

A Multimodal Analysis of Influencer Content on Twitter

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Social Media Influencers

Social media influencers are **content creators** who have established credibility in a specific domain (e.g., fitness, technology), are followed by a large number of accounts and can **impact the buying decisions** of their followers.



Influencer Marketing

- **Influencer marketing** is more effective than traditional paid advertising.
- Online creators can help brands reach new, engaged audiences through endorsements and product placements, **leveraging the trust** these influencers have built with their followers.

Influencer Marketing

Influencer marketing is dominated by **native advertising**

- there is no obvious distinction between **commercial** and **non-commercial** content

Chunky knits and dainty jewels.
🍂🐺🍂 This is my favorite vintage
sweater 🍂🐺🍂 #lovechupi



Detecting commercial content

Automatically identifying commercial content by influencers is important

- **Transparency:** it helps ensure transparency in advertising and marketing.
- **Consumer Protection:** it protects consumers from deceptive advertising.
- **Regulatory Compliance:** some countries have laws and regulations governing advertising and disclosure requirements for influencers and brands.
- **Analysis of commercial language** characteristics on a large scale.

Detecting commercial content

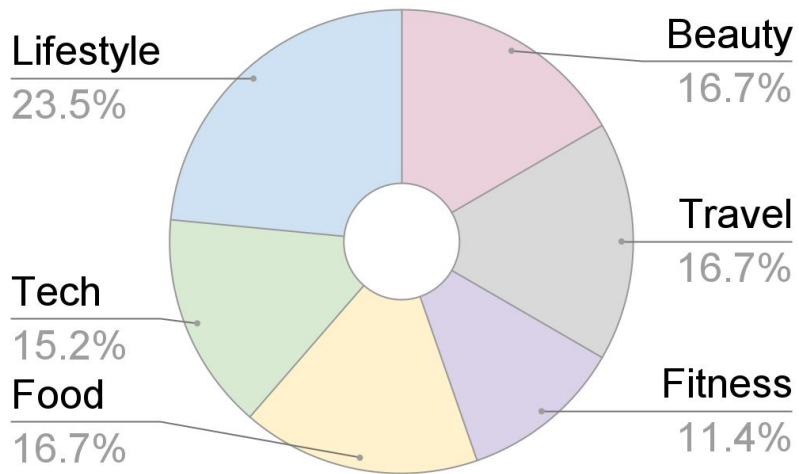
Automatic detection of influencers commercial content is difficult.

- Disclosure guidelines (including keywords such as #ad, #sponsored) are not always followed
- Brand cues may appear in different modalities such as text and images

Multimodal Influencer Content Dataset (MICD)

A large publicly available dataset of 14,384 text-image pairs and 1,614 text-only influencer tweets written in English.

- 132 Influencer Accounts
- 6 domains
- Jan 2015- Aug 2021



Multimodal Influencer Content Dataset (MICD)

Tweets are mapped into commercial and non-commercial categories

- Keyword-based Weak Labeling (train & dev sets)
- Human Data Annotation (test sets)

Multimodal Influencer Content Dataset (MICD)

Keyword-based Weak Labeling

Extend the keyword lists (verified by members of a national consumer authority)

- Disclosure terms: #ad, #sponsored
- Terms relevant to different business models:
 - Gifting: #gift
 - Endorsements: #ambassador
 - Affiliate marketing: #aff
- All of the keywords used for data labeling are removed for the experiments

Multimodal Influencer Content Dataset (MICD)

Human Data Annotation (test sets)

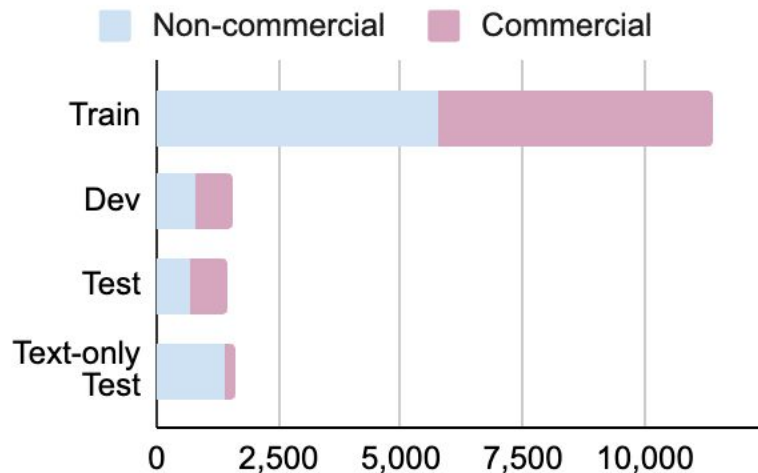
- Four annotators with a substantial legal background and knowledge of advertising regulation
- The inter-annotator agreement between two annotations across all tweets is 0.78 Cohen's-Kappa – substantial agreement — and 0.73 Krippendorff's alpha.

