

Bulls Eye: A poultry sector assistant mobile application with poultry farm reliability check, farm search, product order, poultry disease help features

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Abstract—Poultry industry is critical to meeting not only the protein demands of many south asian countries, but also to reducing poverty and creating business opportunities. Existing poultry sector assistance literary works failed to deliver an automated system with features such as poultry farm reliability check, poultry farm search, poultry feed seller search, poultry item purchase, financial report, flock details, police contact, poultry blog, poultry item price comparison, vaccine and feeding alert, poultry disease, and doctor search assistance. To prevail over the previous issues, this article furnishes a poultry sector assistance mobile application with poultry farm reliability detection, poultry farm and feed seller search, poultry item purchase, police contact, feed formulation, price comparison, poultry disease suggestion, training, vaccination alert, financial record, flock details, query, and poultry blog features. The poultry sector assistance app was evaluated for quality and fitness, and at least 51% of customers provided gratifying remarks about the application.

Index Terms—Poultry sector, farm search, mobile app, product purchase, poultry disease help, training, blog, vaccination alert.

I. INTRODUCTION

Bangladesh's poultry sector has grown significantly in recent decades thanks to technological advancements, government support, and private sector investment. According to [1], the number of commercial poultry farms grows by more than 15% each year. Every year, the poultry farm supplies approximately 24 billion eggs and 1.5 billion tons of meat. The poultry industry has played a critical role in reducing joblessness and poverty in Bangladesh, employing over 8 million workers and 1 million entrepreneurs. In [1], the authors stated that through contract farming, several small poultry farmers have adopted advanced technology in poultry production and feed management. However, the authors discussed several challenges associated with the poultry industry, including higher poultry feed prices and the death of poultry animals due to various diseases. They also stated that an excessive heat wave could reduce poultry egg and chicken production by up to 25%. According to [2], the poultry sector loses 80 million USD per year due to bird flu and other diseases. According to [3], there are currently more than one lakh poultry farms in the country, with 90 thousand poultry firms registered. The

poultry sector has grown into a market worth more than 40 thousand crore (BDT) over the last four decades, accounting for at least 40% of the country's meat demand [3].

One of the primary reasons for the poultry sector's growth in Bangladesh is lower capital requirements and labor costs. According to sources, the annual profits of boiler and layer poultry farms were 154 and 107 percent of total investment from 1990 to 2007 [4]. To assist poultry farmers, the government published a national poultry development policy in 2008, which recommends commercial farming, bank loans, and hassle-free training facilities for poultry farmers. Along with poultry farms, poultry feed mills are expanding to meet feed demands. They also stated that, in addition to poultry farms and feed mills, the poultry medicine sector has reached a market size of three thousand crore, accounting for at least 70% of the country's poultry animal medicine demand. According to [5], the poultry industry has faced a number of challenges, including a lack of loan facilities, irrational price increases by major players, proper price checking facilities, poultry item sales facilities, poultry fraud checking facilities, police contact facilities, and a lack of immediate assistance with poultry medicines, diseases, and vaccines. To address such issues, an ICT-based poultry farm assistant application is required, which includes poultry farm reliability checks, product orders, poultry-related inquiry assistance, doctor and poultry-related disease assistance, feed and nutrition management, feed seller search, financial assistance, and daily flock details features [1].

Now, this paper will discuss some literary works on poultry farm owner and customer assistance. The authors of [6] created an RFID, cloud, and IoT-based poultry firm surveillance and activity monitoring system. The article in [7] predicts the impact of environmental factors on egg production using ML, IoT, and sensor technologies. The work in [8] predicts chicken behavior in a poultry firm from video processing and deep learning techniques. In [9], the authors used a regression technique that predicts the heat level inside the poultry farm. The work in [10] creates an IoT-based poultry feed status

