Twitter Bot Prototypes – Project Write-Up

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Overview

This project involved building a series of prototypes for an AI-powered Twitter (X) bot that generates, scores, and posts replies automatically. The work demonstrates how GPT-based language models, embeddings, and sentiment/context analysis can be integrated into a social media automation workflow.

Features & Approach

- **Reply Generation:** Used GPT-4 with few-shot examples to generate replies in varied tones (serious, hype, sarcastic, etc.).
- **Style Classification:** Classified tweet types (meme, education, shill) using Sentence-Transformers embeddings.
- **Context Enrichment:** Scraped URLs for summaries, generated image captions with BLIP, and analyzed comments for sentiment to adjust tone.
- **Candidate Scoring:** Generated multiple replies, then ranked them using heuristics for likely engagement quality.
- **Automation:** Connected to Twitter's API to fetch recent tweets, run pipelines, and post selected replies.

Results

The system successfully demonstrated the end-to-end workflow of fetching tweets, enriching context, generating multiple candidate replies, scoring them, and posting automatically via the Twitter API. Sample outputs included:

Example 1

Post: "By popular demand, Gemini Credit Card holders can now swap their current card for the orange bitcoin credit card at no extra cost."
Generated Reply: "That's some exciting news! It's great to see that Gemini is listening to its customers' preferences. Just a question – will there be any changes to the card's benefits or terms when switching to the orange Bitcoin card?"

Example 2

Post: "Altcoin szn loading... slowly..."
Generated Reply: "Dial-up internet vibes"

Example 3

Post: "$BOSS @bossonbonk trading is now LIVE on #BitgetSpot."
Generated Reply: "Strap in, folks. We're going interstellar"

Example 4

Post: "From the hidden markets of fortune, the Order of the Jackalope leaps into Transylvania..."
Generated Reply: "Transylvania's pulsing, are you? Join the Jackalope Order at our booth!"
Estimated Engagement Score: 70/100 (rationale: playful tone, direct invitation to participate)

Limitations

- **Reply Quality:** The model struggled with maintaining consistent style. Some replies were witty and natural, while others were generic or awkward or plainly incorrect in perspective, such as reply 4 acting like a salesman rather than a regular X user.
- **Training Coverage:** Limited few-shot data reduced its ability to capture nuanced CT-style tones.
- **API Rate Limits:** Free-tier Twitter (X) API restricted replies to one every 15 minutes, limiting throughput.
- **Engagement Scoring:** Heuristic scoring did not always align with actual engagement outcomes.

Tech Stack

- Python (Tweepy, Requests, BeautifulSoup, Pandas, NumPy, Torch)
- OpenAI GPT-4 for text generation
- SentenceTransformers for embeddings/classification
- HuggingFace Transformers for image captioning and sentiment
- Twitter API v1.1/v2 for automation

Future Improvements

- Expand dataset with more diverse style examples
- Introduce reinforcement learning or engagement feedback loops
- Build a monitoring dashboard for replies and engagement
- Add more sophisticated scoring mechanisms

Conclusion

This prototype highlights the feasibility of building an automated social media agent with GPT-based models, while also identifying key challenges in style consistency, engagement prediction, and API limitations.