

Research Article

Design of a kind of sharing tableware service system

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Abstract: Packing service in food satisfies the need of the consumer with the disadvantages of wasting of tableware and resources, the surroundings pollution and so on. In order to solve above questions and satisfy the need of consumers, we design a solution of sharing tableware service system including the management platform, APP for user, operation and maintenance, self-help cabinet. The solution satisfied the catering requirement by the Internet, intelligent terminate and the third party payment application software. The design of sharing tableware service system supports the needs of consumers and green environmental protection.

Keywords: APP; sharing tableware; self-help; green environmental protection.

INTRODUCTION

The rapid development of the catering industry has brought great convenience to the dining out of people (Davis, B. *et al.*, 2018; Maimaiti, M. *et al.*, 2018). Catering shops for the convenience of our customers as much as possible and increase food consumption, to provide customers with take-out packaging and delivery services, but this service has greatly increased the use of disposable tableware, serious waste of resources and pollute the environment. In view of this situation, the sharing of tableware can be a good way to relieve the waste of disposable tableware, while also convenient for consumers, which is in line with the concept of green and environmental protection (Nikitina, B., *et al.*, 2020).

With the rapid development of Internet technology, the popularity of intelligent terminal and the emergence of third-party payment, and green environmental protection, sustainable development has become a social consensus, and shared economy has penetrated into people's daily life. Based on this, puts forward sharing tableware, this shared product. From the perspective of the user, it ends the era of washing dishes after eating, which greatly facilitates our daily life, and it also reduces the waste of resource and environmental pollution (Pan, Y., & Pan, Y. 2018; Youmei, L. *et al.*, 2019).

Overall System Design

Basic Entity Composition

The sharing tableware system is composed of the background management system, the client APP, the operation and maintenance terminal APP, the cabinet of self-taking tableware and the cabinet of returning tableware (together referred to as the self-help cabinet) (Campbell, A. A. *et al.*, 2016; Ma, L. *et al.*, 2018), as shown in figure 1.

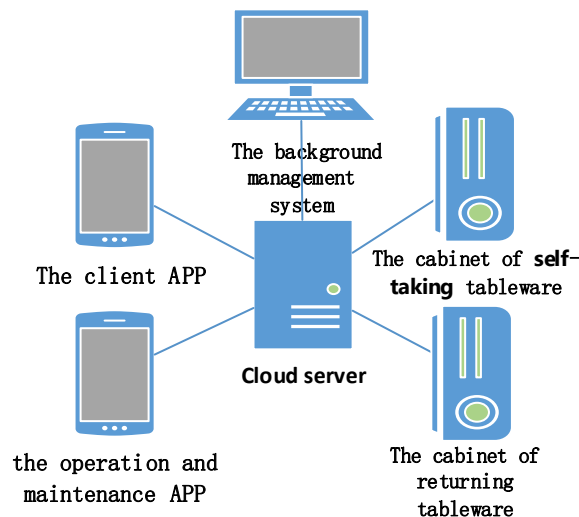


Fig.1 System structure of sharing tableware

Quick Response Code



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Main functions of the background management system include:

- Comprehensive analysis of the use and return of tableware of self-help cabinet, and reasonable planning for the distribution of self-help cabinet;
- Check the location of staff in real time and supervise operation and maintenance work;
- Display the quantity of various kinds of tableware in the self-help cabinet and make unified deployment of tableware.
- Main functions of the client APP includes:
- Accurate map positioning the self-help cabinet;
- Notification of payment and receipt;
- Real-time display of the number of tableware in the self-help cabinet, for the purpose of user access or return of tableware for reference.

Main functions of the operation and maintenance APP include:

- Accurate map positioning self-help cabinet;
- Notification of payment and collection;
- Real-time display of the number of tableware in the self-help cabinet, and remind the operation and maintenance personnel of the deployment of tableware; When the tableware is full or the tableware is not enough, inform the staff in time to collect and distribute the tableware;
- Real-time display of the working status of the self-help cabinet, and inform the staff to repair if there is an abnormality.

Main functions of the cabinet of self-taking tableware include:

- Voice prompt;
- By face recognition technology, the user's mobile phone wallet is charged and refunded, and the mobile phone wallet of the client APP is charged, and the mobile phone wallet of operation and maintenance APP is refunded;
- It has good sealing ability, real-time disinfection and sterilization to taste, and keep the tableware clean;
- Check the integrity of the tableware and whether it is clean, and identify the identification of tableware;
- The automatic entry and exit of tableware and the number of tableware in the cabinet in real time.

Main functions of the cabinet of returning tableware include:

- Voice prompt;
- By face recognition technology, the user's mobile phone wallet is charged and refunded, and the mobile phone wallet of the client APP is refunded, and the mobile phone wallet of

operation and maintenance APP is charged;

- It has good sealing ability, real-time disinfection and sterilization to taste, and keep the tableware clean;
- Check the integrity of tableware, and identify the identification of tableware;
- The automatic entry and exit of tableware and the number of tableware in the cabinet in real time.

The Flow Of The Tableware

The flow of the tableware has four links (Campbell, A. A. *et al.*, 2016; Ma, L. *et al.*, 2018), as shown in figure 2.

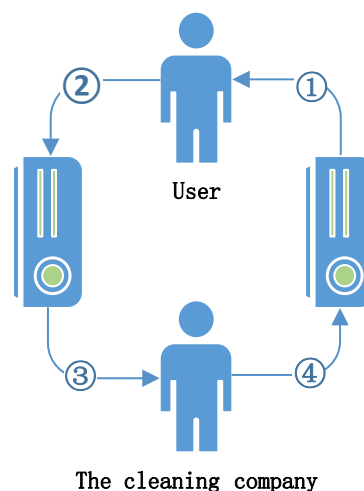


Fig.2 Flow chart of tableware

The first link is tableware from the cabinet of self-taking tableware to the user.