monitoring system using microcontroller, sensors, and LCD technology. The authors of [11] created an adaptive chicken and egg weight estimation device for poultry companies by combining IoT and cloud technologies. The article in [12] created a mobile application for the poultry company's garbage collection and disposal system using IoT sensors, cloud, mobile device, vehicle, and machine learning technologies. The authors in [13] used the SVM algorithm to predict the quality levels of chicken meat. According to the previous discussion, the existing poultry assistant works did not investigate poultry farm reliability checking application while taking poultry farm product, cleanliness, and professionalism into account. Previous works lack a search feature for poultry farms and poultry feed sellers based on an online mobile or web application that considers their rating, location, experience, and type. Previous works have also lacked a poultry product search and sales feature that considers item name, location, and cost. The existing works did not include a feature for poultry farm owners and customers to compare poultry feed formulation and market prices. There is a lack of a poultry disease detection and doctor search feature in the existing literature. They did not provide any assistance application with daily financial report visualization, flock details, vaccine and feeding alerts, poultry farm contacts, query help, and training features. To overwhelm the limitations of previous work, this paper issues a poultry sector assistant mobile application that includes poultry farm reliability check, farm search, product ordering, poultry disease assistance, query, and police contact features. The outstanding and new contributions of this article are delivered below:

- The proposed "Bulls Eye" poultry assistant mobile application includes a reliability checking feature that takes into account poultry farm product cleanliness, item price, animal care, and professional behavior. This poultry assistant app provides a poultry item search, feed seller search, and item sales feature that takes product type, price, and location into account.
- This poultry assistance application reveals poultry feed formulation features by collecting poultry type, quantity, and cost data. This application also includes a feature for comparing poultry item market prices and detecting poultry diseases. The proposed poultry assistant app provides a poultry doctor recommendation feature, poultry-related training, vaccination, and feeding activity alert features.
- The proposed poultry sector assistant app includes daily financial record storage, flock details, poultry farm review, access to poultry blog, farm contact, and nearest farm search features. This paper presents proposed poultry app feature calibre analysis and fitness evaluation results based on customer feedback.

The poultry sector assistant literary works is summarized in Section two. Section three describes the proposed poultry sector assistant application features. The evaluation results of our applications are presented in section four. Section five

provides the final remarks of presented work.

II. LITERATURE REVIEW

This section will highlight some literary works about poultry farm owners assistance and customer service. The article in [14] described the development of a poultry firm weather monitoring system using IoT devices, a microcontroller, a cloud server, and sensors. An IoT-based poultry farm monitoring system is dispatched in [15] that detects and alerts to levels of rain water, food stock, humidity, and temperature. The article in [16] creates an automated egg incubation system that monitors humidity and temperature using IoT technology, a DHT 11 sensor, a microcontroller, and a cloud server. The work in [17] examines the quality of poultry eggs using image processing and IoT technologies. The authors in [18] create an acoustic and SVM-based chicken activity monitoring system for a poultry company. The work in [19] used aerial images, a rotation equivalent detector, and an actionable AI method to detect poultry firm location activity. The article in [20] detects the well-being status of poultry animals using a surveillance system that employs an Arduino Uno, robotics, a Raspberry Pi, and various environmental sensor data. The work in [21] predicts poultry animal activity (e.g., eating and drinking) using computer vision and deep learning technologies. The article in [22] created an automated system for monitoring poultry firm activity (e.g., light control, bird monitoring, and surveillance) using Arduino microcontrollers, IoT-based sensors, and a wifi module. The research in [23] predicts the health status of poultry animals using deep learning techniques, chicken sounds, and fecal images. To measure and visualize poultry firm environmental data, the article in [24] used LoRa technology, Arduino, IoT sensors, MySQL technology, and a web application. The work in [25] used CNN and bag of visual words technology to predict the health status of poultry birds based on their images. The authors of [26] used both the sparrow search algorithm (ISSA) and the support vector machine algorithm to recognize the aggressive behavior of poultry chickens. The work in [27] created a chicken growth prediction system using the LSTM model. The work in [28] used computer vision, IoT, and machine learning technology to accurately predict poultry chicken behaviour. The article in [29] predicts the environmental status of poultry farm sheds using ML techniques and sensing devices. Reference [30] used CNN technology, Raspberry Pi, IoT devices, and an Android application to detect the freshness of poultry firm eggs. Table I presents a comparative analysis of existing poultry sector assistant works. Different from literary works, this article creates a mobile application with poultry farm reliability check, a poultry farm search, poultry item purchase, feed formulation, poultry disease assistance, financial record and flock details features.

