結構化機器學習模型及其應用

第四次報告

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一、Representation

c_{11}	c_{12}	c_{21}	c_{22}	a_1	b_1	a_2	b_2
E	2	A	C	1	0	6	2
5	B	6	3	1	0	6	2

……

a_{15}	b_{15}	a_{16}	b_{16}
4	4	E	E
4	4	E	E

Feature(x) :

$x = [a_1, b_1, \ldots, a_{10}, b_{10}, a_{13}, b_{13}, \ldots, a_{16}, b_{16}]$ (28 Dim) ， a_i , b_i =0~E $\forall i$

$x \longrightarrow [x_1, x_2, \ldots, x_{111}, x_{112}]$ (112 Dim) ， $x_i = 0 \; or \; 1 \quad \forall i$

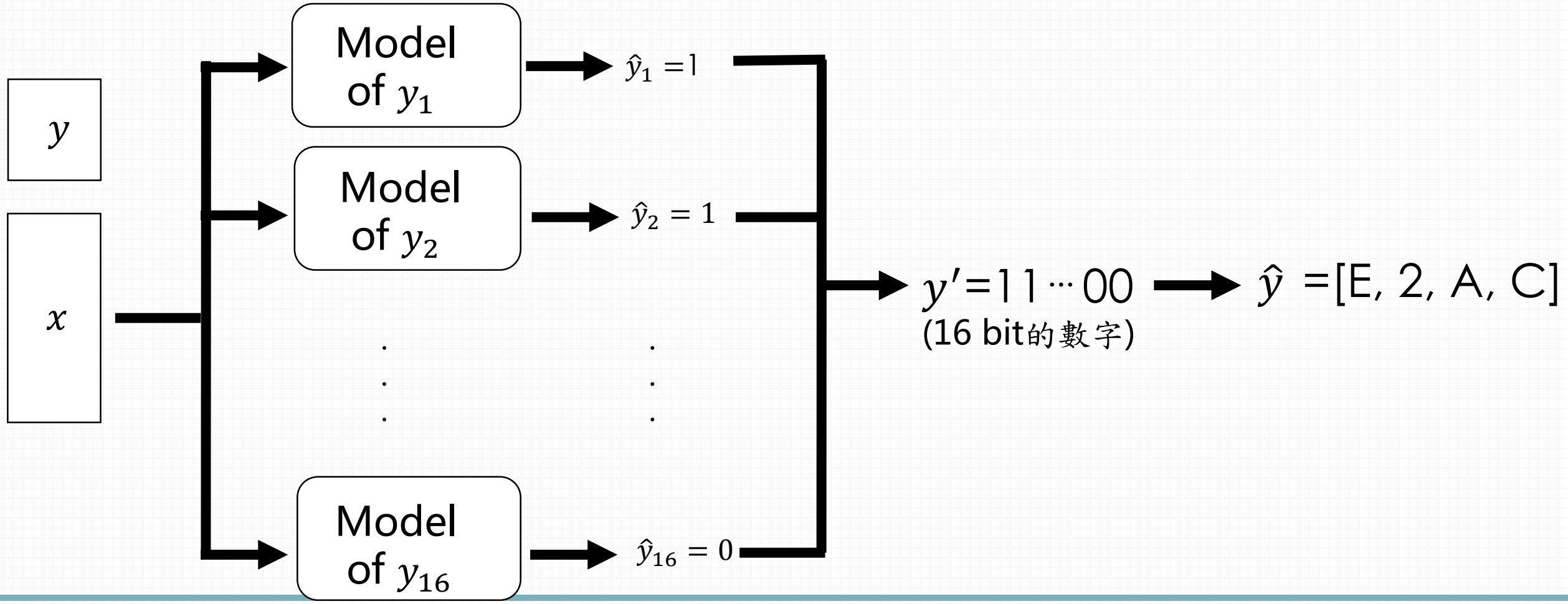
Label($y = [y_1, y_2]$) :

$y = [y_1, y_2] = [c_{11}, c_{12}, c_{21}, c_{22}] \longrightarrow y = 16$ bit$(000 \cdots 000 \sim 111 \cdots 111)$

$y \longrightarrow (y_1, y_2, \ldots, y_{15}, y_{16}) \quad y_i = 0$ or $1 \quad \forall i$=1~16

二、Model

Model(NN/CNN) for y



三、Result

Decision Tree:
depth=16

RandomForest:
estimator=100
depth=8

Train/Test: 70% / 30%

Model($y = [y_1, y_2]$)	Accuracy
Decision Tree	1.125%
RandomForest	1.06%
Model with DCTREE (SBS+Decision Tree)	17.60%
Model with NN	90.64%
Model with CNN	92.66%

三、Result

Result for Model of Neural Network(NN)

accuracy of Total test($y = [y_1, y_2] = [c_{11}, c_{12}, c_{21}, c_{22}]$) : 0.9064

training time : 4 hours 21 minutes

longest time of each bit : 17 minutes

number of parameters : 4322306

Result for Convolutional Neural Network(CNN)

accuracy of Total test($y = [y_1, y_2] = [c_{11}, c_{12}, c_{21}, c_{22}]$) : 0.9266

training time : 5 hours 23 minutes

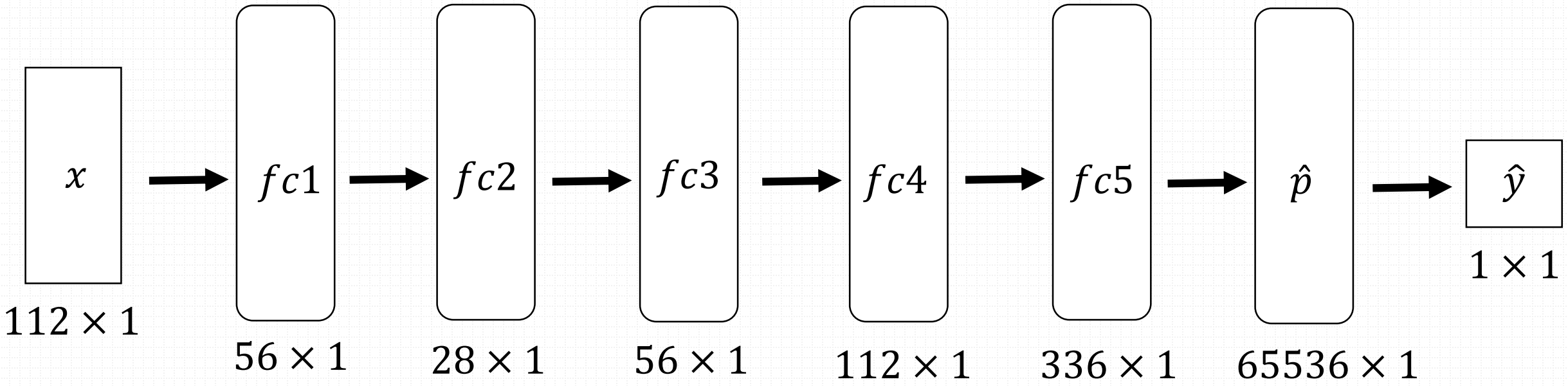
longest time of each bit : 21 minutes

number of parameters : 4269698

四、DeepNN

目的-確認我們的方法能藉由多個電腦平行化，比使用DeepNN所使用的訓練時間更短

DeepNN(比較實驗)



THE END

感謝聆聽