RFID and Restaurant

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Introduction to RFID
• What is RFID?
• Overview of RFID technology
• How does RFID work?
• How can RFID help restaurants?
• Further Discussion

Introduction to Mobile POS system
• What is Mobile POS?
• How does Mobile POS work?
• How can Mobile POS help restaurants?
• Pros and Cons of using Mobile POS in restaurants

Introduction to Internet Technology
• How can Social Media help restaurants?
• How can App-based marketing help restaurants?
• Pros and Cons of using Internet Technology in restaurants

Suggestions on using other Information Technology to help restaurants

Conclusion and Vision
Background

*In the good old days……*

- people seldom dine out
- restaurants:
  - made good use of the manpower
  - use pen + paper to jot down orders
  - ✗ use computers
  - ✓ use human’s brains
Background

XX years later.....

- technology is evolving
- people earn more + are willing to dine out
- diners look for better restaurants
  - ✓ efficient
  - ✓ comfortable dining environment
What is RFID?

- **Radio Frequency IDentification**

- a wireless communication technology

- ✓ transmits the identity (in the form of a unique serial number) of an object or person using radio waves
What is RFID?

- a kind of automatic information technologies (AITs)
  - associated with automatic data capture (ADC) in various applications

Overview of the most important auto-ID procedures
What is RFID?

- a kind of automatic information technologies (AITs)
  - associated with automatic data capture (ADC) in various applications
    1. Fast
    2. ✗ Require physical sight or contact between reader / scanner and the tagged item
    3. Use low cost components
    4. Attempt to provide unique identification and backend integration
Overview of RFID technology

3 basic components

- Tags (or transponder)
  - Composed of:
    1. A semi-conductor chip
    2. An antenna
    3. A battery (sometimes)
Overview of RFID technology

3 basic components

- Tags (or transponder)

RFID Tag Components
Overview of RFID technology

3 basic components

- Tags (or transponder)
  - Attached to almost everything (e.g. cases, vehicles)

RFID tag – Smart label

- a paper label with RFID inside
- an antenna, printed, etched or stamped
- a chip is attached to RFID
- RFID is put on a substrate (e.g. a plastic foil)
Overview of RFID technology

3 basic components

- Tags (or transponder)
  - Store data + transmit data → interrogator
- Active tags
- Passive tags
- Semi-passive tags

Common RFID tag
Overview of RFID technology

3 basic components

- Interrogator (alt. reader or read/write device)
  - Composed of:
    1. An antenna
    2. An RF electronics module
    3. A controller electronics module
Overview of RFID technology

3 basic components

- Interrogator (alt. reader or read/write device)
  - Read the data contents of an RFID tag
  - Write data to the tag (in the case of smart tags)
  - Relay data to and from the controller
  - Power the tag (in the case of passive tags)
Overview of RFID technology

3 basic components

- Controller (or Host)
  - takes the form of a PC / a workstation running database and control software
Overview of RFID technology

3 basic components

- Controller

Network multiple RFID interrogators together + Centrally process information

1. Keep inventory + alert suppliers when new inventory is needed
2. Track the movement of objects throughout a system + redirect them
3. Verify identity + grant authorization
4. Debit an account
Overview of RFID technology

The Basic Building Blocks of an RFID System
Overview of RFID technology

RFID logical view
Overview of RFID technology
How RFID works?
How RFID can help restaurants?

Table Tracker

- a RFID-based system
- high-frequency (HF) RFID tags attached to the underside of each dining table and table trackers
- ✓ identify where its customers have seated themselves
- ✓ measure how long it takes for an order to be served

Each Starter or Clearing Unit contains its own passive RFID tag
How RFID can help restaurants?

Table Tracker

Wireless Table Tracker

No More Name Shouting or Number Cards

- read the table tags
- detect where the guest is sitting
How RFID can help restaurants?

Table Tracker

Provide You Options

• can choose how to tag restaurant tables
How RFID can help restaurants?

Table Tracker

Immediately Locate Guests

- Color indicators show which orders are late
How RFID can help restaurants?

Table Tracker

Gain Important Insights

- ✓ collects important data for restaurant management purposes

Advanced Reporting Tools
How RFID can help restaurants?

