

Intelligent Commerce Facilitates Education Technology: The Platform and Chatbot for the Taiwan Agriculture Service

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Abstract: Intelligence commerce is an important application and development of agricultural markets. From pesticide use to organic production, agriculture is developing progress that will benefit the world. This study uses an e-commerce platform and an AI (Artificial Intelligence) Chatbot as a way to develop intelligence commerce. This can solve why farmers do not participate in business activities, and also provide farmers with the co-creation value of establishing industrial clusters. In particular, intelligence clusters can create customer value and competitive advantage and can allow farmers to run their businesses sustainably.

Key words: Intelligence commerce, platform, AI Chatbot, AI practice education.

1. Introduction

When developing a marketing strategy, an enterprise needs to consider its resources and capabilities to develop a marketing strategy. In the era of e-commerce, agriculture must consider that marketing channels have changed. This can be developed into store streets, self-operated, websites, government-assisted procurement platforms, blog marketing, microblog marketing, keyword marketing, and group buying models and extend those education activities. The most common word-of-mouth marketing channels are blogging and microblogging [1]. For companies to improve the availability of information to target customers, you can use keyword marketing. Even when the capacity of vegetables and fruits is excessive or the quality is small, the group purchase model can effectively sell domestically produced vegetables and fruits and select available e-commerce models [2]. For example, the enterprise sets the priority work order of the undeveloped development of the fog industry [3]. The farm industry can segment the market according to consumer needs and attributes, and provide different types of product combinations for different consumer groups, adopt different pricing strategies or launch diversified preferential plans; through relevant government units. We should assist the industry in promoting strategy and alliances, to promote the e-commerce system for transportation and marketing, and shorten the process of transportation and marketing. Organic agricultural products can use e-commerce platforms and intelligence applications to develop intelligence commerce. This can solve the problems that the existing agricultural e-commerce cannot solve.

2. Literature Review

Agriculture is an important activity for human survival and has continued for thousands of years [4]. The Economic Times predicted that by 2020, 50% of internet users will be from rural. And there were 647 million urban mobile subscribers while 519 million rural subscribers as of Aug 2018 [5]. This data shows, Agricultural information in mobile connectivity is seeing an exponential growth by IT (information technology) services. Smart agriculture is a global issue of agriculture that can protect resources and maintain sustainable development [6]. Recently, researchers have adopted the IoT, including Internet, Internet of Things, artificial intelligence, and Deep Learning Algorithms [7], is used to perform interviews in response to costly face-to-face interview, the manifestation of human intelligence, or chatbot can be placed into different social context [8]. Development of conversational agent systems in commercial market like in retail, banking and education sectors [9].

Many studies have emphasized the adoption and implementation of the Internet of Things in agriculture and the implementation of planting and business models [10], [11]. Besides, artificial intelligence can be needed to distributed throughout supply chains, enable organizations to harness the value of information, including farm data, also emerge as an important paradigm to improve how information about farm [12]. Chatbots are automated systems that assist users by responding to their questions. To businesses, they provide an improved way of connecting with their customers and increasing customer satisfaction [13]. The common function is the development of powerful chatbot dialogue interface, with functions such as text understanding, image recognition, speech interpretation, and language translation, which can speed up the ability of humans to find what they want [14].

The development of a set of fruit ripe image recognition system can be used by farmers [15]. imaging analysis is an important research area in the agricultural domain and intelligent data analysis techniques are being used the image. In fruit and packaged food grading. In text understanding, anomaly detection, LSTM (long short-term memory), etc., this can improve learning ability, thereby improving performance and accuracy recently, In the LSTM model, a soft-max layer is usually added to determine the final output of the NN [16]. In Neural Machine Translation, Sequence has been a popular model based on neural network and deep learning, used [17], [18]. The model have the ability to save and learn, and is suitable for processing long-term time series data. It can also be used for soil moisture irrigation plans in agriculture, and to observe soil moisture, water volume, climate data [19].