Multimodal Influencer Content Dataset (MICD)

Data Splits

Account-level splits

Split	Total
Train	11,377 (79.1%)
Dev	1,572 (10.9%)
Test	1,435 (10%)
Text-only Test	1,614
All	15,998



Multimodal Influencer Content Dataset (MICD)

Dataset	Publicly Available	Posts w/o brand mentions	Human Annotation	Keyword Matching	No. of Commercial Keywords	Platform	Modality	Time Range	Domains
Han et al. (2021)	✗	✗	✗	✗	0	Twitter	Text	not specified	fashion
Zarei et al. (2020)	✗	✓	✗	✓	7	Instagram	Text	Jul 2019 - Aug 2019	not specified
Yang et al. (2019)	✗	✗	✗	✓	3	Instagram	Text & Image	not specified	not specified
Kim et al. (2021b)	✓	✓	✗	✓	3	Instagram	Text & Image	not specified	not specified
Kim et al. (2020)	✓	✗	✗	✓	1	Instagram	Text & Image	Oct 2018 - Jan 2019	beauty, family, food, fashion, pet, fitness, interior, travel,
MICD (Ours)	✓	✓	✓	✓	26	Twitter	Text & Image	Jan 2015 - Aug 2021	beauty, travel, food fitness, technology, lifestyle

Comparison of existing datasets for influencer content analysis

Influencer Content Classification Models

Prompting

- Flan-T5 (zero-shot, few-shot)
- GPT-3 (zero-shot, few-shot)

Text-only

- BiLSTM-Att
- BERT
- BERTweet

Image-only

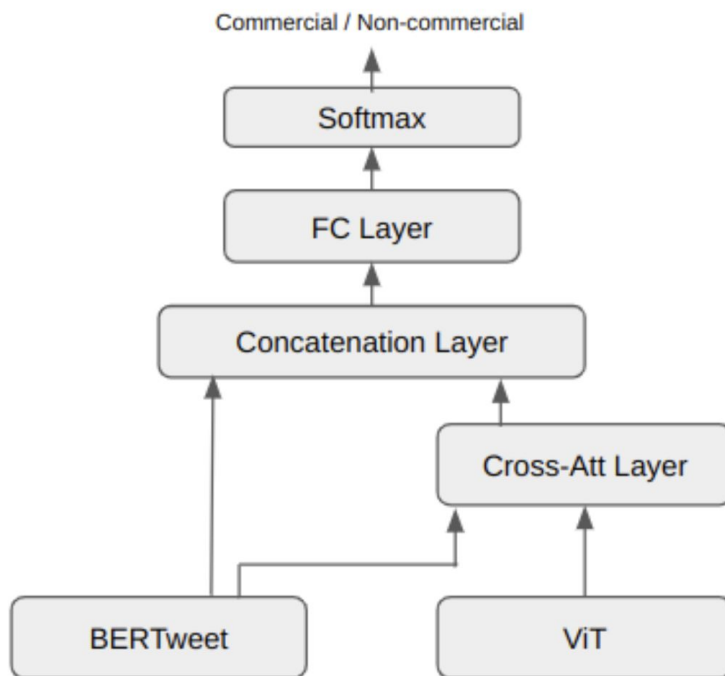
- ResNet
- ViT

Text & Image

- ViLT
- LXMERT
- MMBT
- Aspect-Att
- ViT-BERTweet-Att (Ours)