The Design Of Tableware Process Is As Follows:

- When the user first uses the APP, download the APP and register;
- Through navigation, find the nearby cabinet of self-taking tableware;
- After face recognition, select the type and quantity of the tableware selected on the display screen of the cabinet of self-taking tableware, and the display screen displays the amount of deposit;
- After confirmation, the corresponding deposit will be deducted from the mobile wallet;
- Pick up the tableware by voice.

In order to ensure the operation of functions, it is necessary to specify:

- The user can be either a direct user or an intermediate user. Direct users refer to those who use the tableware directly; Intermediate user refers to only take tableware, and turn again cross for others to use, such as delivery businesses must first pay tableware in the

cabinet of self-taking tableware, and at the time of the order take-away subscribers the tableware again paying merchants, tableware finally reached order takeout;

- The deposit of different types of tableware is different, and the total deposit is charged according to the type and quantity of tableware taken.

The second link is the tableware from the user to the cabinet of returning tableware.

The design of tableware process is as follows:

- Through navigation, find the nearby cabinet of returning tableware;
- Place the tableware at the cabinet entrance;
- Face recognition for users;
- Tableware returning cabinet to check whether the tableware is in good condition.
- If in good condition, the tableware will be stored in the cabinet automatically, and the deposit will be returned to the mobile wallet after deducting the royalty. If there is any damage, the tableware will not be stored in the cabinet, and the deposit will not be returned.

The followings are required:

- The tableware is returned one by one;
- Users may not need to clean the tableware after using the tableware, and refund it directly;
- Users can be either direct or indirect users. Direct user refers to the user who returns the tableware. Indirect users refer to users who have not returned the tableware, such as those mentioned above. When they return the tableware, the deposit will be refunded to their mobile wallet.
- The third link is tableware from the cabinet of returning tableware to the cleaning company.

The workflow design is as follows:

- Face recognition for staff;
- All tableware should be removed from the cabinet at once;
- Deduct the deposit from the wallet of the staff operation and maintenance APP according to the type and quantity of the tableware taken out;
- The staff shall clean the cabinet;
- The staff will send the tableware to the cleaning company for cleaning.

The fourth link is tableware from the cleaning company to the cabinet of self-taking tableware.

The workflow design is as follows:

- the staff will deliver the cleaned and sterilized tableware from the cleaning company to the tableware;
- Face recognition for staff;

- The staff shall clean the cabinet;
- In turn, place the tableware from the entrance to the cabinet, and the good and clean tableware will go into the cabinet; Damaged and un-cleaned tableware will be rejected;
- Return the deposit and pay the remuneration to the staff according to the type and quantity of tableware received.

General Instructions

- The choice of tableware should pay attention to two aspects. At first, the quality of the tableware should be reliable. It is not easily damaged during normal use, and it has repeatability.
- Lightweight and easy to carry; The material is harmless to the human body. Secondly, the type of tableware should be selected according to the place where the self-help cabinet is placed. The specific ones include lunch boxes, spoons, chopsticks, plates, bowls, etc. The most important thing is to meet the needs of users.
- (ii)The removal and return of the tableware shall follow the principle of who shall pay and who shall return the deposit, thereby increasing the liquidity of the tableware.
- Deposit to the staff, then return the deposit and pay the payment to prevent the external transaction, as well as enhance the responsibility of the staff and improve their enthusiasm.
- The cleaning of tableware can be given to the cleaning company, and the corresponding staff can also complete it.
- The cleanliness of tableware is very important link, concern the health of the user, also be the problem that the user concerns most.
- The self-help cabinet should be mainly put into areas where the catering industry is more active, densely populated and with high interest rate.
- The sharing tableware is better in takeout and take-out package, and can cooperate with merchants or takeout platform to achieve a win-win situation.
- Each tableware should have corresponding mark, facilitate the pursuit of tableware.

System promotion process

The first stage can be promoted in a single area, such as the university of a certain university, especially with take-out shops.

At this stage, the type of tableware should be dominated by portable dining box, and the specific tableware provided includes lunch box, chopsticks, spoon and so on. You can add a little bit of high-end tableware, such as an insulated lunch box.

As a pilot, the university mainly has the following considerations:

- College students have a strong ability to accept and use new things;
- The overall quality of students and teachers is relatively high, and the credibility is significantly higher than that of the society;
- There are a large number of students in the university, more intelligent terminals, more takeout and take-out orders, and the use of tableware is higher.

The second phase of the residential community as a pilot.

At this stage, the specific types of tableware can be added on the basis of the first stage, adding bowls, plates and other tableware. Put the self-help cabinet directly into the community, convenient for the residents to use. To observe the use of tableware in daily life.

Third stage regional promotion.

Put the self-help cabinet in the public area, which makes use scope expand to whole society, this becomes the sharing tableware of true meaning. The types of tableware should be more comprehensive and meet the diversified needs of users.

CONCLUSION

The sharing of tableware is different from the existing shared product, and the ownership and use rights are transferred simultaneously (Davis, B. *et al.*, 2018; Maimaiti, M. *et al.*, 2018). When the user obtains the tableware, meanwhile obtains the tableware ownership and the right to use; When the user returns the product, he loses ownership and the right to use. For other shared products, ownership and use are separate when used.

Sharing tableware reduces the use of disposable tableware, saves resources and reduces the pollution to the environment, accords with green environmental protection, sustainable development concept, increases the employment opportunity, at the same time promotes the services and sharing economy the further development.

The development model of sharing tableware can be well transferred to other Shared products, such as sharing shopping bags.

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