Opinion based Intelligent Recommender System

Objective

1. Develop a Web Application (Twitter Sentiment Visualizer) to extract public sentiment data toward a brand name
2. Integrate sentiment data into recommendation algorithm (Sentiment-enhanced Collaborative Filtering)

Twitter Sentiment Visualizer

Technology:
- Python 3.5, VADER Sentiment, SQLite 3
- Dash by Plotly.js

Features:
(a) Sentiment Scatter Plot (b) Sentiment Pie Chart (c) Top 10 Representative Bigrams and (d) Recent Tweets Table

Web page UI (with brand 'Samsung'):

Sentiment-enhanced Collaborative Filtering

Dataset: Amazon 5-core (ratings & reviews)

Algorithms:
- Singular Value Decomposition (SVD)
- SVD++
- Non-negative Matrix Factorization (NMF)

Performance Metrics:
- Root Mean Square Error (RMSE)
- Mean Absolute Error (MAE)

Technology:
- Python 3.5, VADER Sentiment, Surprise

Result:

<table>
<thead>
<tr>
<th>MAE with sentiment</th>
<th>SVD</th>
<th>SVD++</th>
<th>NMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6925</td>
<td>0.6873</td>
<td>0.8158</td>
<td></td>
</tr>
<tr>
<td>MAE without sentiment</td>
<td>0.8937</td>
<td>0.8866</td>
<td>1.0177</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RMSE with sentiment</th>
<th>SVD</th>
<th>SVD++</th>
<th>NMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9024</td>
<td>0.9005</td>
<td>1.0658</td>
<td></td>
</tr>
<tr>
<td>RMSE without sentiment</td>
<td>1.1563</td>
<td>1.1587</td>
<td>1.3424</td>
</tr>
</tbody>
</table>

Conclusion:

1. Social media (Twitter) data can be extracted and processed to help user understand public opinion toward particular brand name
2. Integrating sentiment data improved the performance of a recommender system

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