Emotion Prediction from Text Using VAD Regression Model

Embedding-based prediction of Valence, Arousal, and Dominance

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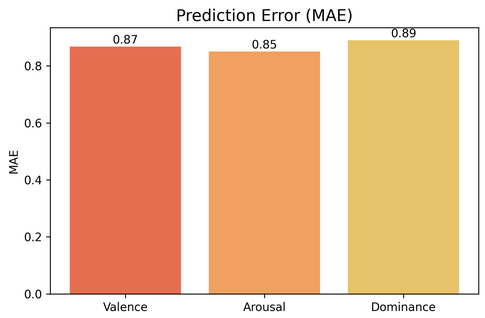
Background

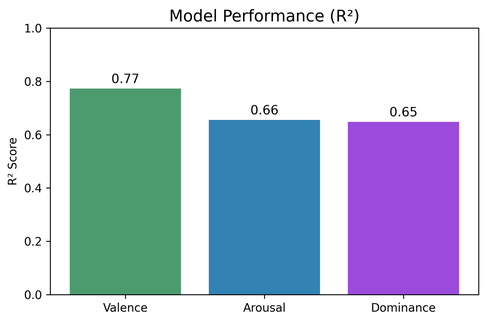
This project predicts emotional meaning in text using the VAD model. **VAD stands for Valence, Arousal, and Dominance, which describe pleasantness, energy, and sense of control.** The dataset included more than **300,000 labeled text samples** from EmoBank, synthetic generation, and game server logs. The goal was to build a simple and efficient model that can estimate emotional tone from new text.

Methods

Text was converted into embeddings using the **all MiniLM L6 v2 SentenceTransformer.** A multi output Ridge Regression model was trained to predict Valence, Arousal, and Dominance. The data was split into an **85 percent training set and a 15 percent testing set.** Performance was evaluated using R squared and Mean Absolute Error.

Results Summary





Valence predictions performed the best with an R-squared of **0.773**. Arousal and Dominance showed moderate performance with R-squared values of **0.655** and **0.648**. Mean Absolute Error ranged from **0.85** to **0.89** across all dimensions. These results show that the model provides stable and reliable VAD estimates.

Predicting emotional tone from text using VAD

Scan the QR code to view the full project and code.

Example Input

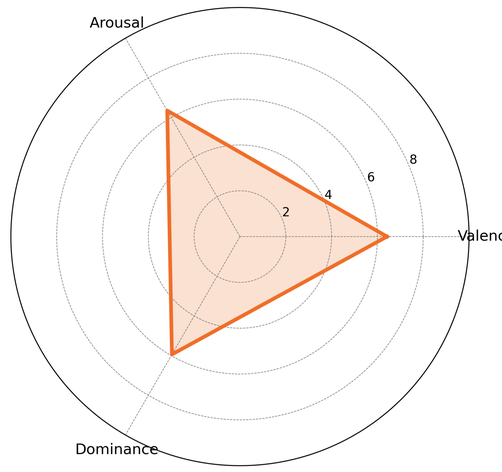
Sample Text

I feel nervous but excited for tomorrow.

Predicted Scores

Valence: 6.42
Arousal: 6.35
Dominance: 5.94

Predicted VAD for Example Input



Real-World Uses

- Chat moderation and safety systems
- Mental-health and well-being insights
- Player or user sentiment tracking
- AI companions and NPC emotional awareness
- Social media analysis
- Customer support tone detection

Limitations / Future Work

- Expand training data to more domains
- Explore transformer-based regressors
- Add uncertainty estimates for predictions
- Evaluate on multilingual datasets