SIMULATION MODELING AND ANALYSIS
FOR IN-STORE MERCHANDIZING OF RETAIL STORES
WITH ENHANCED INFORMATION TECHNOLOGY

BA 500

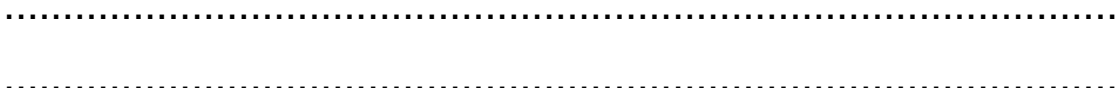## *www.peerapong.com*

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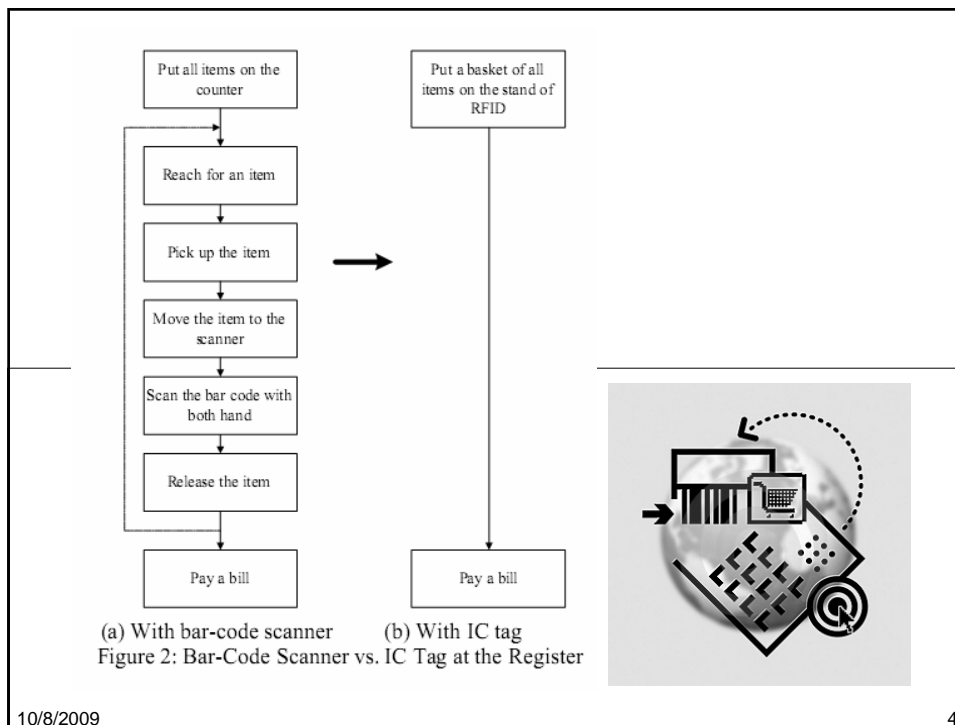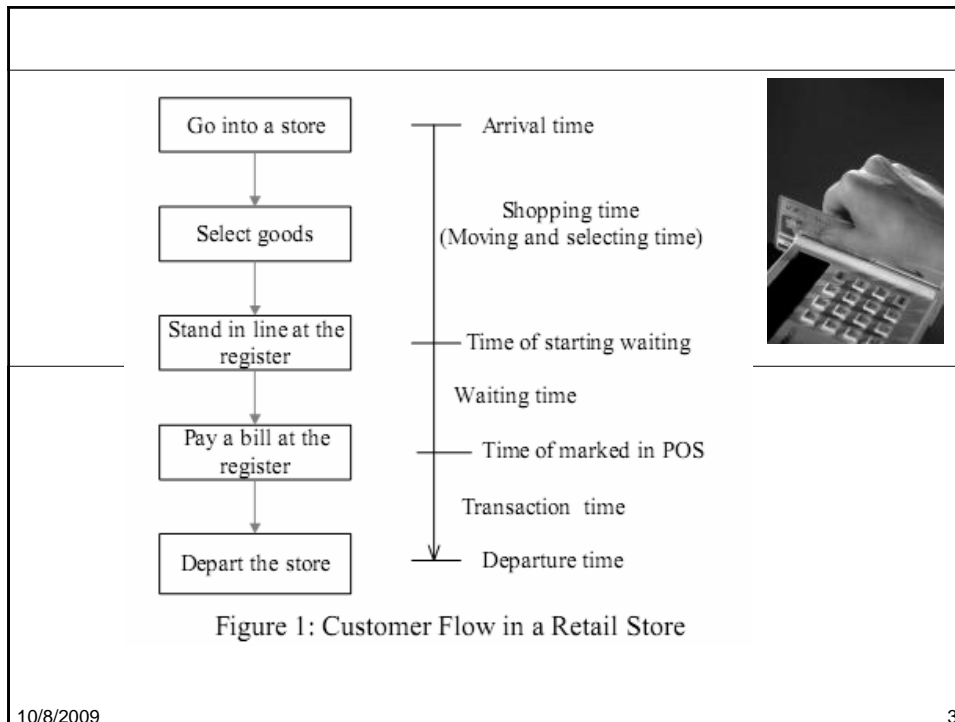
- **POS Data in the Retail Store**
- **Some Difficulties in using POS Data for Simulation**
- **POS with IC Tags**