ViT-BERTweet-Att

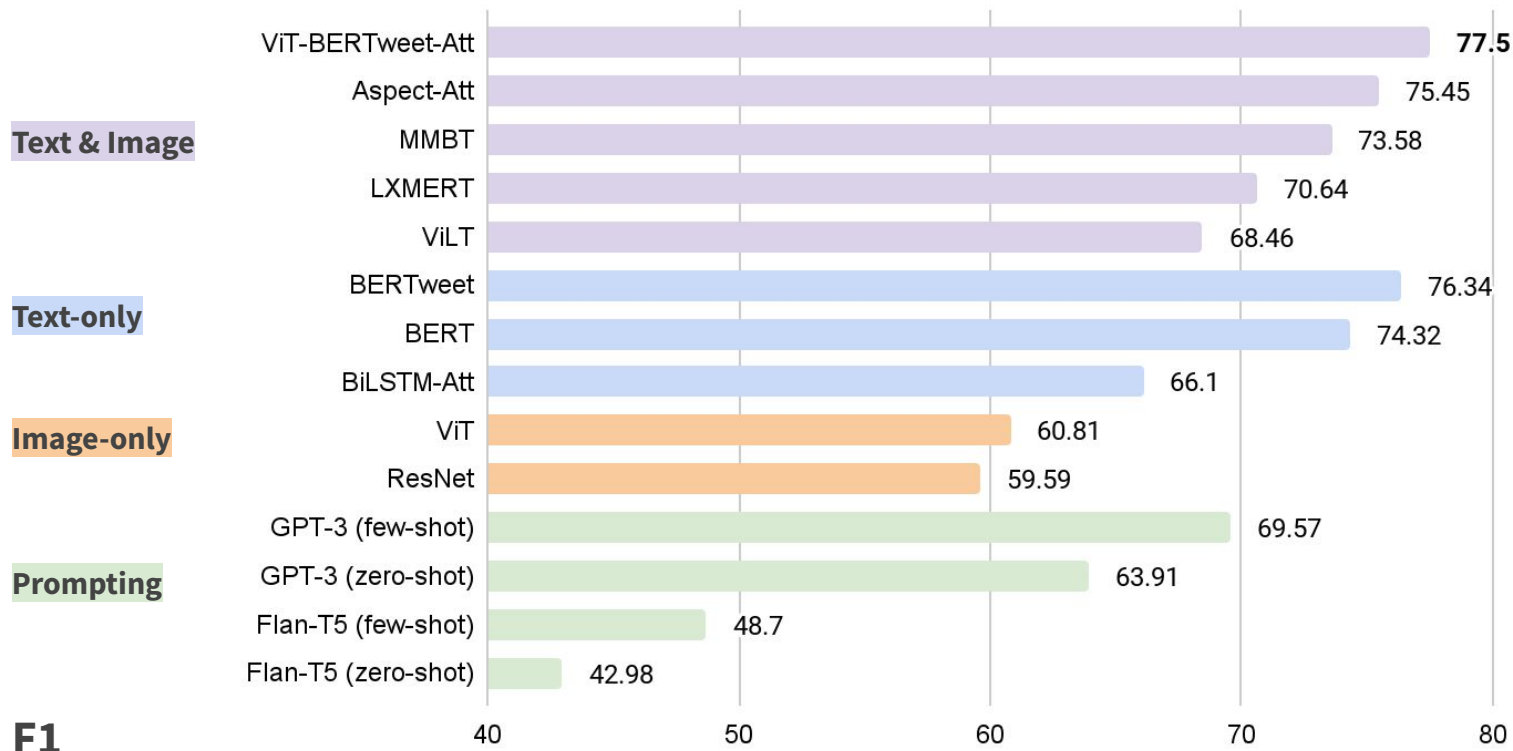
Combine unimodal pretrained representations via cross-attention fusion strategy so that text features can guide the model to pay attention to the relevant image regions.



For a truly beautiful and delicate summer fragrance you have to try USER's newest scent



Identifying Commercial Influencer Content



F1

Identifying Commercial Influencer Content

Text-only Test Set

Text & Image

ViT-BERTweet-Att

88.69

Text-only

BERTweet

87.5

Prompting

GPT-3 (few-shot)

84.03

Flan-T5 (few-shot)

82.22

Most Freq. Class

Most Freq.

78.55

75

80

85

90

F1

Analysis

- Multimodal modeling captures context beyond keyword-matching.

Just seen that Pepsi ad...awkward.

ViT-BERTweet-Att: NC

- Multimodal modeling aids in the discovery of undisclosed commercial posts



chunky knits and dainty
jewels. This is my favor-
ite vintage sweater
#lovechupi

Actual: C

BERTweet: NC

ViT-BERTweet-Att: C

Analysis

Challenging cases for text and multimodal models:

- Posts that describe their “personal” experiences, particularly while traveling
- Posts include “natural photos” rather than product promotions



Cherry tree hill is hands down the best view in #Barbados.

#VisitBarbados

Actual: C

BERTweet: NC

ViT-BERTweet-Att: NC

Summary

- Introduced a novel dataset of multimodal influencer content consisting of tweets labeled as commercial or non-commercial.
- First dataset to include high quality annotated posts by experts in advertising regulation.
- Experiments including vision, language and multimodal approaches for identifying commercial content
- Multimodal modeling is useful for identifying commercial posts
 - Reducing the amount of false positives
 - Capturing relevant context that aids in the discovery of undisclosed commercial posts.
- Dataset: <https://github.com/danaesavi/micd-influencer-content-twitter>

THANKS