

One Rule

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Abstract

The research aims to diagnosis the postoperative period of the patient.in which an integral database designed to contain personal information, clinical checkup and examine the patient case after the surgery based on some properties (symptoms), which is regarded as inputs of the database and results of three classification as outputs (patient prepared to go home, be sent to general hospital,be sent to the intensive care unit), by using neural network as classification algorithm connected with data mining algorithm (one rule) to reach the perfect classification through decreasing the properties of the original data and have one property sufficient to design a complete model,this system is programmed by using visual basic version 6 connected to database through microsoft access.

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(One Rule)

.Microsoft Access

:

Databases

Data Warehouses

Data Mining

DM

(Information Retrieval) IR

.[6]

Data Mining

(KDD) Knowledge Discovery in Database

KDD

Classification

Business

Statistical Algorithm

Genetic

Neural Network Algorithm

[6].Algorithm

()

Self-

)

Organization Maps

One Rule

(

.[4]

Classification

-2

[6]

(clusters)

[3]

()

.[3]

.Statistical Algorithm

.Neural Network Algorithm

.[6] Nearest Neighbor Method

.Genetic Algorithm

Database

-3

.[1]

-4

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.[6]

.[6]



[7].

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-
-
-

[7] .

. [7]

[6]

1-4

:

Data Cleaning :
Noise

-

Data Integration

-

Data Selection : •

[11] (1)

Data Transformation : •

(1)

(3-2-1-5) (Normalization)

Data Mining : •

One Rule

Pattern Evaluation : •

(2)

Knowledge Representation : •

.18 (6) 17 (6) •

[6].

-5

[4]

...

[4].

1-5

Architecture Of Self Organizing Feature Maps

(Input Layer)

(Output Layer)

(Full Connected Feed Forward)

)

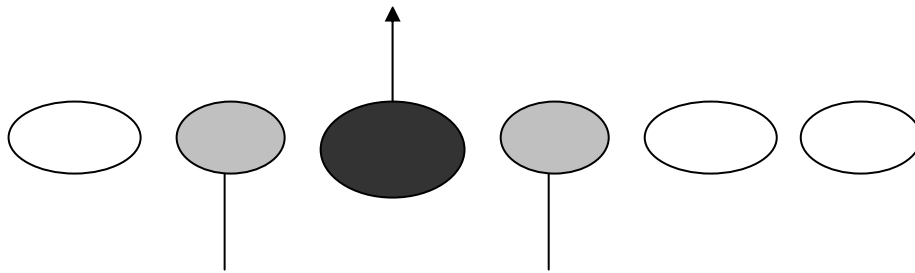
[2].(

()

() (1)

[8].

Winner Node الخلية الفائزة



(1)

Competitive Learning

(Euclidian Distance)

[2].

$$E = \sqrt{\sum_{i=1}^m (X_i - W_i)^2}$$

1-1-5

The Algorithm Of Self Organzing Feature Maps

[2]:

(Initialization) (1)

$$W = \begin{bmatrix} W_{11} & W_{12} & \dots & W_{1m} \\ W_{21} & W_{22} & \dots & W_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ W_{n1} & W_{n2} & \dots & W_{nm} \end{bmatrix}$$

n
m

p p=1.....p X(p) (2)

[2]:

$$W_j^{new} = W_j^{old} + \eta \cdot \Lambda(j,k) \cdot (X - W_j^{new})$$

$W_{j,new}$

$W_{j,old}$

η

X

$\Lambda(j,k)$

K

(3)

(Average Distance)

...

(Tolerance Distance)

$$D = \frac{\sqrt{\sum_{i=1}^p (d_i)^2}}{p}$$

P

i

d_i

[2]

2-1-5

∴ ()

1-2-1-5

2-2-1-5

3-2-1-5

4-2-1-5

∴ ()

[2]

1-2-1-5

()

[2]

2-2-1-5

∴

[0..1]

(1

(2)

[0..1]

0.5

. [0..1]

3-2-1-5

(Normalization)

(1 0)

[2]:

$$\bar{X} = X/I$$

$$I = \sqrt{\sum_{i=1}^n X_i^2}$$

n

x

(magnitude)

[2].

[2]

4-2-1-5

[0.1....0.9]

(Tolerance Distance)

(1R)

(One Rule 1R)

(Filter)

(1R)

.(Wrapper)

[4].

(1R)

(1R)

(1R)

[4].

