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결합 리스펀스 모델링을 이용한 고객리스트 세분화

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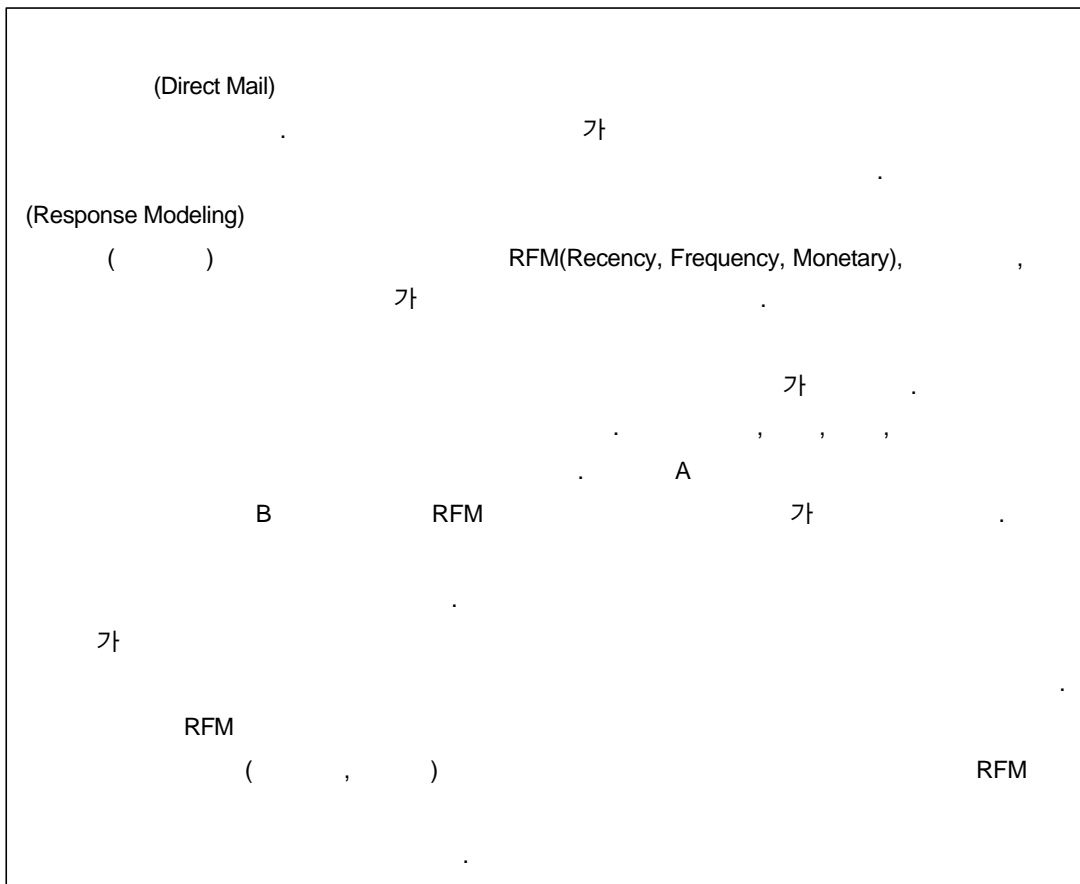
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Customer List Segmentation Using the Combined Response Modeling

Eui-ho Seo
Kap-chel Noh
Eung-beom Lee



1.

1.1

1

1. (Arakawa Damaki,1995)

1960			
1970			
1980			
1990		가가	

, 4P

가

(Zahavi and Levin,1995).

가

(Blattberg)

(Blattberg,1987).

The purpose of such models is to predict the probability that an individual will buy from a new offering, given specific historical data about that individual.

The modeling problem is to design techniques that can improve upon current methods.

Are there methods which can be designed for the specific problems direct marketers face that predict better than regression or AID?

1.2.

(Wiersema,1987; Ramaswamy, Desarbo, Robinson and Reibstein,1993). 가

가 .
4가 .

- 1. 가?
- 2. 가?
- 3. 가 가?
- 4. 가 가?

4가

RFM
(,)

2.

2.1

1 . (Zahavi and Levin,1995).

가

1 가 .

