Forecast the daily traffic from Facebook fan page to content website for TC Incubator

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### Business Problem

- **Social Media Marketing dept**

  - Scheduled and posted.

  - See the posting result based on the result from this week to plan next week posting.

- Marketing team has no serious A/B testing method to plan the posting strategy.

- See the posting result.
Goal

Provide a tool that TC will be more convenient to compare the traffic from the different categories of posting.

Stakeholders

Social Media Marketing department (Social Manager)

Challenge/Opportunity

1. More Efficiency for the planning of posting.
2. Increase website traffic.
3. Apply it to other business client.
4. Without data analyst maintain and implement forecasting.
Forecasting
Goal

“Predict traffic from the Facebook page into the TC official website in the next 7 days, with different categories of posts.”
Forecasting Process

Define business & forecasting goal

Get data
Both GA and performance of Facebook posts

Explore & Visualize series
By using Tableau

Pre-process data
- Aggregate data (from hourly to daily)
- Label & theme the theme of the Facebook post (include Jinrih toolbox, Jinrih planning, Jinrih growth, Jinrih check-in, Jinrih attitude, Jinrih brand)
- Exclude outlier data
- Check each lag of value & 6 theme of post

Implement
Provide TC a tool which evaluate in what time post which kind of theme could get best traffic to their content website.

Partition series
- The last two week validation period

Evaluate & Compare performance
- Chart
- MAPE

Apply forecasting method
- Linear Regression
- Neural Network
- Ensemble
**Data Description**

Source: Google Analytics set up by TC
Measure: hourly traffic
Time period: 2018.08.01~2018.11.31
Type: Hourly

**Pre-processing**

Aggerate data (hourly - daily) → Remove the outlier → Label&Map the theme of post → Check each lag of value & six themes of post

<table>
<thead>
<tr>
<th>Time</th>
<th>Traffic</th>
<th>Jinrih toolbox</th>
<th>Jinrih planning</th>
<th>Jinrih growth</th>
<th>Jinrih check-in</th>
<th>Jinrih attitude</th>
<th>Jinrih brand</th>
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</thead>
<tbody>
<tr>
<td>2018/9/1</td>
<td>(Total in day)</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2018/9/2</td>
<td>(Total in day)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
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</tbody>
</table>
Method

Benchmark: Naive

Model: Regression, Neural Network, Ensemble
(with external data including 6 different posting theme and Lag)

Performance:
1. Chart
2. MAPE
Results & Evaluation

Series

- Ensemble
- NNet
- Linear
- Actual
<table>
<thead>
<tr>
<th></th>
<th>RMSE</th>
<th>MAPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>347.6232</td>
<td>52.999353</td>
</tr>
<tr>
<td>NNet</td>
<td>421.7101</td>
<td>57.05525</td>
</tr>
<tr>
<td><strong>Ensemble</strong></td>
<td><strong>287.8759</strong></td>
<td><strong>40.70686</strong></td>
</tr>
<tr>
<td>Naive</td>
<td>322.7974</td>
<td>45.5156</td>
</tr>
</tbody>
</table>

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<tr>
<th></th>
<th>RMSE</th>
<th>MAPE</th>
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</thead>
<tbody>
<tr>
<td>Linear</td>
<td>504.17</td>
<td>100.417</td>
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<tr>
<td>NNet</td>
<td>417.9051</td>
<td>68.5472</td>
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<tr>
<td>Ensemble</td>
<td>373.5245</td>
<td>68.40184</td>
</tr>
<tr>
<td>Naive</td>
<td>322.7974</td>
<td>45.5156</td>
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</tbody>
</table>
Implement

Update the traffic data (From GA)

Fill the past data in the excel file

Run R code and get the suitable post strategy next week.

Use the forecast outcome.

Social media manager can try new post strategy for next week of post theme

Control Group

Test Group
We suggest them to record the adjustment and promotion they have done in A/B testing, cause variables effect a lots.

We suggest them to use forecast as a tool to do A/B testing more serious.

If shiny interface is needed by client, we can assist them to conduct it.

In the future, we can combine outsource API to automate data collection to offer complete solution.