

# Youbike 缺車預測 及站點配置最佳化分析

[ W h y ]	[ W h a t ]	[ W h o ]	[ W h e n ] [ W h e r e ]	[ H o w ]
Youbike使用者上升， <ul style="list-style-type: none"><li>管理者:無法及時調度車輛</li><li>使用者:站點沒有車輛能租賃或滿位無法停放</li></ul>	<ul style="list-style-type: none"><li>管理者:預知站點缺車情況方便調度</li><li>使用者:預知站點情況方便借還車</li></ul>	<ul style="list-style-type: none"><li>使用者:一般民衆</li><li>管理者:業者與調度員</li></ul>	適用於臺北市任一 時間、地點	利用模型分析 進行缺車預測

## 資料處理

蒐集Youbike即時資料之API至MYSQL

增加時間欄位

取得氣象局開放數據之雨量、溼度、溫度

整理為以30分鐘做為間隔資料

刪除outlier

標準化

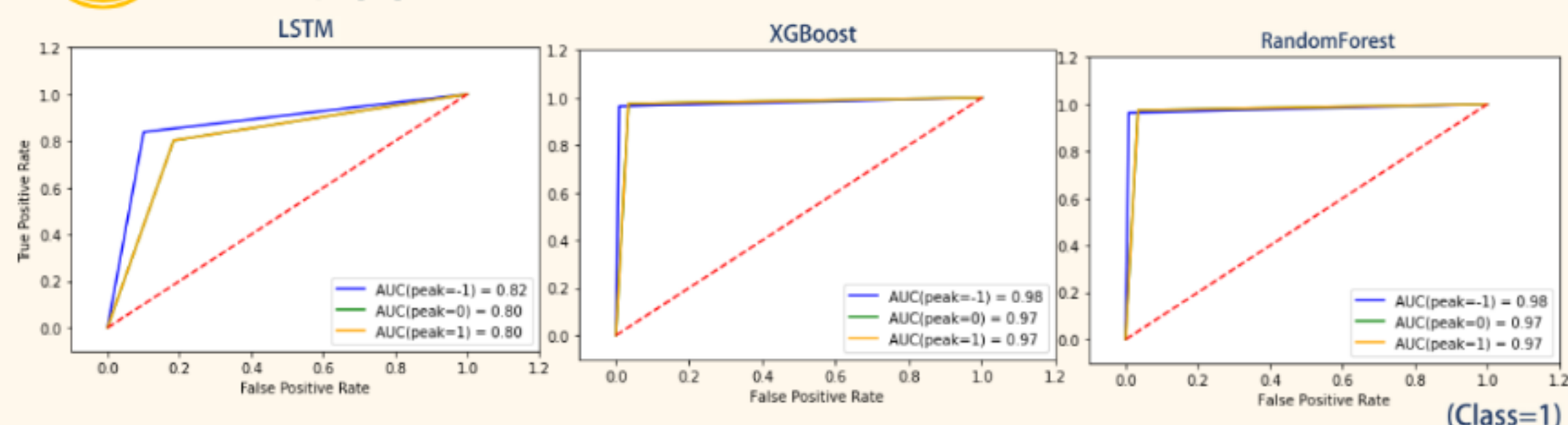
利用華德法將資料分三群

## 研究成果

### 1 分群前

模型	LSTM	RandomForest Classifier	XGBoost Classifier
參數	learning_rate=0.001 epochs=1 batch_size=300	n_estimators=110	learning_rate=1 max_depth=20 n_estimators=120
Accuracy train	0.72	0.724	0.739
Accuracy Test	0.75	0.961	0.961
F1 score	0.73	0.6960	0.719
AUC	0.78	0.7549	0.778
分類 AUC	Peak=-1 → 0.79 Peak=0 → 0.75 Peak=1 → 0.75	Peak=-1 → 0.794 Peak=0 → 0.739 Peak=1 → 0.739	Peak=-1 → 0.802 Peak=0 → 0.750 Peak=1 → 0.750

### 2 分群後



### 3 APP建置



模型	XGBoost		
	Class = 0	Class = 1	Class = 2
參數	learning_rate = 1.4 max_depth = 20	learning_rate = 1 max_depth = 16	learning_rate = 1 max_depth = 12
Accuracy Train	0.99	0.99	0.99
Accuracy Test	0.98	0.97	0.94
F1 score	0.98	0.97	0.93
AUC	0.98	0.98	0.95
分類 AUC	Peak = -1 → 0.99 Peak = 0 → 0.98 Peak = 1 → 0.98	Peak = -1 → 0.98 Peak = 0 → 0.97 Peak = 1 → 0.97	Peak = -1 → 0.96 Peak = 0 → 0.94 Peak = 1 → 0.94
模型	RandomForest		
	Class = 0	Class = 1	Class = 2
參數	random_state = 50 estimators = 110	random_state = 50 estimators = 50	random_state = 30 estimators = 30
Accuracy Train	0.99	0.99	0.99
Accuracy Test	0.97	0.97	0.94
F1 score	0.97	0.97	0.93
AUC	0.97	0.97	0.95
分類 AUC	Peak = -1 → 0.98 Peak = 0 → 0.97 Peak = 1 → 0.97	Peak = -1 → 0.98 Peak = 0 → 0.97 Peak = 1 → 0.97	Peak = -1 → 0.96 Peak = 0 → 0.93 Peak = 1 → 0.93
模型	LSTM		
	Class = 0	Class = 1	Class = 2
參數	learning_rate = 0.0001, batch_size = 300, epochs = 20, validation_split = 0.05	learning_rate = 0.001, batch_size = 300, epochs = 20, validation_split = 0.05	learning_rate = 0.001, batch_size = 300, epochs = 20, validation_split = 0.1
Accuracy Train	0.80	0.80	0.77
Accuracy Test	0.78	0.76	0.76
F1 score	0.77	0.78	0.74
AUC	0.81	0.82	0.79
分類 AUC	Peak = -1 → 0.83 Peak = 0 → 0.78 Peak = 1 → 0.78	Peak = -1 → 0.82 Peak = 0 → 0.80 Peak = 1 → 0.80	Peak = -1 → 0.81 Peak = 0 → 0.76 Peak = 1 → 0.76

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