[9][12] [2]:

One Rule

	A	(1
A	V _A	(2
		1-2
	C _f	2-2
A = V _A		3-2
:		
-		=

		(3

	(4)
.(Attribute)	(5)
One Rule	(6)

[13] One Rule

1-6

	:													
Temperature Outcome	64	65	68	69	70	71	72	72	75	75	80	81	83	85
	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No
	8													
Temperature Outcome	64	65	68	69	70	71	72	72	75	75	80	81	83	85
	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No

72

No Yes

()

.(No Yes)

() ()

[13] . ()

Temperature Outcome	64	65	68	69	70	71	72	72	75	75	80	81	83	85
	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No

(Yes 3)

Yes

cool (70-64)

mild (75-71)

[13].hot

Yes

:

Temperature outcome	64	65	68	69	70	71	72	72	75	75	80	81	83	85
	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No

...

:

(80 75) 77.5
 (10 3) outcome
 .(4 2) No= 77.5
 (14)

. [13]

[10]

2-6

()

()

-3

-2

-1

-7

()

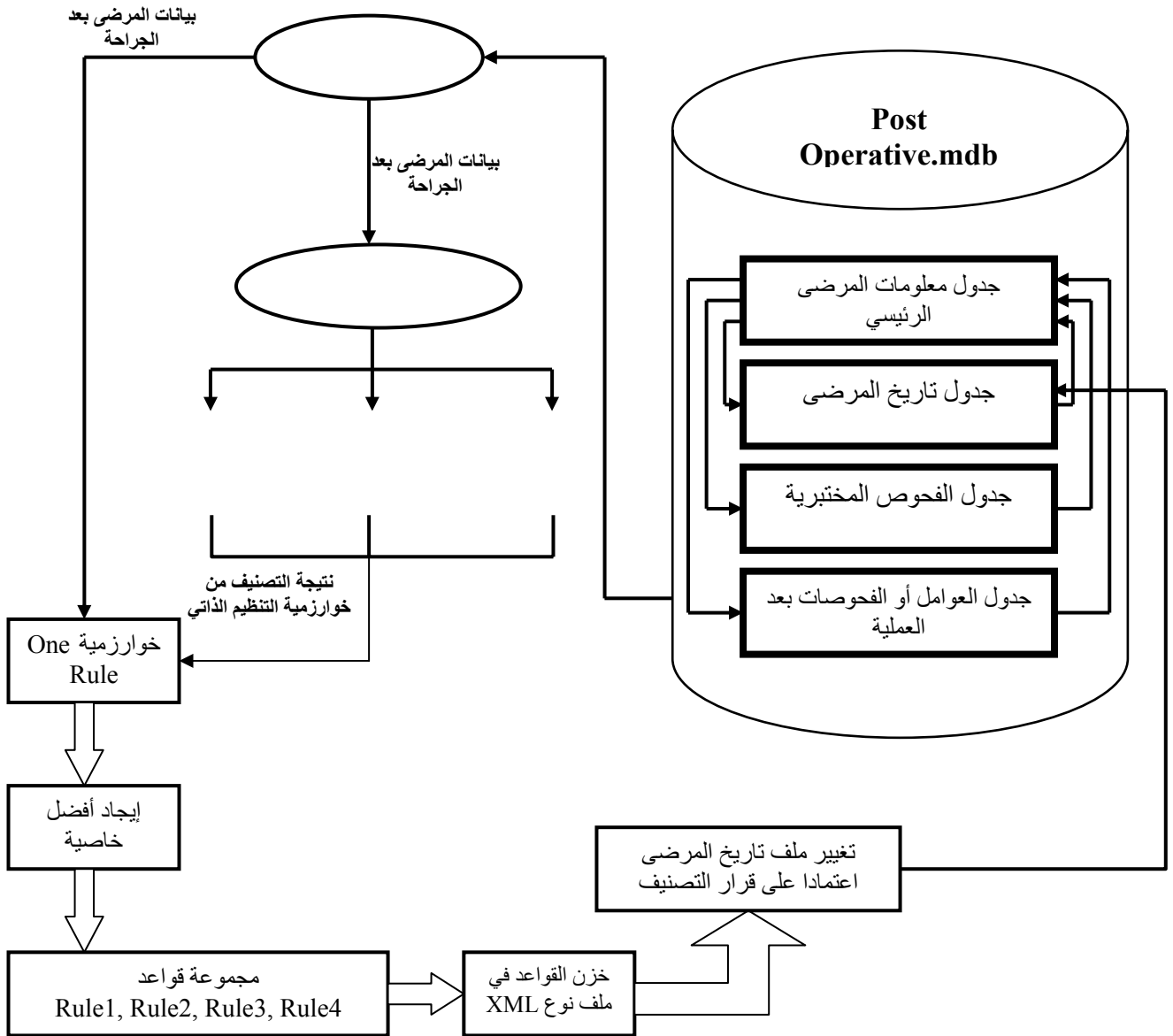
(1)