The most popular techniques used for analyzing images like linear polarizations, wavelet-based filtering, K-means, SVM (support vector machine), ANN (artificial neural networks), vegetation indices (NDVI, Normalized Difference Vegetation Index), and regression analysis. [11] Besides, Chatbots have the potential to help the agriculture application in many ways. Farmers can use this language to send messages to an artificial intelligence system, which can answer their questions in real-time, thereby helping to spread modern agricultural technology faster and more [20]. Natural Language Processing (NLP) techniques and Deep Learning Techniques like Deep Neural Network (DNN) and Deep Reinforcement Learning (DRL) are being used to model and train the Chatbot systems.

This system recognizes whether the fruit in the picture is ripe by capturing the picture taken by the imaging lens. The data will be transmitted back to the system to facilitate subsequent processing and open up the apex for productivity 4.0 science and technology agriculture. By integrating the chat robot system (intelligent dialogue agent) into the instant messaging application of the popular social media platform, it is considered to be able to maximize the penetration of the Internet of Things technology across the fields and connect it to the network platform. Besides, many studies in recent years believe that implementing intelligent agents provides an efficient, effective, and user-friendly way of interaction. Finally, enter the

recognition, and will be classified according to the set classifier [21].

In terms of website architecture, virtual space includes virtual message space, virtual communication space, virtual distribution space, and virtual transaction space, which analyzes the leisure farm's website structure. Leisure farms still use industrial resources mostly, followed by comprehensive utilization. However, there are no purely cultural resource utilization-type operating characteristics. After implementation and cluster analysis, it is found that leisure farm websites are mostly guided by virtual information space, showing that they are still at the level of introducing the farm. The virtual distribution space and There is still room for the development of e-commerce functions such as virtual transaction space. On the whole, leisure farm websites in Taiwan are relatively complete in terms of functional architecture, and they also pay more attention to security and privacy [22]. Therefore, the development of intelligence commerce provides a good application environment for machine learning and computing. In Agriculture Service, we can be further enhanced by farmers offering all of its services are already chatting with manufacturers or consumers. such analysis the current commodity market, use these data to further understand market demand.

3. Method

First of all, this study needs to determine the detailed theoretical framework and draw up the research framework content. This must further explore the relevant literature at home and abroad, and collect and review it to determine the theoretical correctness and stability of the research framework of this study. In this way, this study can further design research methods, focusing on system design. To achieve the purpose of the study, this study compiles a user flow chart from the perspective of users, including farmers, farms, etc. Follow this flowchart to further develop the system and promote local trauma services. After system development, perform a system test to see if the system is suitable and stable. Finally, the practical application by the farm can also adjust the function and description of the system promptly, which is beneficial for users to quickly understand and use the system. This process can be analyzed and discussed. On the whole, the implementation content of this plan will be aggregated into an outcome report, which will explain the research process and results for reference by subsequent researchers.

4. Results

By the methodology guideline, we design 7 steps to show how to craft an AI Chatbot for agriculture service. That also illustrates the results for some figures.

4.1. Design Information Platform System: Design and Construction Method for Intelligence Commerce

To generate proper responses to user queries, chatbot models should selectively consider dialogue histories [23]. In terms of the systematic design method of design science, this study also adopts the systematic development research methodology developed by [24] as the development step of this study system. The research process reference [25] includes the following five main steps, namely the construction of a conceptual framework, the development of system architecture, an analysis and design system, and the establishment and observation and evaluation of a prototype system.

4.2. Constructing a Conceptual Framework

This step is the construction of a conceptual framework based on the results of interviews with farms, cooperatives, and consumers. Develop system architecture: In terms of system conceptual framework requirements, this study refers to [25] system architecture, the preliminary architecture of the developmental prototype system. Development System Architecture. In terms of system conceptual

framework requirements, this study refers to the system architecture of [26], the preliminary architecture of the developmental prototype system.

4.3. Analysis and Design System

This includes system functions, analysis content, and functional design. The system integrates databases and applications with multi-language capabilities, multi-person support, and security and bug fixes. Furthermore, enterprises need an application server, which can mainly provide application configuration settings, set security functions, and reduce network attacks. Especially in the user management interface, it is easy to manage and expand the expansion module.

