Case-Based Reasoning and Call Centers

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"Applying Case-Based Reasoning" by Ian Watson chapters 5 - 8

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1 Introduction to Help Desks
1 Broderbund and Compaq
1 GE Appliances “Save the Call”
1 GE Appliances eMail Handling
1 Customer Service Issues

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Introduction to Help Desks

1. What is a customer service help desk?
   – Companies provide telephone support for their products through 1-800 numbers
   – this is a multi-million dollar industry
     1. Compaq
     1. Broderbund
     1. GE Appliances

Help Desk Challenges

1. Growing complexity of products
1. Extended warranties
1. Corporate Image depends on service
1. Limited supply of qualified people
1. Training is expensive
1. Low pay / high turnover (80% per year)
1. Training when new products released

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Help Desk Challenges

1. Consistency among call takers
2. Warranties for other manufacturers
3. Need to store new problems so the correct solution can be determined
4. Need to retain problems so they can be fixed in the next release
5. Fair treatment for all callers

Help Desk Solution

1. Old help desks
   - work from paper manuals
   - need to find proper manual / section
2. New help desks
   - CBR tools
   - type question and perform keyword search
   - search uses model #, service info, …
   - automated without call taker (Internet)
   - eMail Questions

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General Help Desk

1. Expand to any getting ANY information
   - question answering system
   - collaborative search
   - knowledge management tool
   - decision making tool

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Compaq SMART System

1 The problem
   - Compaq manufactures personal computers, laptops, servers
   - In early 1990's had group of support engineers for dealers
   - In March 1991 they opened a customer call center
   - Customer service aim was "elate every customer by being accessible, responsive, enthusiastic, courteous, helpful, and caring."
   - Received thousands of calls daily
   - Increased staff by 100%, but that was not enough

2 The new process - CBR system (Inference Corp.)
   - The call taker collects basic information (name, address, ...)
   - Asks for a brief description which is typed in
   - SMART uses the description to provide an initial search
   - The call taker is presented with the best matching cases and questions to distinguish between them.
   - As each question is answered a new search is performed
   - Once a sufficient level of certainty is reached, the call taker will relay the solution.
   - If no solution was found the call was transferred to a more experienced call taker with a log of all the answered questions.
Compaq SMART System

1 Learning
– problems that were transferred by SMART
– solved by more experienced call taker
– call taker updates the case-base
– 1st level call takers can use the new case

1 Impact
– non-transferred solutions from 50% to 87%
– engineers moved to other work

Broderbund

1 The problem
– Broderbund creates computer games and educational software
– Their customer service answered questions about their software, hardware, operating systems, drivers, ...
– Call takers were experienced technologists, not trained as service representatives. “They were surly, short-tempered, and occasionally insulting to the customers”
– Releasing, MYST, for Christmas 1995
– Expected large number of technical support calls
– 1-800 call is expensive
Broderbund

1. New process (1997) - CBR system
   - Internet based customer support
   - 3,000 cases went live Christmas day
   - Customers performed searches and answered questions
   - The same case-base is used when customers call the 1-800 number

1. Benefits
   - In 1997 implemented for all products
   - 24 hour support
   - Web site handles work of 7 call takers

1. Replaced by simple FAQ in 1999

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GE Appliance

1 The problem
   – GE Appliances sells all major household appliances
   – Their customer service answers more than 3,000,000 calls per year and has over 300 full/part time call takers.
   – There is 70% turnover per year
   – Training is difficult
   – Unnecessary service calls are expensive
     - each call costs about $75
     - 15% of service calls are unnecessary
   – People would rather get the answer over the phone than wait at home
GE Appliances

1. New process - CBR system (eGain)
   - Internal call takers use CBR
   - Internet based customer support
   - Mail out parts with instructions
   - Customers can schedule their own service calls on-line

1. Future
   - Graphics, animations, and video available
   - Internet chat / Internet phone with call taker
   - Push the appropriate web site
   - CBR for remote diagnostics

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eGain k-Commerce

1. Case-Based Reasoning with Question Answering and Rule-Based System
1. k-Commerce is the market leader for customer support applications
   - Authoring environment (CBR Express),
   - Search engine (CasePoint),
     1. DLL, and API
     1. WWW facility,
k-Commerce - Case data

LOG: 7/29/96 14:19:15 - Lower cassette tray is installed improperly. The printer didn’t print, and couldn’t print a self test. On inspection the display message was: “14 Lower Tray” and the optional Lower Cassette tray was installed incorrectly. The action taken was to reinstall the lower Cassette tray.

