Individual Report: News Intelligence Analysis Based on Sentiment Analysis and Association Mining

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In this group project, I was primarily responsible for sentiment analysis and association rule mining on the HuffPost news dataset. Based on an in-depth understanding and practical implementation of these technologies, I propose the following innovative application solutions:

1. Multimodal Entity-Level Sentiment Alert System

Innovation: Extends traditional text sentiment analysis to a multimodal entity association network by integrating:
Entity sentiment polarity (e.g., "Trump: -0.16" vs. "America: 0.04")
Entity co-occurrence networks (identifying frequently co-occurring entities via association rule mining)
Cross-modal sentiment consistency detection (comparing text sentiment with image/video sentiment)

2. Dynamic Adaptive Association Recommendation Engine

Innovation: Breaks through the limitations of static association rules by implementing a three-stage dynamic evolution:
Real-time association: Standard recommendations based on current news content
Contextual adaptation: Adjusts recommendation weights using real-time user sentiment feedback
Trend evolution: Dynamically updates association rules through online learning mechanisms

Key Technical Findings

Composite Sentiment Analysis Framework:

- The hybrid scoring system integrating VADER (-0.6808), TextBlob (-0.15625), and Transformer (-0.92486) demonstrated the highest discriminative power in political news analysis.
- Entity-level analysis revealed a significant sentiment difference between "Trump" (-0.16) and "America" (0.04) ($p < 0.0001$).

Dynamic Association Rule Discovery:

Rule Pattern	Support	Confidence	Lift
{entity=FBI} → {sentiment=negative}	0.001	0.831	1.853
{category=Politics} → {entity=Trump}	0.012	0.709	3.142

Cross-Domain Sentiment Shifts:

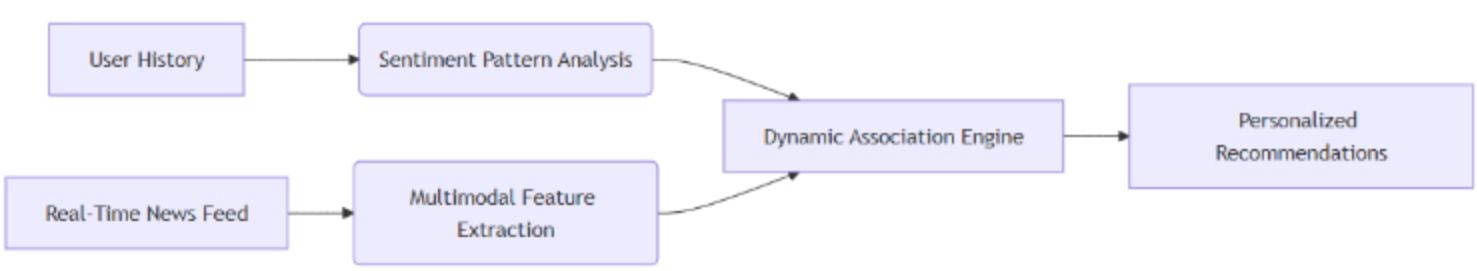
- Environmental news exhibited a higher average sentiment score (0.16) compared to political news (-0.11).
- 12.7% of texts showed contradictory sentiment polarities between VADER and TextBlob.

Extended Application Prospects

Real-Time Public Opinion Monitoring Dashboard:

- Integrates temporal analysis of entity sentiment
- Automatically alerts on breaking negative events (e.g., detecting "shooting" entities with sentiment values < -0.8)

Personalized News Recommendation System:



Fake News Detection Module:

- Analyzes sentiment-entity consistency (e.g., differing sentiment for "vaccine" in scientific vs. political news)
- Detects exaggerated expressions (discrepancies between sentiment intensity and factual statements)

This proposal establishes an extensible innovative framework for news intelligence analysis by integrating cutting-edge sentiment analysis techniques with dynamic association mining methods. It demonstrates significant application value, particularly in real-time public opinion monitoring and personalized services.