4.4. Establishment of Prototype System

This step is based on the system architecture and analysis designed and developed according to the above three steps, planning the system architecture and processes in detail, and implementing the prototype system.

4.5. Observation and Evaluation System

After the establishment of the prototype system is completed, the effectiveness of the system is observed and evaluated based on the system content, system operation capacity limitation, and operation efficiency. In order to grasp systemic risks, this study focuses on risks ([27]; [28]) and guidelines [29]. The first is the technical risk. This study will control the complete measurement mechanism, detailed software code inspection, and software version control and modification. Third is cloud risk. The cloud is one of the most useful technology tools. Users need an audit log function design. All users should have roles that define personnel responsibilities. To comply with ISO 27001 requirements, this study needs to meet cloud application management mechanisms and extend the regular implementation of scanning and penetration testing system vulnerabilities. Finally, there is a user's risk. The user account should have a management mechanism, and the password setting must exceed 8 alphanumeric characters. The processing of personal data in the system is designed according to the rules of personal data. Therefore, the system and data of this study can be effectively managed.

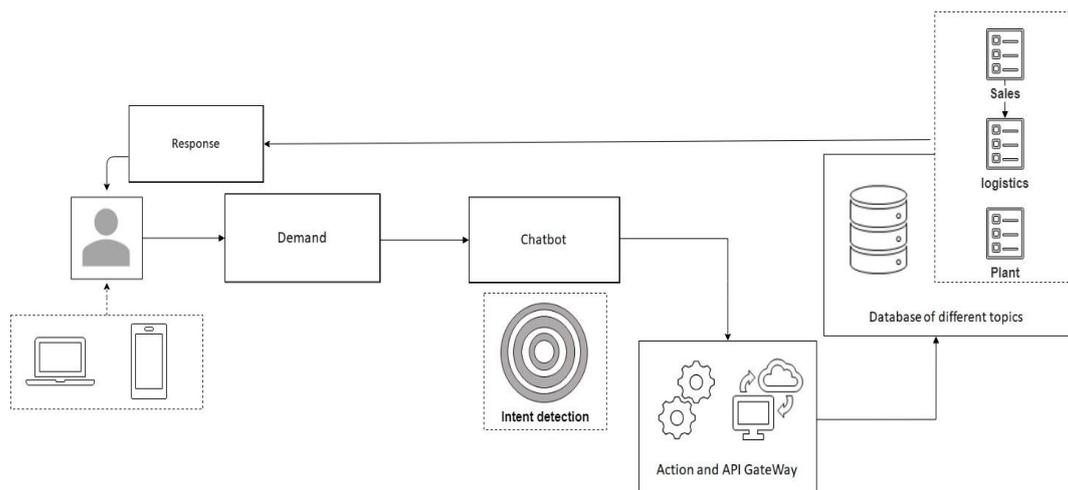


Fig. 1. A Chatbot process.

4.6. Chatbot Architecture

Our service includes audio, video, and document, including several functions. The dialogue interpretation

was done by Python and LSTM through NLP (natural language processing) and ML (machine learning). Users can visit the website to chat through the network service, and the chat robot has the function of judging intent and transfers to the API (application programming interface) to extract the required content from the database.

It is represented, in Fig. 1 the current response content is mainly text, and then the package picture, and try to Features added audio and video.

4.7. Chatbot Data Collection

We collected our more than 1,000 groups interviewed by investigators and farmers, dialogue on specific topics from 2018 to 2019. Also, the data, we obtained was not in the format and could not be read by the machine. To facilitate training, we will convert the file to a CSV (comma-separated values) file. The files are classified according to three categories: Sales, Logistics, and Plant, which contain the query ID, query type, region name, season, and answer to a given query. And, the seasons will be classified according to the attributes of the crops.

