

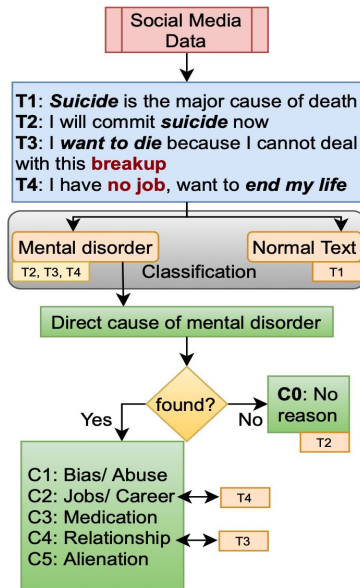
CAMS: An annotated Corpus for Causal Analysis of Mental Health Issues in Social Media Posts

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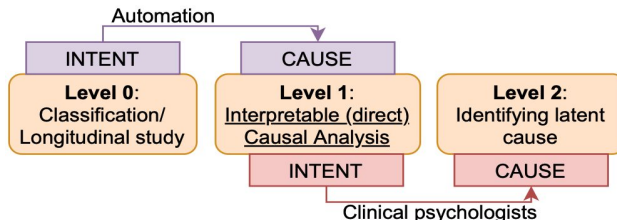
EVOLUTION OF STUDIES

2013	Mental illness detection and analysis on social media (MIDAS) Depression detection on social media
2014	Deep neural network for stress detection
2015	User profile features for MIDAS CLPsych Shared task dataset for MIDAS
2016	Ethical implications of social media data
2017	MIDAS for different social media data Social network features for MIDAS
2018	Attention mechanism used for MIDAS Handling imbalanced dataset
2019	Hybrid approach of ML and DL for MIDAS Explainability by ablation study
2020	Ontology and knowledge graph for features, GNN, and genetic algorithms for optimizing features
2021	temporal aspect of users' historical posts handling noisy labels in dataset annotation

TASK DEFINITION



FRAMEWORK



DATASET & ANNOTATIONS

Cause	CC	Train_S	Test_S	CAMS
No reason	292	332	70	694
Bias or abuse	122	194	35	351
Jobs/careers	399	181	48	628
Medication	410	170	43	623
Relationship	956	297	91	1344
Alienation	976	340	92	1408
Total	3155	1517	379	5051

Fliess' Kappa inter-observer agreement coefficient:
CC - 64.23%, Train_S - 60.23%, Test_S - 73.42%
Agreement rate for annotators: 61.28%

ANNOTATIONS PERPLEXITY

- Multiple reasons in post, i.e., more than one reason in the conveyed feelings: **Solution:** *Root cause.*
- Ambiguity in human interpretations due to subjective nature of causal analysis. **Final category:** *Majority rules.*
- Subject of intent in the post: Many posts refer to the depression of loved ones and other acquaintances. **Solution:** *Consider self-reported instances only.*

Dataset	Task	Avail.
CLPsych (Coppersmith et al., 2015)	Depression detection for suicide risk	S
MDDL (Shen et al., 2017)	Depression candidate detection (D1, D2, D3)	A
RSDD (Yates et al., 2017)	Depression detection from Reddit data	ASA
SMHD (Cohan et al., 2018)	Multi-task mental illness from Reddit data	ASA
eRISK (Losada et al., 2018)	Early risk detection: CLEF	A
Pirina18 (Pirina and Çöltekin, 2018)	Depression detection from Reddit data	A
Ji18 (Ji et al., 2018)	Suicide risk detection from Reddit data	AR
Aladag18 (Aladag et al., 2018)	Suicide risk detection	AR
Sina Weibo (Cao et al., 2019)	Identifying candidates with suicide risk	AR
SRAR (Gaur et al., 2019)	Suicide risk from Reddit posts	ASA
Dreddit (Turcan and McKeown, 2019)	Stress detection from Reddit posts	A
UMD-RD (Shing et al., 2020)	Suicide risk detection from Reddit data	ASA
SDCNL (Haque et al., 2021)	Suicide v/s depression from Reddit	A
CAMS (Ours)	Interpretable Causal analysis from Reddit	A

EXPERIMENTS AND RESULTS

Classifier	F1: C0	F1: C1	F1: C2	F1: C3	F1: C4	F1: C5	Accuracy
LR	0.63	0.28	0.54	0.46	0.46	0.53	0.5013
SVM	0.54	0.23	0.56	0.44	0.48	0.45	0.4670
LSTM	0.54	0.27	0.52	0.46	0.42	0.51	0.4595
CNN	0.56	0.27	0.51	0.42	0.46	0.38	0.4378
GRU	0.51	0.27	0.54	0.47	0.48	0.42	0.4541
Bi-LSTM	0.55	0.12	0.41	0.23	0.44	0.50	0.4351
Bi-GRU	0.57	0.14	0.55	0.46	0.49	0.39	0.4568
CNN+GRU	0.51	0.14	0.49	0.36	0.27	0.45	0.4027
CNN+LSTM	0.54	0.22	0.54	0.47	0.54	0.47	0.4778

LIMITATIONS & CONCLUSIONS

Introduced CAMS dataset with 5051 instances in the format of <Text (String), Causal category (Integer), Interpretation (String)>
DISCOURSES AND PRAGMATICS

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