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Figure 1: Customer Flow in a Retail Store

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(a) With bar-code scanner   (b) With IC tag
Figure 2: Bar-Code Scanner vs. IC Tag at the Register

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SIMULATION MODEL FOR IN-STORE MERCHANDIZING

- **Description of the Simulation Models**
  - 1. *Time Control*: this subsystem was designed to create entities or customers.
  - 2. *Category Allocation*: this subsystem was de- signed to read the location of gondola display. This logic read file of "Category_Area". File was written the allocation of the area by Item group ID of 990 categories. If allocation of the category in the area was changed, we changed the con- tents in the file.
  - 3. *Customer Flow*: this subsystem was designed to read a series of POS data and to move customers inside the retail store.
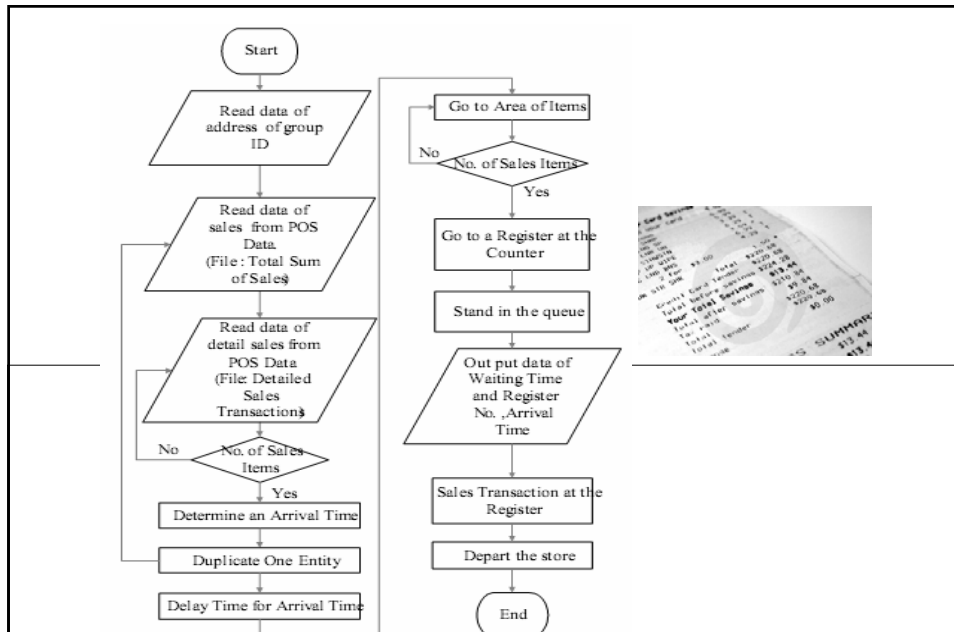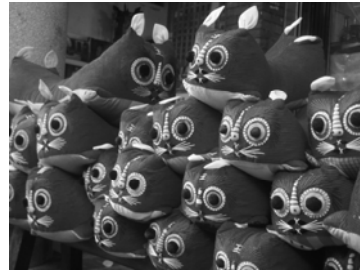- **Performance Measures**

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Figure 3: Flow of Simulation Model

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APPLICATION

- **Description of a Retail Store**
- **Parameters of Simulation Models**
- **Performance Measures for Congestion Degree**
- **Animation Model**
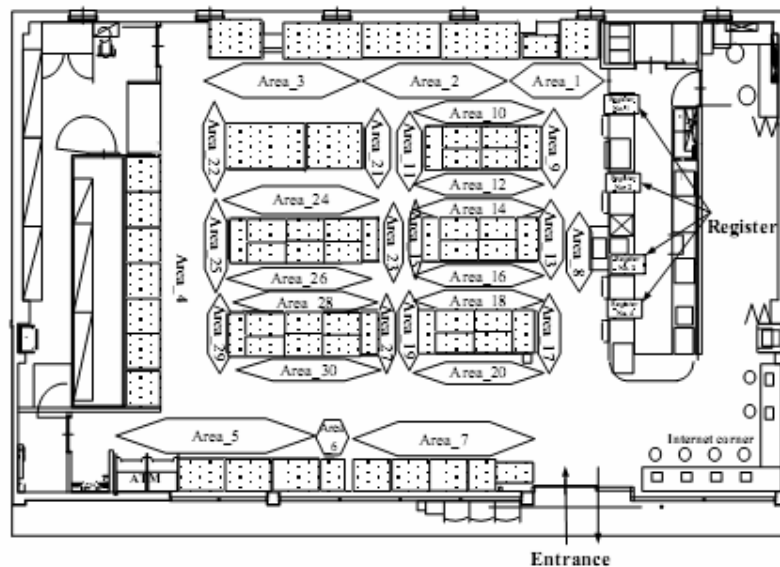- **Scenarios**
- **Selected simulation analysis**

Figure 4: Area Division at a Retail Store

Table 1: Ranking Sales of Item Group (2008/01/21)