4.8. Chatbot Approach

In our case, the sequence is the input string to the Chatbot that uses deep learning area unit the majority victimization some variant of a sequence to sequence (Seq2Seq) and more commonly, text sequences or basically any sequence of symbols. Currently, the Seq2Seq model can be described as a method of converting a sentence into a vector, which is widely used in the industry and practiced for the response. RNN (recurrent neural networks) is a special kind of neural networks that can deal with sequential data. RNN is also neural networks with a hidden state h and output, which is a function of a sequence. Our objective is to jointly maximize the log probability of the output sequence conditioned on the input sequence. It is represented, in Fig. 2, helps "understand" the input sequence "Are you free tomorrow?" The decoder then decodes the "thought vector" and generates the output sequence. When we see a paragraph, we will first absorb the sentence, and then according to our understanding. The answer stated in the content is that the Sequence to Sequence is to simulate this process. Connectionist sequence taxonomy is another popular technique for mapping sequences to sequences through neural networks, although it assumes monotonic alignment between input and output. At the current stage of research, we consider Chinese and English as a primary language, and cleaned our data, which includes lower casing words, remove redundancy (Stop word). word segmentation, word embedding, we use jieba and word segment. Besides, we use Document embedding with paragraph vectors developed by google and train the English part we use Document embedding with paragraph vectors developed by google. Prediction We pre-processed the input query from the test dataset similarly and convert it into a vector using the embedding of the trained model.

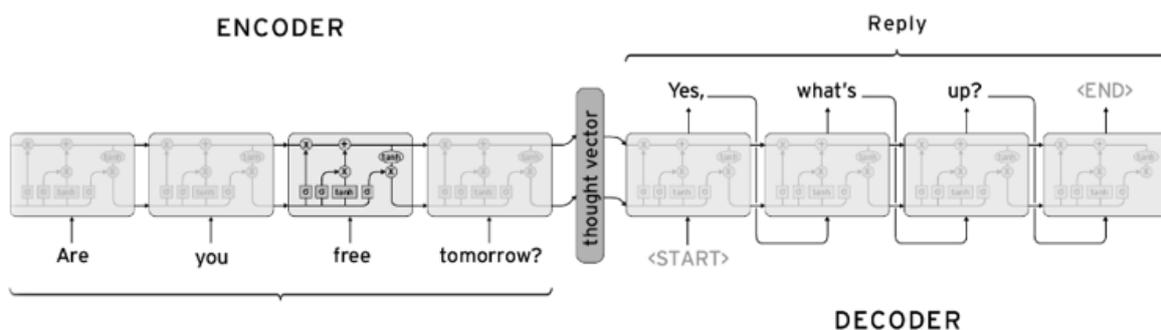


Fig. 2. A recurrent neural network.

The model outputs the most similar query from the training data by comparing the embedding vectors using cosine similarity (Fig. 2). We found that the LSTM model is fairly easy to train. We use a depth LSTM of 100 layers, each layer has 100 cells, and has 100-dimensional word embedding, the total input vocabulary size and the output word size are 30,000. In the software part, we use the Rectified Linear Unit (ReLU).

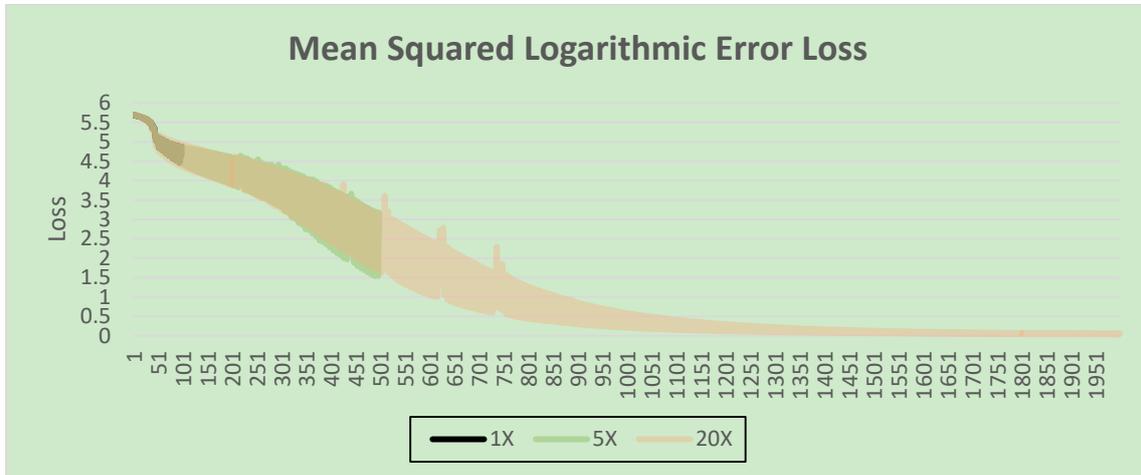


Fig. 3. A recurrent neural network.

