ภาคผนวก ก

รูปแบบโมเดลการตัดสินใจของเทคนิค **J48**

```
 1   === Run information ===
 2
 3   Scheme:      weka.classifiers.trees.J48 -C 0.25 -M 2
 4   Relation:    Data_IS_unmissing_V5_new2-weka.filters.unsupervised.attribute.Remove-R1
 5   Instances:   12893
 6   Attributes:  5
 7              Utilization
 8              Movement
 9              LTV
10              PaymentHistory
11              Class
12   Test mode:   10-fold cross-validation
13
14   === Classifier model (full training set) ===
15
16   J48 pruned tree
17   ------------------
18
19   Utilization = >95-100
20   |   LTV = <=75: Pass (1292.0/95.0)
21   |   LTV = >80-100
22   |   |   Movement = <10: No (80.0/10.0)
23   |   |   Movement = 15-19.99: No (13.0)
24   |   |   Movement = 10-14.99: No (12.0/2.0)
25   |   |   Movement = >=20: Pass (38.0/8.0)
26   |   LTV = >75-80
27   |   |   Movement = <10: No (73.0/7.0)
28   |   |   Movement = 15-19.99: Pass (1.0)
29   |   |   Movement = 10-14.99: Pass (9.0/2.0)
30   |   |   Movement = >=20
31   |   |   |   PaymentHistory = Good: Pass (25.0/4.0)
32   |   |   |   PaymentHistory = Bad: No (2.0)
33   |   LTV = CleanLoan: Pass (189.0/17.0)
34   |   LTV = >100
35   |   |   Movement = <10: No (92.0/31.0)
36   |   |   Movement = 15-19.99: No (7.0/1.0)
37   |   |   Movement = 10-14.99: No (10.0/2.0)
38   |   |   Movement = >=20: Pass (30.0/4.0)
39   |   LTV = Deposit: Pass (129.0/2.0)
40   Utilization = <=80: Pass (8202.0/58.0)
41   Utilization = >100
42   |   LTV = <=75
43   |   |   Movement = <10: No (293.0/4.0)
44   |   |   Movement = 15-19.99: Pass (2.0/1.0)
45   |   |   Movement = 10-14.99
46   |   |   |   PaymentHistory = Good: Pass (3.0/1.0)
47   |   |   |   PaymentHistory = Bad: No (2.0)
48   |   |   Movement = >=20
49   |   |   |   PaymentHistory = Good: Pass (16.0/4.0)
50   |   |   |   PaymentHistory = Bad: No (3.0)
51   |   LTV = >80-100: No (30.0/3.0)
52   |   LTV = >75-80: No (24.0/2.0)
53   |   LTV = CleanLoan: Pass (35.0/1.0)
54   |   LTV = >100: No (22.0/7.0)
55   |   LTV = Deposit: Pass (22.0/1.0)
56   Utilization = >80-90
57   |   LTV = <=75: Pass (858.0/16.0)
58   |   LTV = >80-100
59   |   |   Movement = <10: No (42.0/3.0)
60   |   |   Movement = 15-19.99: Pass (7.0/1.0)
61   |   |   Movement = 10-14.99: No (6.0/2.0)
62   |   |   Movement = >=20: Pass (64.0/8.0)
63   |   LTV = >75-80: Pass (84.0/5.0)
64   |   LTV = CleanLoan: Pass (76.0/8.0)
```

ภาพที่ ก.1 รูปแบบโมเดลการตัดสินใจของเทคนิค J48

```
65  |  LTV = >100
66  |  |  Movement = <10: No (22.0/7.0)
67  |  |  Movement = 15-19.99: Pass (2.0)
68  |  |  Movement = 10-14.99: Pass (9.0/1.0)
69  |  |  Movement = >=20: Pass (31.0/4.0)
70  |  LTV = Deposit: Pass (63.0/2.0)
71  Utilization = >90-95
72  |  LTV = <=75: Pass (656.0/33.0)
73  |  LTV = >80-100
74  |  |  Movement = <10: No (25.0/4.0)
75  |  |  Movement = 15-19.99: Pass (5.0/1.0)
76  |  |  Movement = 10-14.99: No (6.0)
77  |  |  Movement = >=20: Pass (45.0/9.0)
78  |  LTV = >75-80
79  |  |  Movement = <10: No (27.0/1.0)
80  |  |  Movement = 15-19.99: Pass (3.0)
81  |  |  Movement = 10-14.99: Pass (6.0)
82  |  |  Movement = >=20: Pass (37.0/2.0)
83  |  LTV = CleanLoan: Pass (64.0/4.0)
84  |  LTV = >100
85  |  |  Movement = <10: No (24.0/4.0)
86  |  |  Movement = 15-19.99: No (0.0)
87  |  |  Movement = 10-14.99: No (4.0)
88  |  |  Movement = >=20: Pass (21.0/2.0)
89  |  LTV = Deposit: Pass (50.0/2.0)
90
91  Number of Leaves  :    55
92
93  Size of the tree :     72
94
95
96  Time taken to build model: 0.06 seconds
97
98  === Stratified cross-validation ===
99  === Summary ===
100
101 Correctly Classified Instances     12495              96.9131 %
102 Incorrectly Classified Instances      398               3.0869 %
103 Kappa statistic                      0.7673
104 Mean absolute error                  0.0545
105 Root mean squared error              0.1671
106 Relative absolute error             37.2147 %
107 Root relative squared error         61.7539 %
108 Total Number of Instances           12893
109
110 === Detailed Accuracy By Class ===
111
112           TP Rate   FP Rate   Precision   Recall  F-Measure   ROC Area  Class
113           0.992     0.297     0.975       0.992   0.983       0.92      Pass
114           0.703     0.008     0.885       0.703   0.784       0.92      No
115 Weighted Avg.  0.969   0.274    0.968     0.969   0.968       0.92
116
117 === Confusion Matrix ===
118
119    a     b   <-- classified as
120  11774   94 |   a = Pass
121    304  721 |   b = No
```

ภาพที่ ก.1 (ต่อ)