Ranking	Item Group	Total Sales Volume (Jyen)	Percentage (%)
1	Deep-fried food	47796	6.73
2	Lunch boxes - 2	38919	5.48
3	Tea, Oolong tea	34753	4.89
4	Snack noodles - 1	31896	4.49
5	Coffee	27038	3.80
6	Sweetened buns, Bun -1	24957	3.51
7	Rice Ball - 2	24656	3.47
8	Cup noodles	24338	3.42
9	Milk-based drinks	22354	3.15
10	Chocolates	20580	2.90
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	Item
1	Hot Drinks -1
2	Health drinks
3	Rice balls, Sushi, Packed lunches - 1
4	Rice balls, Sushi, Packed lunches - 2
5	Sandwiches, Pasta, Western- & chinese dishes
6	Soup, Pasta, Dishes, Chilled foods, Packed dishes
7	Sausages, Eggs, Cheese, Chilled foods, Butter,...
8	Chilled drinks
9	Packed drinks
10	Frozen food, Ice cream, Ice
11	Coffee, Black tea
12	Tea
13	Tea
14	Fruit juice, Fruit drinks
15	Cola, Soda pops
16	Isotonic drinks
17	Water
18	Japanese sweets, Bread
19	Sweetened buns, Bun -1
20	Sweetened buns, Bun -2
21	Cakes
22	Candies - 1
23	Candies - 2
24	Chewing gum
25	Cookies

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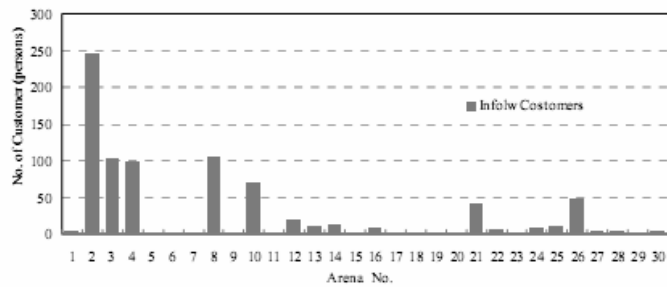
Figure 7: Number of Inflow Customers in the Area
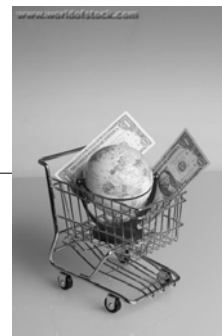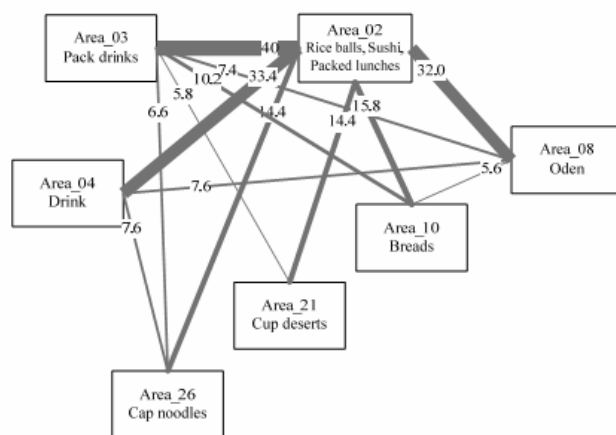
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Figure 8: Average No. of Customers Transfer between Areas

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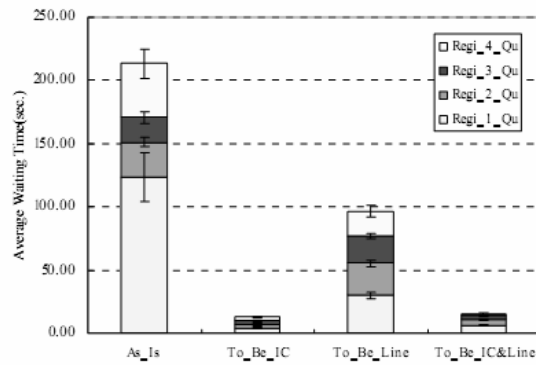
Figure 8: Average No. of Customers Transfer between Areas
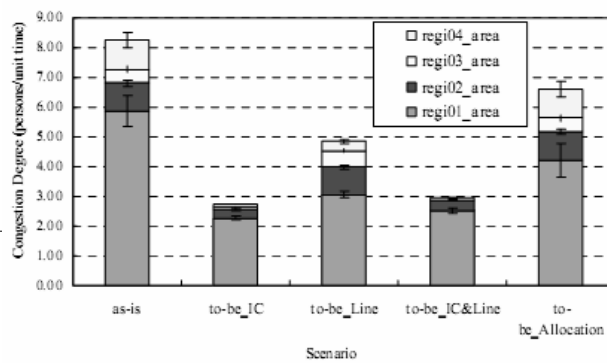

Figure 9: 95% Confidence Interval on the Average Waiting Time

Figure 10: Congestion Degree

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BA 500 Retail Information System

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Nagoya Gakuin University Furo-cho, Nagoya University Astuta-ku,
JAPAN., *Proceedings of the 2008 Winter Simulation Conference*

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