K-Commerce - Case Format

| Case Title | Lower cassette tray installed improperly
| Case Description | Printer doesn’t print, and will not print self test
| Questions | Action |
| Can you print a self test? | NO |
| What is the display message? | 14 Lower Tray |
| Is optional Lower Cassette tray installed correctly? | NO |
| | Reinstall the Lower Cassette tray |

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k-Commerce - CBR Express

1. Windows based case authoring tool

k-Commerce - CasePoint

1. Windows based case retrieval tool

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Soft Computing: Case-Based Reasoning

**k-Commerce - Webserver**

Support The Consumer

**Search Keywords:** Whirlpool model JHR2500 too hot refrig

**Questions:**
- How long has it been since you started the refrigeration?
- Is the refrigerator empty or near empty?
- Which refrigerator compartment is too hot?
- What type of refrigerator do you need help with?
- What refrigerator topic are you calling about?

**Recommendations:**
- Wait 24 hours after startup to see if refrigerator is still down.
- Put food in refrigerator. Refrigerator will not cool properly if it is empty.
- Settemp adjustment to lower fresh food compartment temperature.

**Symptom**

Cases developed to solve customer education, installation, and minor Do-It-Yourself cosmetic repairs...

**Resolution**

Expert teams developed flowcharts that comprise the decision tree in the cases

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Soft Computing: Case-Based Reasoning

Desktop launches CBR and sends Brand, Product Line, Warranty Type, Model Number and Problem statement to CBR.

- Unlimited number of cases
- Only relevant cases displayed
- Attachments / Graphics

Calltaker collects Consumer Information and Product Information on call using Calltaking 32

Calltaker attempts to save the call using CBR

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Text attachments and graphics provide resolutions to Consumer Problems

GEA “Save the Call” - Benefits

Fully deployed for all product lines on June 1999

This effort saves $2.5 MM / year (3.9% to 12.3%)

- reduce Service Call Rate (SCR) and spending on Customer Education & Installation (CEI) calls.
  - CEI calls were 15% of all calls (1,400,000 per year)
- each service call avoided saves $50
- increase consumer satisfaction (solve issues in one call),
- feedback issues to design teams
- we can enforce policies “Always ask question X if callers issue is Y”

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Additional Uses of CBR

1. Web Based Save the Call for Internet Service Application
   - Meets the Consumer expectation for total online service
   - Increases the Brand commitment for GE consumers

2. Consumer Relations - controls concessions, reduces escalations, provides consistency
   - Resolves consumer complaints faster and to the consumers satisfaction more consistently than without CBR

http://www.geappliances.com/geac/schdl_rpr/solve.htm  
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Updated Overall Results

Interview with Appliances General Manager 5-8-03

“This is the most wonderful thing to ever happen at Appliance”

Saving 17% of all calls.

Over the last 4 years this has saved $61 Million

Surveys show customer satisfaction is up

Better at answering questions of potential customers (sales up)

Web version being updated (purchased new version from eGain)

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GEA eMail - Problem

1 Managing Costs/Productivity
   – 10 min per email at 1.00 per minute
   – Increasing volume
   – Consistent miss on business commitment
   – Agent subjectivity

1 Content Consistency
   – Inconsistent answers among team members
   – Inconsistent answers among GEA teams (GEAC/ASI)

1 Reporting
   – Manual reporting (over/under 24 hours) lacking detail
   – No automated method to measure agent productivity or performance
Soft Computing: Case-Based Reasoning

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Soft Computing: Case-Based Reasoning

GEA eMail - Results

1. **Hard Benefits**
   1. 40% reduction in email handle time
      - $4.00 cost out per email
      - $600,000 gain in productivity for 2001
   2. 99.9% response within business commitment
   3. Average span 5 hrs

1. **Soft Benefits**
   1. Improved Process and Content Control
      - Consistence Internal Response
      - Streamlined processes among email teams
      - Reduced Agent Subjectivity
   2. Improved reporting
      - Ad Hoc
      - Individual Metrics
      -- Performance Appraisal

Increase Productivity and Responsiveness, Reduce Cost!!

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“80% of profits come from 20% of customers. The rest nag you”

But technology changed everything. It has become much easier to track and measure individual transactions. People can now serve themselves on the Web at a negligible cost. Companies are doing everything possible to push their customers—especially low-margin ones—toward self-service.

‘We’re Sorry, All of Our Agents Are Busy with More Valuable Customers’

Companies have become sophisticated about figuring out if you’re worth pampering—or whether to just let the phone keep ringing. Here are some of their techniques:

CODING
Some companies grade customers based on how profitable their business is. They give each account a code with instructions to service staff on how to handle each category.

ROUTING
Based on the customer's code, call centers route customers to different queues. Big spenders are whisked to high-level problem solvers. Others may never speak to a live person at all.

TARGETING
Choice customers have fees waived and get other hidden discounts based on the value of their business. Less valuable customers may never even know the promotions exist.

SHARING
Companies sell data about your transaction history to outsiders. You can be slotted before you even walk in the door, since your buying potential has already been measured.

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