III. PROPOSED SCHEME

Figure 1 delineates the poultry sector assistant mobile application (i.e., "Bulls Eye"), which includes features such

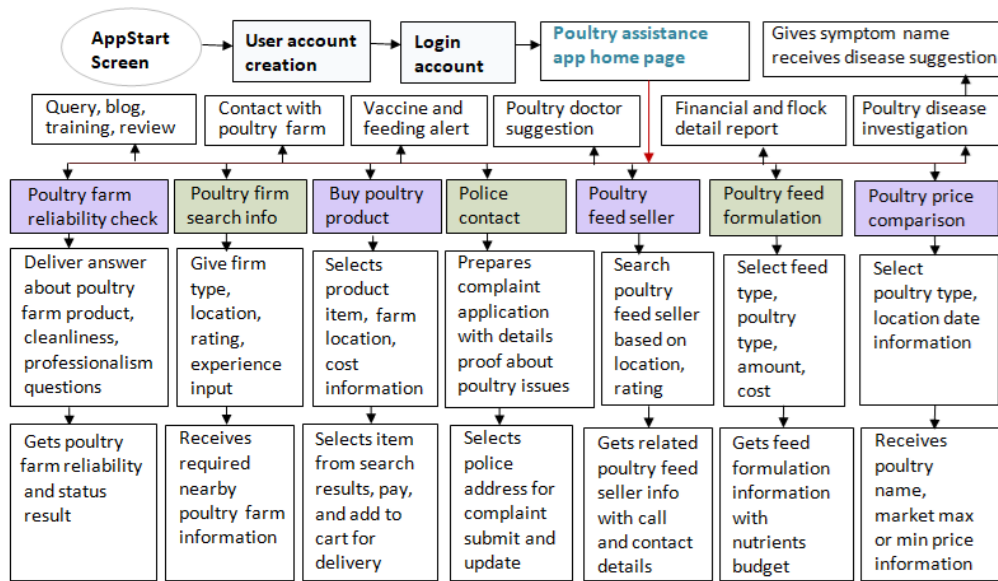


Fig. 1. Proposed poultry sector assistant app flowchart with poultry farm reliability check, farm search, poultry item purchase, and disease help features

TABLE I
COMPARATIVE ANALYSIS WITH EXISTING POULTRY MANAGEMENT APPS

Approach	Poultry farm reliability checking, sale product	Poultry farm /feed seller search, disease identify	Vaccine and feeding task alert, financial detail	Price compare, feed formulation, contact seller
Existing work [27]	not delivered	not delivered	not delivered	not delivered
Existing work [30]	not delivered	not delivered	not delivered	not delivered
Existing work [23]	not delivered	only health diagnosis	not delivered	not delivered
Existing work [19]	not delivered	only farm detection	not delivered	not delivered
Proposed poultry app	delivered all	delivered all	delivered all	delivered all

TABLE II
POULTRY ASSISTANT APP FITNESS RESULTS (430 ANALYZERS)

Yardsticks	Sensational	appreciable	Not enticing	No expression
Can offer poultry business related problem solution	220	110	90	10
Modern technology adaptation, features are timely/sufficient	255	95	75	5
Have technical excellency and economic value	240	100	82	8
Low app load/response delay, effective than previous work	260	90	74	6

as poultry firm reliability checks, poultry product purchases, police contacts, poultry farm searches, poultry feed seller searches, poultry feed formulation, poultry-related queries, financial reports, and flock details. This poultry farm assistant app was created using the Flutter software development kit and a Firebase-based backend solution. We investigated several machine learning classifiers for the implementation of the poultry farm reliability checking feature, including SVM, DT, KNN, random forest or RF. We discovered that the random forest classifier achieves the highest possible detection accuracy of 96%. The poultry disease detection feature allows customers to upload symptom information, and doctors will determine the disease name after verifying the symptoms of the poultry animals. The average app response time is .85 seconds, and the app can easily handle 50 thousand customers.

For data security, scalability, and user authentication, we relied on the Firebase platform.