:

. [11]

:(1)

	()
) (37) (37 36 (36)	
) (36.5) (35 36.5 (35)	
) (98) (98 90 80) (80) (90	L-O2
) (130) (90 130 (90)	:(L-BP)
Stable,mod-stable,unstable	Surf-STBL
Stable-mod-stable,unstable	CORE- STBL
Stable-mod-stable,unstable	BP-STBL
	Comfort
I S A	



(2):

•

Ms Access 2000

:

:

(1)

...

.(1)

(2)

:

(2)

.(1)

(3)

(3)

.(1)

(4)

(4)

()

.(1)

(5)

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-9

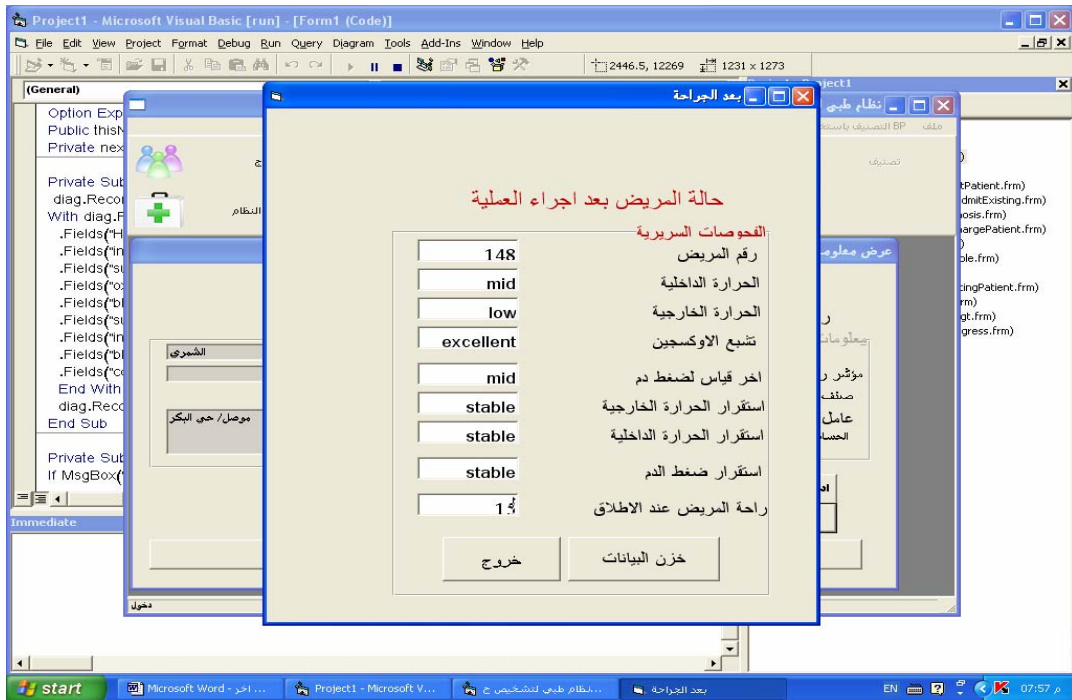
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(1)

.(3)



() (3):



(4):

) (2)

(4)