가

가 , 10% 10

50% 2 0% 8

가 100% 1

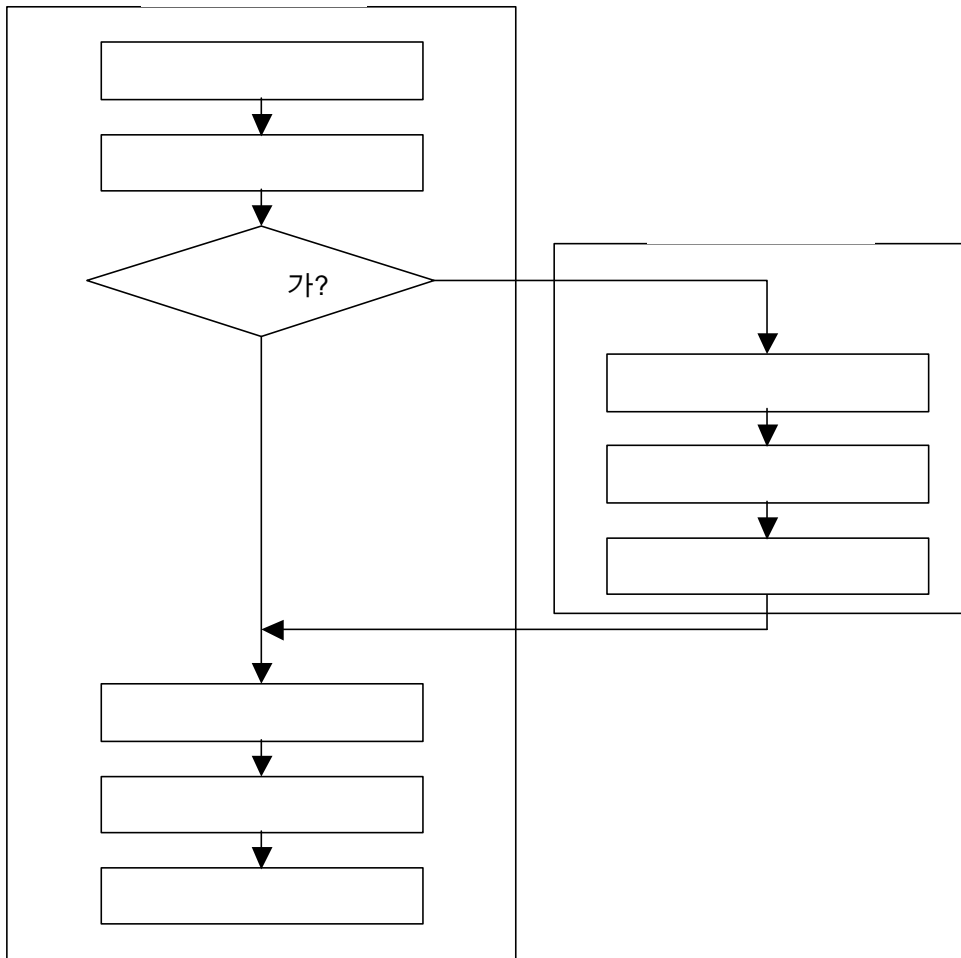
0% 9 가 (Kim, J.,1997).

. RFM,

가

1

(Zahavi and Levin,1997)



2.2

1999. 3

22

가 ,
 가
 RFM (Hughes,1998; Wang and Baker,1996),
 (Widrow, Rumelhart and Lehr,1994) AID, CHAID (Blattberg and
 Vitale,1986; Magidson,1998), CART, (Ben and Lerman,1985;
 Berger and Magliozzi,1992; Shepard,1995) RFM
 가
 (Hughes,1998; Zahavi and Levin,1997).