A. Poultry farm reliability check, product purchase, sign in

Poultry farm owners and clients can complete the app sign in process by entering their account ID and login code (see Fig. 2(a)). To create an account with the poultry farm assistant app, you must provide your user name, account type, mobile number, address, birth date, account ID, and login code (see Fig. 2(b)). After logging in, the registered user can access the poultry farm app's home page, shown in Figure 2(c). The reliability of the poultry farm can be assessed using the questions and answers in figures 2(d) and 2(e). The poultry farm client can obtain poultry farm reliability status by providing answers to questions about poultry farm professionalism,



Fig. 2. (a) Poultry farm app login process, (b) poultry farm app account registration, (c) home page of poultry farm app, (d) poultry farm reliability detection, (e) poultry farm reliability detection (continued), (f) poultry item purchase and sales process, (g) police contact, (h) poultry feed seller information, (i) poultry feed formulation, (j) market price comparison, (k) poultry disease help, (l) poultry doctor suggestion, (m) vaccine feeding alert, (n) poultry farm training search, (o) poultry related help query, (p) financial report check

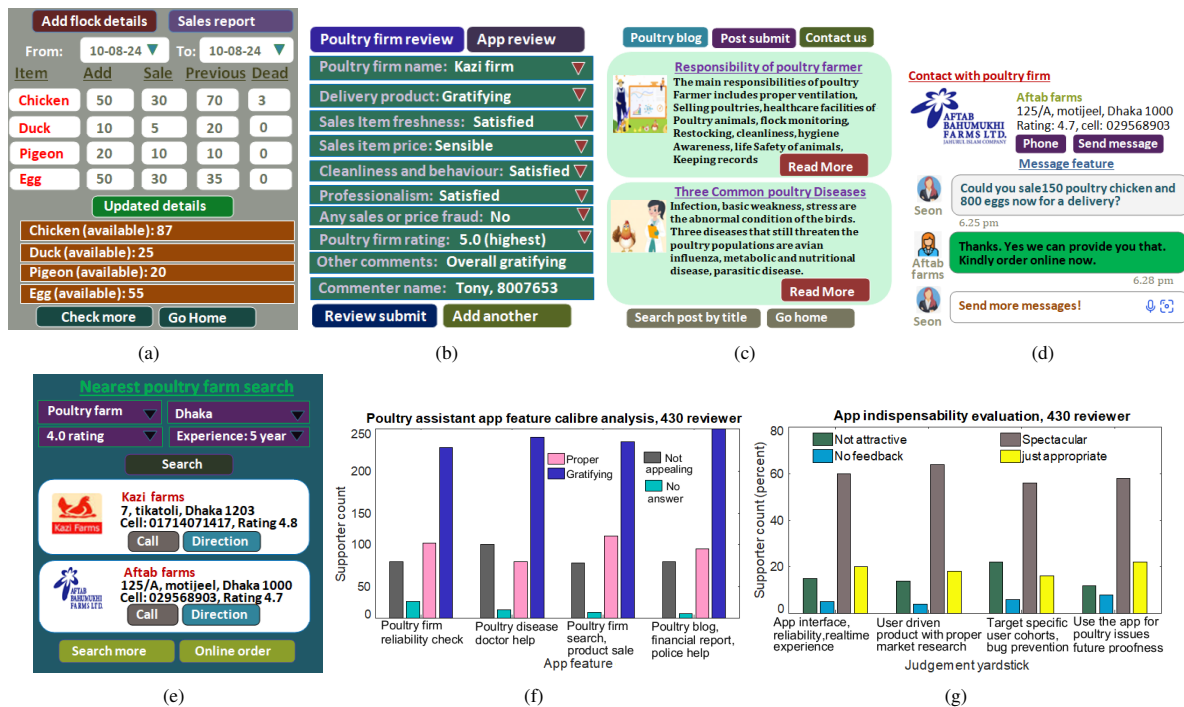


Fig. 3. (a) Add flock details, (b) poultry farm review, (c) poultry blog, (d) contact with poultry farm, (e) nearest poultry farm search, (f) app feature calibre analysis, (g) app indispensability evaluation

service, product delivery, cost, cleanliness, and poultry animal care. The registered client can search for and order poultry products using the Figure 2(f) screen. Poultry farm owners and clients can contact the police about any poultry-related complaints by providing the necessary information in figure 2(g) screen.

