Artificial Intelligence Analysis of GLP-1RA Social Media Posts

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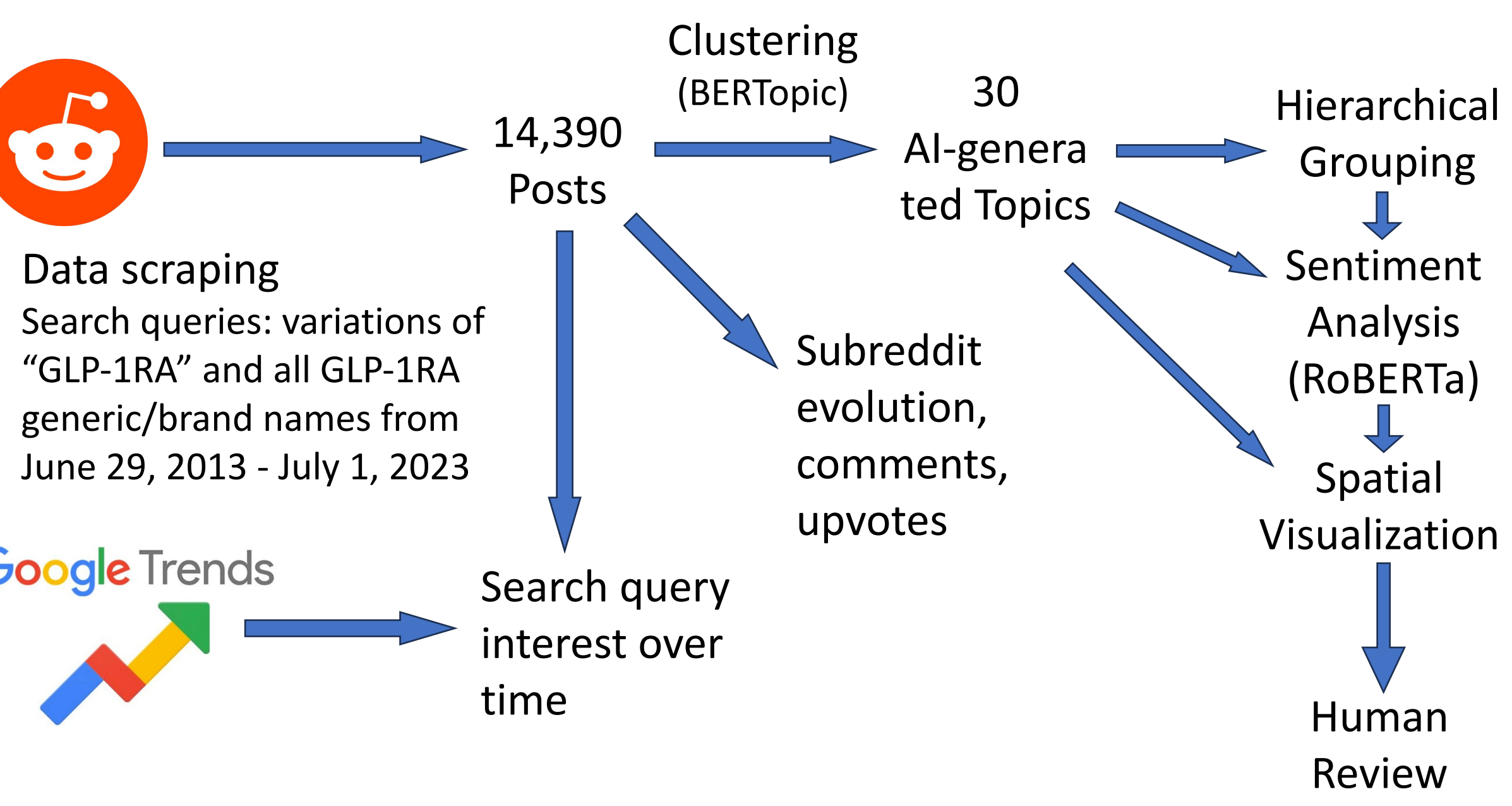
BACKGROUND