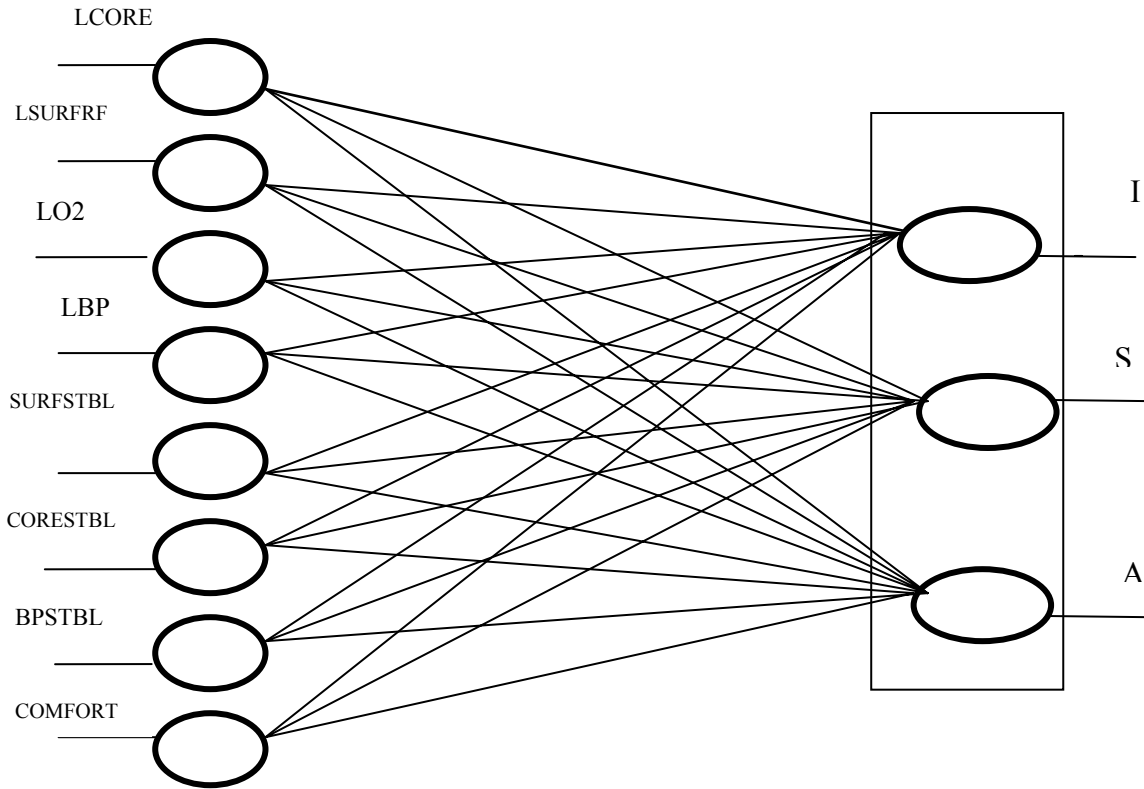
(

(Patterns)

(Symptoms)

Core_Stbl Surf_Stbl L_Bp L_O2 L_Surf L_Score)
 3 (BP_Stbl, Comfort

S I
 (5) A



:(5)

90 (Patterns)

0.02 (0.5) (300)

1

.(6)

:(6)

%75		0.02	1	600	0.5
%80		0.02	1	300	0.5
%75		0.002	1	1000	0.6
%63		0.002	1	700	0.6

...

One Rule (3)

()

(1)

One Rule

(

(6)

6

نتائج تدرب خوارزمية One Rule

Tools

BestRule	Total	Frequency	Class	UpperBound	LowerBound	Value	IsNumeric	Attribute	BestRule	IsNumeric	Attribute
False									False	False	bp_stbl
False									False	False	core_stbl
False									False	False	lbp
False									False	False	lb2
False									False	False	lscor
False									False	False	lsurf
False									False	False	surf_stbl
True	2	2	A	1.0	1.0	1.0	True	comfort			
True	1	1	S	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort	True	True	comfort
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	S	1.0	1.0	1.0	True	comfort			
True	1	1	A	1.0	1.0	1.0	True	comfort			
True	1	1	S	1.0	1.0	1.0	True	comfort			

تدقيق وزن فتح 1 خروج < إنهاء مساعدة

One Rule (6)

(4)