Table Tracker
How RFID can help restaurants?

Table Tracker

- restaurants using it:

“"We shaved a full minute off ticket times. Table Tracker has given us the ability to prioritize orders and deliver food faster.”

Michael Johnson,
Regional Manager
Jason’s Deli
How RFID can help restaurants?

Table Tracker

- restaurants using it:

“The Table Tracker tells you where to go like a light beam to the table."

“It’s the best investment I’ve made this year.”

Johnny Carrabba,
Owner & Founder of the Original Carrabba’s & Mia’s
How RFID can help restaurants?

**Freshness dishes tracking system**

- RFID magnetic tags embedded beneath each plate
- A centralized system + robotic arm → remove “expired plates”
  - raw food is cleared after an hour;
    cooked food is cleared after two hours
- restaurant using it:

![Sakae Sushi logo]
Further Discussion towards RFID

- Surveys conducted

**Q : How can RFID help a restaurant in your mind?**

- Easier to management the restaurants
- The heavy workload among workers can be spread
- Both the efficiency and effectiveness can be improved
- Restaurants can earn more profits

**Q: What are the possible worries that you are having towards using RFID in restaurants?**

- Obstacles may be faced (e.g. unexpected bugs, unstable system)
- High maintenance cost
- May threaten workers' positions
- Other

* Required

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**Survey on the Influence of IT and RFID on Restaurants**

The purpose of conducting this questionnaire is to investigate the influence of RFID and information technology on restaurants. The following questionnaire contains questions about the familiarity with RFID and information technology that are using in restaurants, and the opinions on using RFID in restaurants from the views of both the diners and staff of restaurants in terms of its feasibility and the corresponding vision. The findings gathered from this survey will be incorporated into a research project. We would like to invite you to spend about 5 minutes on our questionnaire. All data collected will only be used for research and analysis purposes and will be kept strictly confidential. Thank you for your time!

Part A Familiarity with Information Technology currently using in restaurants

1. Do you know what is Radio Frequency Identification (RFID) technology and its underlying techniques used? *
   - No idea
   - Had heard about the name “RFID” only
   - Just know what the abbreviation RFID stands for but don’t know what it is actually
   - Have clear understanding on what RFID is and how it

2. Do you have any working experience in restaurants? *
   - Yes
   - No
## Further Discussion towards RFID

<table>
<thead>
<tr>
<th>Pros of using RFID in restaurants</th>
<th>Cons of using RFID in restaurants</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ improve efficiency and effectiveness</td>
<td>may have obstacles while using RFID technology (unexpected bugs, unstable system)</td>
</tr>
<tr>
<td>✓ easier to manage restaurants</td>
<td>high maintenance cost</td>
</tr>
<tr>
<td>✓ share workload of staff</td>
<td>may threaten workers' positions</td>
</tr>
<tr>
<td>✓ earn more profits</td>
<td>old workers may not know how to use it</td>
</tr>
</tbody>
</table>
What’s more?

According to surveys conducted…..

<table>
<thead>
<tr>
<th>Q. Can you select the technologies you saw in restaurants?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touchscreen Food Vendors</td>
</tr>
<tr>
<td>iPad order kiosk</td>
</tr>
<tr>
<td>LED Alert Systems</td>
</tr>
<tr>
<td>RFID technology</td>
</tr>
<tr>
<td>Webcam-Enabled Monitoring</td>
</tr>
<tr>
<td>Automatic Biodiesel Converters</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

- Mobile POS ⇒ helps restaurants!
Mobile POS

- Two types of POS:
  1. Traditional POS
  2. Modern POS
What is Traditional POS?

- POS stands for “Point of sale” initially

- A system

- Purposes
  - Calculate the amount of goods
  - Customers easily make payments
What is Traditional POS?

• Equipment needed:
  1. Computers that have connected to center server
  2. Barcode scanners

• Widely used in supermarkets
What is Modern POS?

- Modern POS = “Point of Service”

- NOT only for checkout
- NOT only can be touched by cashiers
- Customers ✓ use it directly

EXAMPLE

1. ✓ store patient’s data for doctors
2. ✓ display menu or act as an ordering system for restaurants
What is Mobile POS?