- Glucagon-like-peptide-1 receptor agonists (GLP-1RA, e.g., Ozempic)) are a medication class initially approved to treat type-2 diabetes[1] and recently found to have significant weight-loss and cardioprotective effects[2]
- GLP-1RA have surged in popularity but no study has systematically analyzed the content of media posts
- We aimed to use artificial intelligence (AI) to analyze public perceptions of GLP-1RA on social media

METHODS

Data scraping
Search queries: variations of "GLP-1RA" and all GLP-1RA generic/brand names from June 29, 2013 - July 1, 2023

14,390 Posts → Clustering (BERTopic) → 30 AI-generated Topics → Hierarchical Grouping → Sentiment Analysis (RoBERTa) → Spatial Visualization → Human Review

Subreddit evolution, comments, upvotes

Google Trends → Search query interest over time

CONCLUSIONS

1. AI can generate insights on perceptions of GLP-1RA on social media, which may guide strategies for:
   - overcoming barriers to GLP1-RA use
   - addressing misinformation
   - identification of new groups interested in using these medications who may warrant further study
2. Sentiment analysis requires modification for healthcare

References: (1) Drucker DJ, Buse JB, Taylor K, Kendall DM, Trautmann M, Zhuang D, Porter L. Exenatide once weekly versus twice daily for the treatment of type 2 diabetes: a randomised, open-label, non-inferiority study. *The Lancet.* 2008;372(9645):1240-1250. (2) Ryan DH, Lingvay I, Colhoun HM, et al. Semaglutide effects on cardiovascular outcomes in people with overweight or obesity (SELECT) rationale and design. *American heart journal.* 2020;229:61-69.

RESULTS
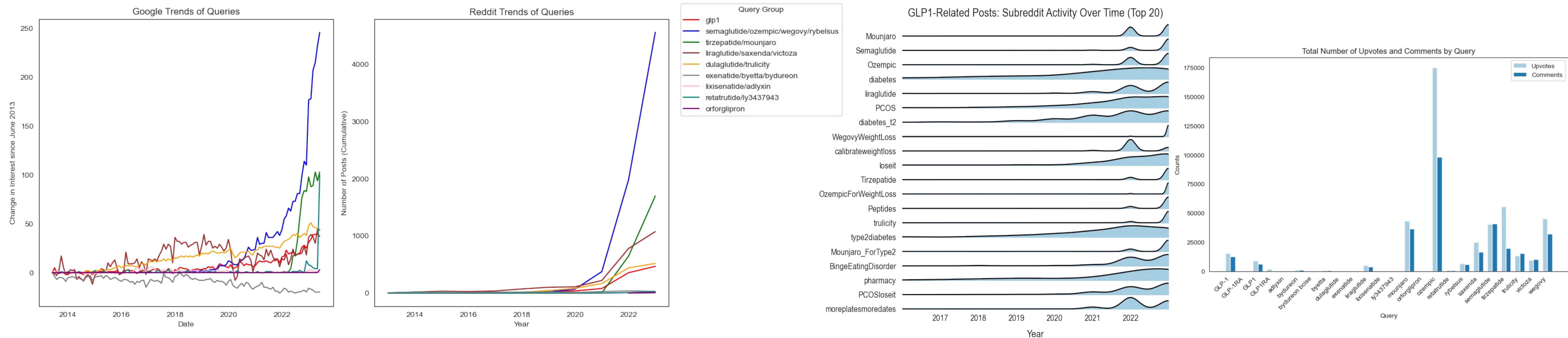
Figure 1. Interest in GLP-1RA search query groups On Google Trends (Left) and Reddit (Right) over the last decade. Queries for brand names were grouped under the shared generic name.