가
 가
 가
 가
 (Jain and Neg,1997; Zahavi and Levin,1997).
 . J. Zahavi 가
 가
 가
 15가 (Zahavi and Levin,1997). Zahavi 가

1. Min (Output of M1, Output of M2)
2. Min (Output of M1, 2*Output of M2)
3. Min (Output of M1, 3*Output of M2)
4. Min [SQRT (Output of M1), SQRT (Output of M2)]
5. Min [SQRT (Output of M1), 2*SQRT (Output of M2)]
6. Min [SQRT (Output of M1), 3*SQRT (Output of M2)]
7. Output of M1 + Output of M2
8. 2*Output of M1 + Output of M2
9. 3*Output of M1+ Output of M2
10. 4*Output of M1 + Output of M2
11. SQRT (Output of M1) + SQRT (Output of M2)
12. 2*SQRT (Output of M1) + SQRT (Output of M2)
13. 3*SQRT (Output of M1) + SQRT (Output of M2)

- 14. 4*SQRT (Output of M1) + SQRT (Output of M2)
- 15. Upper 50% Output of M1 and Upper 50% Output of M2

Zahavi 가 가 가
 RFM RFM RFM RFM

3.

3.1.

RFM, ,

3.1.1. RFM

RFM Recency, Frequency, Monetary

30 . R

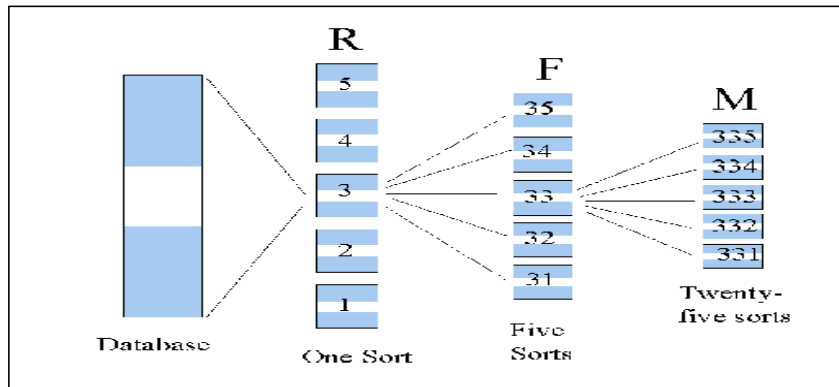
F M

(Hughes,1996; Jen,1995; Park,C.,1996). RFM 3가

R 가 가

F , M

가 . 2 RFM

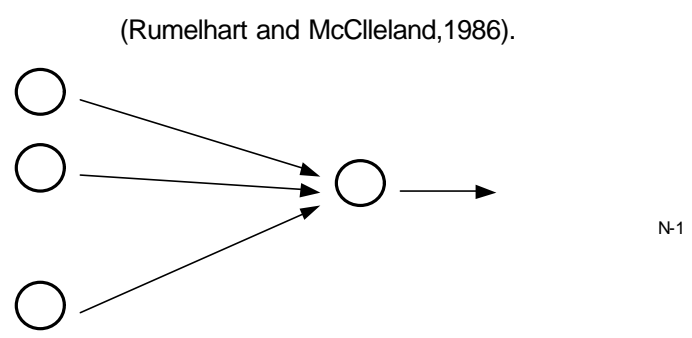


2 RFM

2 5 5 125 F R 5 5 M 1 2

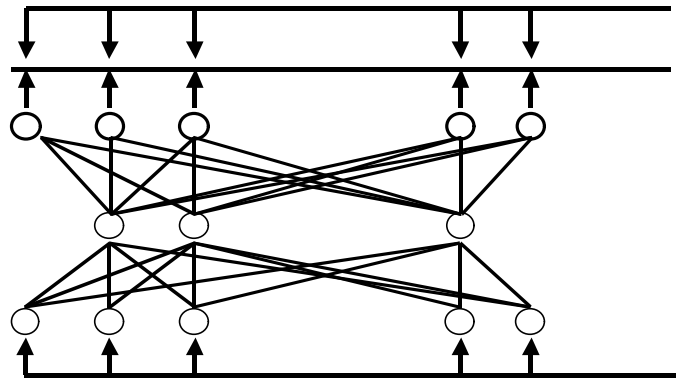
3.1.2.

가 (Connection Weight) 가 (Activation Function) 가 (Learning Process) (Rumelhart, Widrow and Lehr, 1994; Lee,J.,1996). Backpropagation



$X_0 \sim X_{N-1}$: The values of input nodes (between 0 to 1)
 $W_0 \sim W_{N-1}$: Connection weights
 y : Output value (between 0 to 1)
 θ : offset

3 가 Multi-Layer Perceptron (Hidden Nodes) (Lee,J.,1996).