- Mobile POS
  - = Mobile “Point of Service”
  - = a food ordering system

- Functions for restaurants’ usage:
  - order food
  - transmit orders to the kitchen
  - prepare bills for each of the tables that has consumed
  - show financial statistics (e.g. daily reports)
Mobile POS (in the past)

- Mobile POS has been used for years, but...
  - ✗ user-friendly
  - Expensive
Mobile POS (nowadays)

After smartphones were commonly used…….

- Mobile POS just likes an App
- No extra devices is needed
- ✔ User friendly
How can Mobile POS help restaurants?

- Itacho Sushi (板長壽司) uses iPad mini as the Mobile POS
How does Mobile POS work?

Waiter

Mobile POS

Central Server
(All data store here)

Chef

Mobile POS
How can Mobile POS help restaurants?

<table>
<thead>
<tr>
<th>Pros of using POS in restaurants</th>
<th>Cons of using papers + pens in restaurants</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Accuracy of food names and amounts ✓ guaranteed</td>
<td>• Waiter/waitress always writes strange words</td>
</tr>
<tr>
<td></td>
<td>• Write prices of the dishes wrongly</td>
</tr>
<tr>
<td></td>
<td>• Difficult for the chefs to understand the wordings wrote</td>
</tr>
</tbody>
</table>
How can Mobile POS help restaurants?

Pros of using POS in restaurants
- ↓ chances to miss diners’ food orders

Cons of using papers + pens in restaurants
- Easy to lose the papers of orders
How can Mobile POS help restaurants?

• Generate statistics
  • daily financial reports
  • total revenue

• Through data analysis......
  • know which dishes are more attractive to diners
Pros of using Mobile POS over POS

- Customers do NOT need to line up
Cons of using Mobile POS in restaurants

- need IT supporting team to maintain the system
- × existing POS can perfectly fit a specific restaurant
  - further development is needed
- ↑ cost for maintenance + sustainable development
  ⇒ not suitable for small scale restaurants
What's more?

According to surveys conducted.....

Q: What do you think about the influence of using these kind(s) of Information Technology in restaurants?

- It will bring NEGATIVE effects to the restaurants in both short and long term: 0%
- No effects: 4%
- In short run, it may benefit the restaurants but may negatively affect it later on: 7%
- In short run, it may negatively affect the restaurants but soon will have benefits on it: 11%
- It will bring POSITIVE effects to the restaurants in both short and long term: 78%

Q: From your view, will it be the market trend to use information technology in restaurants?

- Definitely yes: 23
- Probably yes: 32
- Uncertain: 9
- Never will be: 1

- Internet Technology ⇒ helps restaurants!
Social Media

- A group of websites, that built on the foundations of Web 2.0, not just only provide you information but can also interact with you
  - ✓ freedom of speech (allowed to give comments on anything)
  - ✓ freedom of voting
  - ✓ recommend articles based on user’s interests freely
Common Social Media Services

- Social Networking websites
- Photos and Videos Sharing websites
- Blogs
- Coupon sites
- Customer review sites
Create content that attracts attention
encourages readers to share it across their social networks

Any statements consumers share via Internet about an event, product, service, brand or company is called electronic word of mouth (eWoM)

underlying messages spread from a trusted third-party source + resonates
results in earned media
Overview of Facebook Application Technology

1. Application requests
https://apps.facebook.com/myapp

2. App content requests
http://myapp.com

3. App HTML gives responses

4. Facebook HTML gives responses

User

Facebook platform

App server

Conclusion + Vision
How can Facebook Applications help restaurants? 

- Data can be collected includes:
  - Users’ profiles
  - Educational background of users
  - Events participated
  - Groups joined
  - Users’ corresponding interests
  - Posts / groups / comments users “Liked”

- Things can be done by restaurants:
  - Writing posts
How can Social Media help restaurants?

- Offering discounts to diners
- Promote new and special dishes
- A platform for recruitment
How can Social Media help restaurants?

- Raise the public awareness by organizing different contests to make it more fun
How can Social Media help restaurants?