Figure 2. Left: Post activity over time in the top 20 most posted subreddits (Reddit communities). Right: Upvotes and comments by search query.
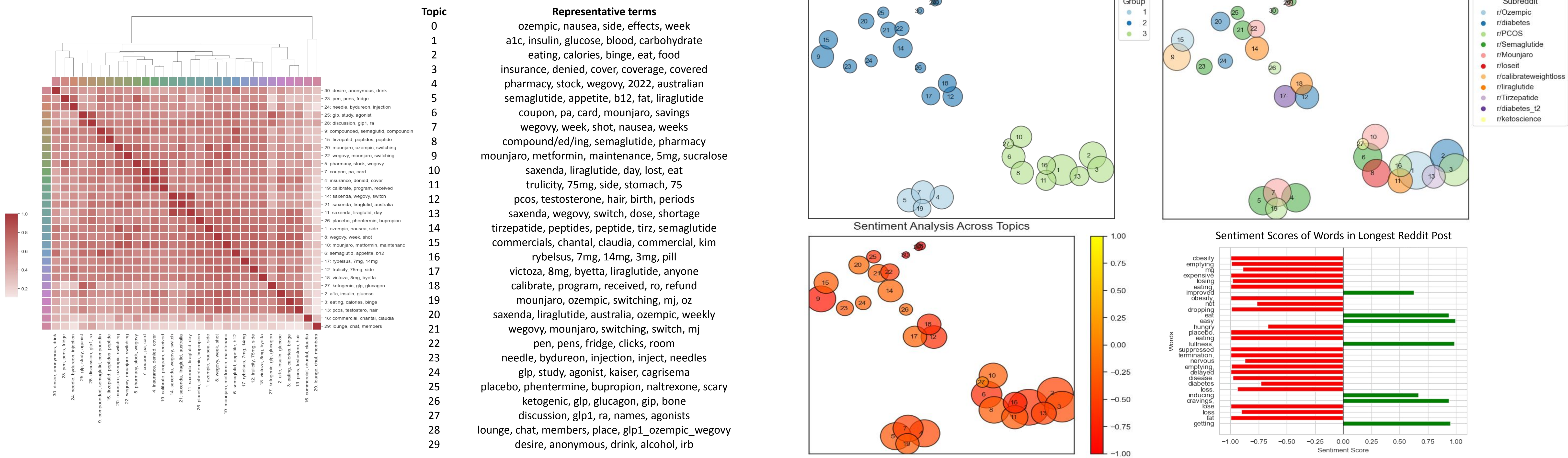
Figure 3. Left: Similarity matrix of AI-generated topics with dendrogram of hierarchical relationships between topics. Right: table with representative terms for each topic.

Topic	Representative terms
0	ozempic, nausea, side, effects, week
1	a1c, insulin, glucose, blood, carbohydrate
2	eating, calories, binge, eat, food
3	insurance, denied, cover, coverage, covered
4	pharmacy, stock, wegovy, 2022, australian
5	semaglutide, appetite, b12, fat, liraglutide
6	coupon, pa, card, mounjaro, savings
7	wegovy, week, shot, nausea, weeks
8	compound/ed/ing, semaglutide, pharmacy
9	mounjaro, metformin, maintenance, 5mg, sucralose
10	saxenda, liraglutide, day, lost, eat
11	trulicity, 75mg, side, stomach, 75
12	pcos, testosterone, hair, birth, periods
13	saxenda, wegovy, switch, dose, shortage
14	tirzepatide, peptides, peptide, tirz, semaglutide
15	commercials, chantal, claudia, commercial, kim
16	rybelsus, 7mg, 14mg, 3mg, pill
17	victoza, 8mg, byetta, liraglutide, anyone
18	calibrate, program, received, ro, refund
19	mounjaro, ozempic, switching, mj, oz
20	saxenda, liraglutide, australia, ozempic, weekly
21	wegovy, mounjaro, switching, switch, mj
22	pen, pens, fridge, clicks, room
23	needle, bydureon, injection, inject, needles
24	glp, study, agonist, kaiser, cagrisema
25	placebo, phentermine, bupropion, naltrexone, scary
26	ketogenic, glp, glucagon, gip, bone
27	discussion, glp1, ra, names, agonists
28	lounge, chat, members, place, glp1_ozempic_wegovy
29	desire, anonymous, drink, alcohol, irb

Figure 4. Spatial representation of 30 AI generated topics filtered by overarching group (top left; (1) insurance and cost (2) medication-related blogs, and (3) diabetes/diet), most frequent subreddit per topic (top right), mean post sentiment per topic (bottom left). Bottom right shows an example of the sentiment of each word in the longest Reddit post.