bit of the unmistakable specialist instrument. Since most appraisal frameworks are finished according to a coherent investigation, there are off-base assessment results and expected results of discretionary instabilities. Also, material specialists use individuals as assessing instruments so that alterability will be included diverged from other logical strategies (for instance, physical or compound assessments using devices). The flow chart of statistical model food testing is shown in Figure 5.

**Result and discussion**

Generally speaking, protein refers to some foods containing protein, which have certain nutrients and can meet the needs of human growth and development. These foods containing protein are indispensable for human growth and development. In the production, transportation, and storage of these foods, it is necessary to ensure that these foods can meet the relevant national safety standards and health standards, so as to improve the safety of these foods and avoid adverse reactions or hazards caused by eating these foods.

According to the relevant literature records, the current laws and administrative regulations on food safety in China are not very sound and perfect, and the corresponding food safety standards and rules on food safety and hygiene are not very comprehensive and accurate, so that the relevant competent authorities cannot really have laws to abide by when they supervise and manage food safety, cannot be on the relevant standards and guidelines, and give a good implementation, so that a series of problems and troubles in the process of food safety supervision and management and this or that kind of food problems will occur, and food nutrition and safety play a very important role for food.

In terms of food safety supervision, in the process of food safety supervision and management, relevant competent departments can also learn from some excellent management methods and experience of other countries. In addition, in terms of food nutrition, especially protein-based food nutrition, in-depth research and development should be carried out, so that the related food research in China can be more scientific and nutritious, so that different groups of people for food nutrition needs can be met, in order to enhance the physical quality and health of the Chinese people.

One of the most critical inspirations to explore this food analysis from the perspective of clients and makers is to ensure their security. Food producers will not, in any way, shape, or form discover budgetary trouble if they are to sell things that are terrible or destructive; anyway, they will be entirely hopeless buyers since it contains pernicious microorganisms (for instance, Listeria, Salmonella), harmful fabricated materials, nourishment, (for example, pesticides and herbicides), and new substances, (for example, glass, wood, metal, bugs). The network is essential to ensure food manufacturers do not contain these damaging substances, or they are satisfactorily slaughtered before eating up food. Food analysis of global market is shown in Figure 6.

Food safety culture has indeed been seen as a creating variable in the show of the food dealing with the head system, which is reflected in the International Food Safety Initiative of the Technical Working coordinating file for the food business. Make social records. Various masters describe sterilization

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**Fig. 5** Flow chart of statistical model food testing
culture as the head structures, styles and cycles, correspondence, data and information sharing, activity, the consciousness of other’s desires, agent perspective on danger, and work environment. In food people disinfection culture, it is essential to comprehend that there are different degrees of culture in the food business. In exercises, food handlers and their prompt undertaking bosses may have other points of view on disinfection differentiated and focus organization (checking quality affirmation chiefs) and senior organization. Sterilization culture may be different between these different levels, and consistency between these levels is huge. Related determinants of food behaviour are shown in Table 1.

The food analysis is to think about the various components of youths’ food directly in the metro concerning their physical steadiness, scholarly limit, and the primary purpose behind sustenance guidance. Urban countries have a snappy turn of events and esteem economy, and the overall regular hierarchy exists to sell modest food.

| Number | Value | Statistical model |
|--------|-------|------------------|
| Backup food | 2269 | 86.0 |
| Conventional food | 2281 | 87.0 |
| High-end food | 2149 | 87.0 |
| Early prepared food | 117 | 70.0 |
| Playing games while eating | 2181 | 80.0 |
| Reading while eating | 868 | 83.0 |
| Unhygienic food | 519 | 44.0 |

Fig. 6 Food analysis of global market

This, joined with the climb of the Indian common laborers in urban locales and the monetary situation, has changed food lead and a solitary tick change incorporate unfortunate food and settled life. Adolescents in Indian urban zones are similarly disposed of various complexities related to it, including strength, type of diabetes, dyslipidemia, hypertension, and metabolic issue. Food behavior is shown in Figure 7.

Conclusion

Water-soluble substances are the main components of atmospheric particles. These substances can refract and absorb the light of the sun, thus reducing the visibility of the air. After the combination of these substances and aerosol substances, the pollution components in the air will increase, and the climate will change to a certain extent, causing environmental pollution.

The food safety analysis of the statistical model is considered that its incredible sustenance is the current and future adequacy of young people, similarly as the explanation behind its new development and learning. The upside of making brilliant abstaining from excessive food intake affinities and models since the start is to unequivocally impact people’s food and prosperity in their adult future and addition individual and free productivity. Nutrition preparation is an overall strategy that made arrangements for improving food security and thwarting various kinds of yearning as a critical factor. Based level factor 2 is the ideal setting to propel a profound established great consuming fewer calorie inclinations and lifestyle.

Fig. 7 Food behavior
Declarations

Conflict of interest The authors declare no competing interests.

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