One Rule

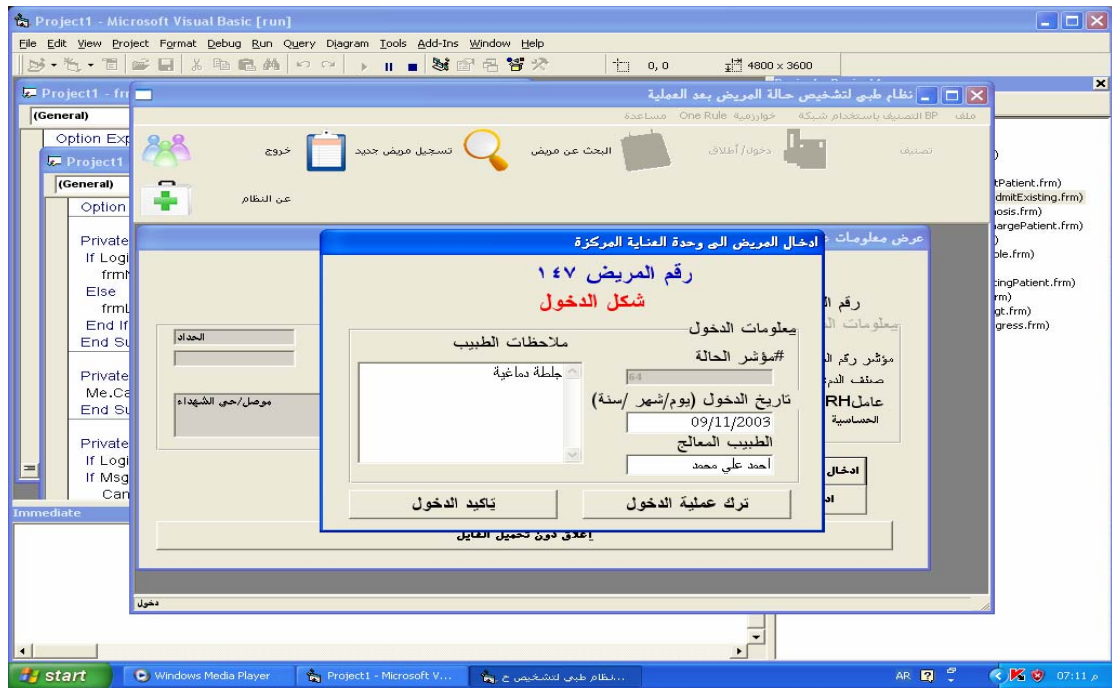
(7)

(8)

...



(7):



(8):

One Rule

-10

...

(1)

(1)

(2)

(3)

(I A S)

) A 42 mid =

() S (5) (

I

. [12] A

mid

mid=

- mid

mid

$$\frac{6}{48} = \frac{42 - 48}{48} =$$

S 10 A

High= ()

I

3

$$\frac{3}{13} = \frac{10 - 13}{13}$$

10

Low =

1 I 6 S 12 A ()

$$\frac{12 - 19}{19}$$

Low=

$$\frac{7}{19} =$$

(4)

$$\frac{7}{19} + \frac{3}{13} + \frac{6}{48}$$

(Low, High, Mid)

3

(5)

[12].

(6)

One Rule

-11

One Attribute (6)

One Rule

Xml

Comfort

One Rule

:(7)

Rule 1	If Comfort > or = 1 And Comfort <6 Then Diagnosis Is A
Rule 2	If Comfort > or = 6 And Comfort < 10 Then Diagnosis Is S
Rule 3	If Comfort > or = 10 And Comfort <15 Then Diagnosis Is A
Rule 4	If Comfort > or = 15 Then Diagnosis Is S

1

6

10 6

15 10

15

One Rule

90

81

One Rule

.%90 100

:

One Rule

(1)

One Rule

(2)

One Rule

.%80

%90

(3)

One Rule (4

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(9

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.(2004)

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(10

.2002

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C4.5 (11

.(2006) 28

(12

IBK,K-Means

.(2003)

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.CSPA' 2006

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(14

.2005

.(2005) "

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(15

(16

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<http://www.ics.uci.edu/~mlearn/MLsummary.html>
 [Postoperative-Patient-Data]size 90*8 class 90*1 ,1991.
 - 12) Tagbo, Kingsley, "Data Mining With One Rule Algorithm", 09, April, 2005.
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(1)

:(2)

Patient_No	Number	
SName	Text	
FName	Text	
Date_Of_Birth	Date/Time	
sex	logical	
Home_Add	Text	
State_of_Origin	Text	
Occupation	Text	
Phone	Number	
Name_of_Sponsor	Text	
Add_of_Sponsor	text	

:(3)

Patient No	Number	
Case Ref No	Number	
Admission Status	Text	
Date of Admission	Date/Time	
Name of Doctor	Text	
Doctors Diagnosis	Text	
Date of Surgery	Date/Time	
Date of Icu	Date/Time	
Note of Doctor	Memo	
Date of Discharge	Date/Time	
Status Upon Discharge	Text	

...

:(4)

Lab_Ref_No	Number	
Patient_No	Number	
Blood_Group	Text	
RhFactor	Text	Rh
Allergy	Text	

:(5)

Patient_No	Number	
L_Score	Text	
L_Surf	Text	
L_O2	Text	
L_Bp	Text	
Surf_Stbl	Text	
Core_Stbl	Text	
Bp_Stbl	Text	
Comfort	Number	
Postoperative_patient	Text	