- get feedback from customers for improvement
- provide solutions to problems + resolve complaints
- keep living up to its good reputation
Pros of using Social Media Marketing

- either free or at low price
- fast
- can promote globally
- Two-way communication → improve customer services
- enhance the network connections with both customers and raw materials suppliers
- collaboration of knowledge sharing
Cons of using Social Media Marketing

- may reveal unwanted negative comments to users + raise criticism
- may face problems like spam, copyright & privacy related issues
- may have risks of being hacked → shared incorrect information
How can App-based Marketing help restaurants?

- ✔ e-Menu
- Use GPS to search for restaurants around you
How can App-based Marketing help restaurants?

- Loyalty Program
  - ✓ view membership details
  - ✓ save / accumulate points for future use
  - ✓ reserve table
How can App-based Marketing help restaurants?

• order pick up / food delivery
• offer coupons and discounts
• spread the latest news of new dishes
• ✓ embed with In-app game
Food Ordering Real Example

1. Online ordering
2. Delivery details
3. Food delivery
Pros of using App-based Marketing

- ✓ send notifications to customers
- ✓ convenient to prepare marketing materials
- ✓ interact with customers directly
- ✓ keep track on users’ responses
- ✓ allow e-payment
Cons of using App-based Marketing

From views of restaurants...

• Difficult to build a version that is suitable for all different existing mobile platforms
  • different screen sizes, OS, browsers

From views of diners...

• Limited navigation for handheld gadgets
Suggestions

How can we make use of the existing *Information Technology* to run a restaurant other than those are using now?
Suggestions

1. How can IT help **facilitating the seating of guests** in restaurants?

   - Hosts use NFC technology instead of keeping sheets for reservation
   - Better table management
   - Provide the best plan for utilizing all tables to serve diners in every turn
   - ✓ more accurate quoting of wait times
Suggestions

2. How can IT help improving food ordering process in restaurants?

- Touch screen dining tables
  ➔ shows all food related information
Suggestions

2. How can IT help **improving food ordering process** in restaurants?

For restaurants that have low budgets:
- Using QR code menu (EACH dish will have its' own unique QR code)
  - ↓ cost
  - ↑ efficiency
  - less room for mistakes in ordering food
  - ✓ offer instant discounts
Suggestions

3. How can IT help *food production procedures in kitchens* of restaurants?
Suggestions

4. How can IT help retaining traditional style in Chinese restaurants?
   
   • Things that only Chinese traditional restaurants have:
     • “Dim Sum” Cart
     • Pantry helpers
Suggestions

4. How can IT help retaining traditional style in Chinese restaurants?

- Using smart “Dim Sum” carts + smart tables
  - Unmanned carts using beacons
  - NFC embedded tables + dishes
Suggestions

4. How can IT help retaining traditional style in Chinese restaurants?
Suggestions

4. How can IT help retaining traditional style in Chinese restaurants?
Suggestions

5. How can IT help improving services in VIP rooms in restaurants?

- Everything can be made without the use of manpower and enhance privacy within the VIP rooms
- Unmanned services include:
  1. Tea type selection for Chinese restaurants
  2. Water refilling services
  3. Computerized menu for food ordering
  4. Hidden and secure convey belt to deliver food
  5. e-Payment for the bill
Suggestions

5. How can IT help improving services in VIP rooms in restaurants?

- Using advanced dining tables, like the automatic “mah-jong” tables
Suggestions

5. How can IT help *improving services in VIP rooms* in restaurants?
   - Using advanced dining tables, like the automatic “mah-jong” tables
Suggestions

6. How can IT help **improving takeout services** in restaurants?

- Make use of QR code technology to select food from menu
- NFC technology ⇒ food takeaway
Conclusion

By using ......

RFID technology
- Improve restaurants’ management of materials flow

Mobile POS
- Operation cost of restaurants

Social Media
- Help making profits for restaurants

Suggestions

Background

RFID

Mobile POS

Social Media

Suggestions

Conclusion + Vision
Vision

In future, with the help of information technology in restaurants......

• Restaurants may be able to earn more profits
• Manpower no longer accounts for the most of the cost
  • Lots of processes can be finished by using technology
  • Many tasks can be done in unmanned ways
• Efficiency can be raised
  • Avoid careless mistakes made by lazy waiters/waitresses
• Still 10% service charges ?
The End