真實答案/與預測答案↵

Q: 要怎麼算收成的時間?↵

How to count my harvest time?↵

A: 跟老一輩的前輩的學習↵

Ability to learn from experienced farmers.↵

Case 1 (The same demand, the correct predict) response)↵

你:
要怎麼算收成的時間?
小麥:
跟老一輩的前輩的學習

Case 2 (Similar needs, the correct predict)↵

你:
怎麼算收成時間?
小麥:
跟老一輩的前輩的學習

Case 3 (incomprehensible needs, the wrong predict)↵

你:
時間收成
小麥:
給我滿滿的大晴天

Case 1 ↵

(The same demand, the correct predict) response)↵

Q: 要怎麼算收成的時間?↵

How to count my harvest time?↵

A: 跟老一輩的前輩的學習↵

Ability to learn from experienced farmers.↵

Case 2↵

(Similar needs, the correct predict)↵

Q: 要怎麼算收成的時間?↵

How to count my harvest time?↵

A: 跟老一輩的前輩的學習↵

Ability to learn from experienced farmers.↵

Case 3↵

(incomprehensible needs, the wrong predict)↵

Q: 要怎麼算收成的時間?↵

How to count my harvest time?↵

A: 給我滿滿的大晴天↵

Give me sunshine.↵

Fig. 4. Answer situation and test.

To increase the bot stable, we add more and more training data, tuning the hyper-parameters to minimize the loss value. As shown in Fig. 3. The plot of an MSE function, that shows true target value, 1X is 1000 steps training 5X is 5000 steps 20X is 20000 steps Mean Square Error (MSE) is the most commonly used

regression loss function. MSE is the sum of squared distances between our target variable and predicted values. The results indicate that when the training times are close to 10000 steps, it can have better results

This study uses a development platform (such as Visual Studio 2012, Net Framework 4.5) and a support platform (such as Windows, iOS, Android, Mac, Browser needs support IE 9+, Chrome, Firefox, Safari, and web function development to be compatible based on IE 9+, Chrome, Firefox, Safari, no problem occurs) is also an important key factor for the construction. The intelligent customer service system uses a Neural Conversational Model [20]. Fig. 4 shows sample conversations between users and Chatbots. Case 1 and Case 2 provide the correct answers, which can prove that the robot can judge the intention of use in a timely manner. In Case 3, The situation, if the user gives a requirement other than the text, it will lead to a wrong judgment intentions show are required.

5. Conclusion

The artificial intelligence application of this plan is mainly to assist farmers with insufficient communication skills or not in place, which can be divided into two ways. Frequently asked questions from customers: The rule is to use the response as the mainstay, supplemented by the learning-type response. The main purpose is to stabilize commonly used words first, and then gradually correct them by generating calculations. In addition, professional questions are based on regular responses, mainly because the professional words are accurate and the applied words are fixed. This shows that the effects of AI must be calculated in a good GPU space, and have high-speed calculations and times to meet the needs of intelligence commerce. In addition, For the future, we plan to improve the answer ranking mechanism, implement multilingual support for the Chatbot with voice-over support and entity extraction from answers for generating knowledge graphs. In addition, if we encounter the inability to judge the user's intention, we will design a variety of logics to induce users to complete the expression of the user's intent and correct needs. In the future study, we will compare with non-AI vs AI in education activities. That will know more about the perception, cognition, intention, behavior, and outcome for the Chatbot useless.

Conflict of Interest

The author declares no conflict of interest.

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