4 Multi-Layer Perceptron

3.1.3.

Inc,1991).

가

(SAS Institute

(Sung,N.,1996).

가

- Probability
- Odds
- Logit
- Odds ratio
- Log Odds

Odds

$$odds = p / (1 - p)$$

$$\ln(yes) = \ln(p / 1 - p) = \ln(p) - \ln(1 - p)$$

(Jeon,C., Jung,M. and Lee,H.,1998; Shepard,1995).

$$\log it = \ln(p / 1 - p) = \mathbf{b}_0 + \mathbf{b}_1 X$$

Exponential Function

$$p = \exp(\log it) / (1 + \exp(\log it)).$$

3.2.

Zahavi

15가
 가 1, 4, 7, 11 가
 11 가

- 16. Min (Output of M2, 2*Output of M1)
- 17. Min (Output of M2, 3*Output of M1)
- 18. Min [SQRT (Output of M2), 2*SQRT (Output of M1)]
- 19. Min [SQRT (Output of M2), 3*SQRT (Output of M1)]
- 20. 2*Output of M2 + Output of M1
- 21. 3*Output of M2+ Output of M1
- 22. 4*Output of M2 + Output of M1
- 23. 2*SQRT (Output of M2) + SQRT (Output of M1)
- 24. 3*SQRT (Output of M2) + SQRT (Output of M1)
- 25. 4*SQRT (Output of M2) + SQRT (Output of M1)
- 26. Upper 50% Output of M2 and Upper 50% Output of M1

Minimun 1 ~ 6 가 가
 가 가 3가
 (RFM+ , + , +RFM)
 26가 1 ~ 6 RFM (Ordinal
 가 Value) RFM value

3.3.

1580 C 3 1 2
 27 . 27

● RFM

RFM (R), 3 (F), 3
 (M) . R 5 5
 F 2 M 2
 522 111 20 . RFM
 522 가
 . RFM
 가 . RFM
 522, 521, 322 가

RFM
 가 .
 0 1 20
 522 0.95 ~ 1
 521 520 0.90 ~ 0.95 0.85 ~ 0.90
 111 .
 가

RFM .

●

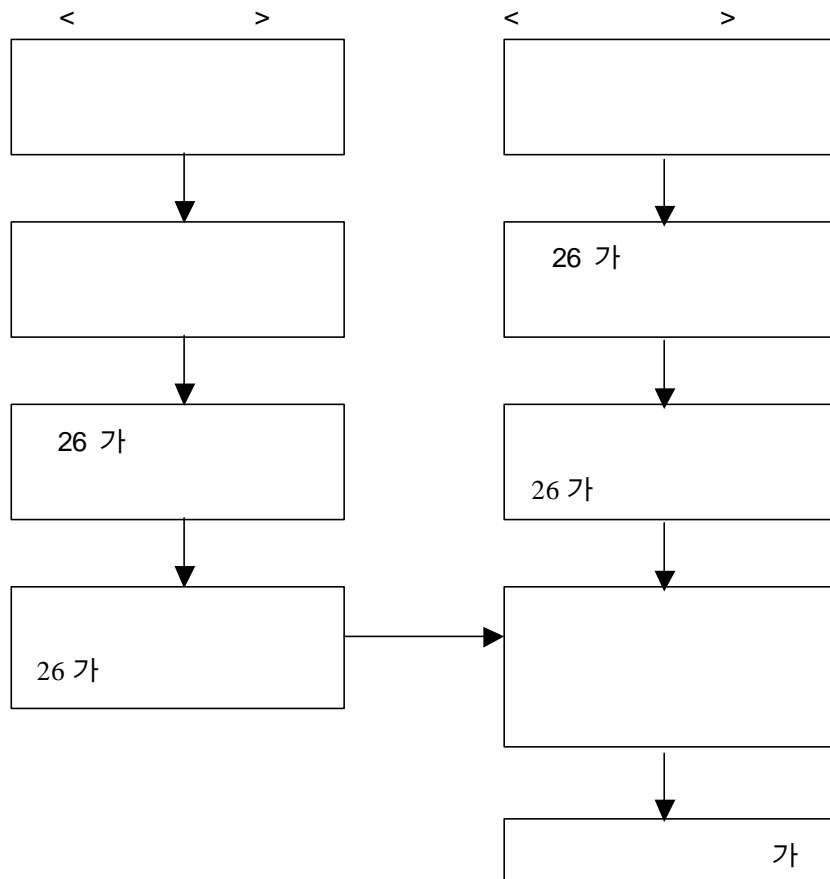
, , , , 가
 , 6 가
 20% .
 가
 가 150
 가 (6 , 10
 1 , 1) .
 가
 20% .
 20% 가 .