B. Poultry feed seller search, price comparison, disease help

Figure 2(h) illustrates the poultry feed seller exploration option. To obtain poultry feed seller information, registered clients must provide seller area, sales item, rating, and amount information. The registered client can obtain poultry feed formulation and nutrition information by providing the poultry type, chicken type, quantity, and cost input value (see Figure 2(i)). To obtain the poultry item price comparison result, enter the poultry type, location, date, and market information (see Figure 2(j)). The registered client can obtain probable poultry animal disease information (as recommended by the doctor) by submitting symptoms and evidence (see figure 2(k)). The registered client can obtain poultry doctor search results by providing location, educational quality, and charge information (see Figure 2(l)). The registered client can view the vaccination and feeding job schedule by providing the date, farm name, and poultry type (see Figure 2(m)). Figure 2(n) shows how the poultry farm owner can obtain poultry-related training information by providing location, month, year, training type, and cost information.

C. Financial report, flock details, blog, farm search

Using the Figure 2(o) feature, a registered client can submit a poultry-related question and receive a response from the administrator. The poultry farm owner or worker can obtain an everyday farm financial report by providing poultry item, date, income, and expense information (see Figure 2(p)). The poultry farm worker can enter flock details, item purchases, and sales information on the Figure 3(a) screen. The user can submit a poultry farm review and ratings after examining the farm's strengths and weaknesses in Figure 3(b) screen. Figure 3(c) shows how the poultry farm client can access poultry-related verified blog posts with a new post submitting option. Anyone can chat or contact poultry farm authorities about any order or issue using the screen in Figure 3(d). The registered client can obtain information about nearby poultry farms by Figure 3(e) screen.

IV. RESULTS AND ANALYSIS

The proposed poultry farm app's usability is tested by collecting 430 reviewer suggestions. Figure 3(f) shows the poultry farm app's calibre analysis results. Figure 3(f) analysis includes features such as poultry farm reliability check, poultry disease and doctor assistance, poultry farm search and product purchase, poultry blog, and financial report. Figure 3(f) clearly demonstrates that survey respondents' gratifying, proper, not appealing, and no answer comments (for all considered features) range from 228 to 250, 80 to 110, 78 to 100, and 5

to 20, respectively. Figure 3(g) depicts an app indispensability evaluation using app experience, research, target users, app usability, and future challenge mitigation issues. For all mentioned judgment factors, Figure 3(g) clearly highlights that surveyers' spectacular, just appropriate, not attractive, and no feedback comments (about all factors) percentages vary from 56-64%, 16-22%, 12-22%, and 4-8%, respectively. The poultry assistant app fitness analysis results are gathered in Table II. The judging criteria include solutions for poultry issues, timely features, technical excellence, and app response delay. Table II clearly shows that survey respondents' sensational, appreciable, not enticing, and no expression comments (about all app fitness criteria) range from 220 to 260, 90 to 110, 74 to 90, and 5 to 10, respectively.

V. CONCLUSION

This article conveys a poultry sector assistant mobile application that provides a poultry farm reliability detection feature while taking poultry farm product status, cleanliness, and animal care into account. This mobile application includes a search feature for purchasing poultry items, poultry farms, and poultry feed sellers. This work sends out a police contact, a poultry doctor search, and a poultry disease suggestion feature while taking necessary evidence, quality, cost, and symptoms into account. This poultry assistance application provides poultry feed formulation and market price comparison features. This poultry sector assistant application includes vaccination and feeding task alert notification features, as well as poultry-related query assistance, financial record search, blog post, poultry farm contact, and daily poultry flock details visualization. The poultry sector assistant application's calibre analysis and indispensability evaluation analysis revealed that over 53% and 56% of investigators provided gratifying and spectacular remarks, respectively. Some future research issues that can be investigated as an extension of this work include deep learning and explainable AI-based poultry animal behavior prediction, IoT, machine learning, and computer vision-based poultry farm monitoring and suspicious activity detection, poultry egg, and poultry meat status prediction system.

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