1.

- 1.
- 2. 1
- 3. 26가
- 4. 1 3
- 5. 4 가

2.

- 6.
- 7. 5
- 8. 6 7
- 5



5

4.

4.1.

2 1

2. 1

Methods	Correct	Incorrect	Percent
RFM	78	80	49
NN	87	71	55
Logistic	61	97	39

가

3 2

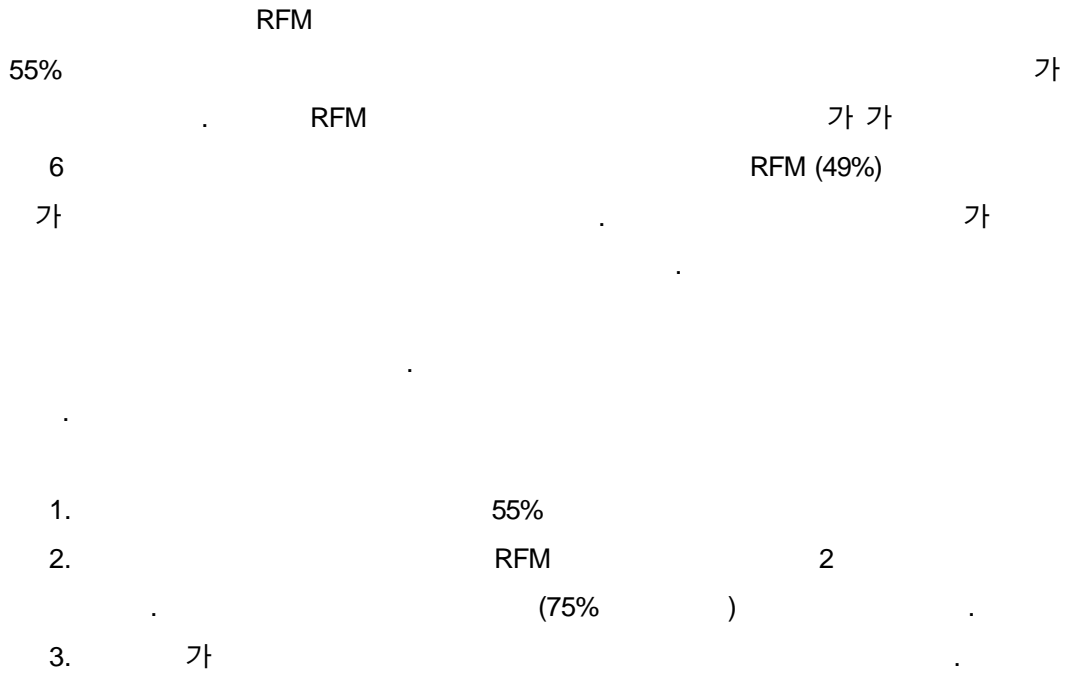
3. 2

Methods	RFM	NN	Logistic
RFM	1	0.32	0.27
NN	0.32	1	0.62
Logistic	0.27	0.62	1

RFM 가 가
가 4

4.

RFM, NN	26	0
RFM, Logistic	20	6
NN, Logistic	1	25
	47	31



4.2.



5. 6

Methods	Correct	Incorrect	Percent
RFM	79	79	50
NN	57	101	36
Logistic	57	101	36

6

6.

Methods	RFM	NN	Logistic
RFM	1	0.29	0.33
NN	0.29	1	0.66
Logistic	0.33	0.66	1

RFM 가 RFM
 가
 . 7 26가

7.

RFM, NN	19	7
RFM, Logistic	20	6
NN, Logistic	24	2
	63	15

가 RFM
 7
 RFM (50%) 가 RFM
 6가 RFM
 가
 5% 가
 26가 11, 12, 13
 1. 50% RFM
 2. RFM 3
 (69%)
 3. 가

1 2
가

가

RFM
37%

2

5.

가

RFM
RFM

가

RFM

가

가 RFM, ,

4가

, RFM
, RFM

가

.RFM

, 가

, 가

37%

가

가

가

가

- Arakawa Damaki, *Database Marketing*, Knowledge Supply, Seoul, 1995.
- Ben, A. M. and Lerman, S. R., *Discrete Choice Analysis*, MA:MIT Press, 1985.
- Berger, P. D. and Magliozzi, T. L., “The Effect of Sample Size and Proportion of Buyers in the Sample on the Performance of List Segmentation Equations Generated by Regression Analysis”, *Journal of Direct Marketing*, v6, n1, 1992, p13-p22.
- Blattberg, R. C. and Vitale, D., “Bull’s Eye Targeting”, *ZIP Target Marketing*, Feb, 1986, p63-p68.
- Blattberg, R. C., “Research Opportunities in Direct Marketing”, *Journal of Direct Marketing*, v1, n1, 1987, p7-p14.
- Hughes, A. M., *The Complete Database Marketer*, 2nd, McGraw-Hill, 1996.
- Hughes, A. M., [Http://www.dbmarketing.com/articles/rfntools.html](http://www.dbmarketing.com/articles/rfntools.html), 1998.
- Jain, B. A. and Neg, B. N., “Performance Evaluation of Neural Network Decision Models”, *Journal of Management Information Systems*, v14, n2, 1997, p201-p216.
- Jen, L., *Measuring the Value of Customers: A Hierarchical Bayes Model of Interpurchase Time*, The Ohio State University, Doctor of Philosophy, 1995.
- Jeon, C., Jung, M., and Lee, H., *The Practical Statistics for Engineering*, Postech Press, 1st, 1998.
- Kim, J., *The integrated Database Marketing System*, Bum-Woo publishing, Seoul, 1997.
- Lee, J., *Development of a Neural Network based Executive Information System*, Master of Science, Pohang University of Science and Technology, 1996.
- Magidson, J., “Improved Statistical Techniques for Response modeling”, *journal of Direct Marketing*, v2, n3, 1988, p6-p18.
- Park, C., *Database Marketing*, Yeon-Am Publishing, Seoul, 1996.
- Ramaswamy, V., Desarbo, W. S., Robinson, W. T., and Reibstein, D. J., “An Empirical Pooling Approach for Estimating Marketing Mix Elasticities with PIMS Data”, *Marketing Science*, 12, 1993, p103-p124.
- Rumelhart, D. E. and McClelland, J. L., *Parallel Distributed Processing*, MIT press, 1986.
- Rumelhart, D. E., Widrow, B., and Lehr, M. A., “The Basic Idea in Neural Networks”, *Communications of The ACM*, v37, n3, 1994, p87-p92.
- SAS Institute Inc., *SAS Procedures Guide*, 1st, 1991.
- Shepard, D., *The New Direct Marketing*, 2nd, McGraw-Hill, 1995.

- Sung, N., *SAS/STAT Regression analysis*, Liberty Academy, 3rd, 1996.
- Wang, P. and Baker, J. R. "Procedures to Improve the House List Segment Tests", *Journal of Direct Marketing*, v10, n2, 1996, p24-p35.
- Widrow, B., Rumelhart, D. E., and Lehr, M. A., "Neural Networks: Applications in Industry, Business and Science", *Communications of The ACM*, v37, n3, 1994, p93-p105.
- Wiersema, F. D., "Advanced Segmentation's Practical Parameters", *Direct Marketing*, 49, 1987, p30-p37.
- Zahavi, J. and Levin, N., "Issues and Problems in Applying Neural Computing to Target Marketing", *Journal of Direct marketing*, v9, n3, 1995, p33-p45.
- Zahavi, J. and Levin, N., "Applying Neural Computing to Target Marketing", *Journal of Direct Marketing*, v11, n1, 1997, p5-p22.