

SENTIRE 2024

Sentiment Elicitation from Natural Text
for Information Retrieval and Extraction

<https://sentic.net/sentire>

9th December 2024, IEEE ICDM, Abu Dhabi

sentic.net/sentire2024intro.pdf

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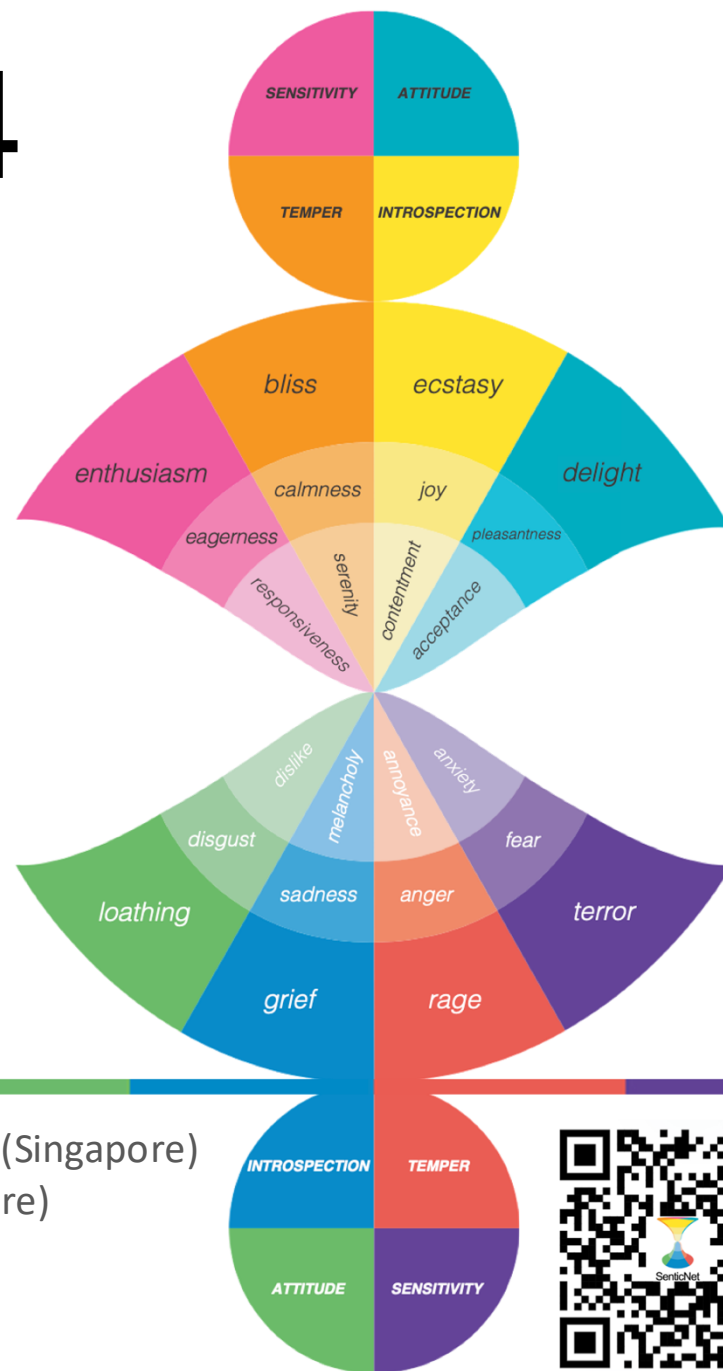
Erik Cambria & Rui Mao, Nanyang Technological University (Singapore)

Zhaoxia Wang, Singapore Management University (Singapore)

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Newton Howard, University of Oxford (UK)

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**Asst Prof (Tenure-Track) /
Assoc Prof (Tenure-Track):**

Data Science

- Statistical Foundations
- (Statistical) Machine Learning
- Data Analytics, Data Engineering and Data Protection
- Database Systems and Principles



All Levels:

Artificial Intelligence



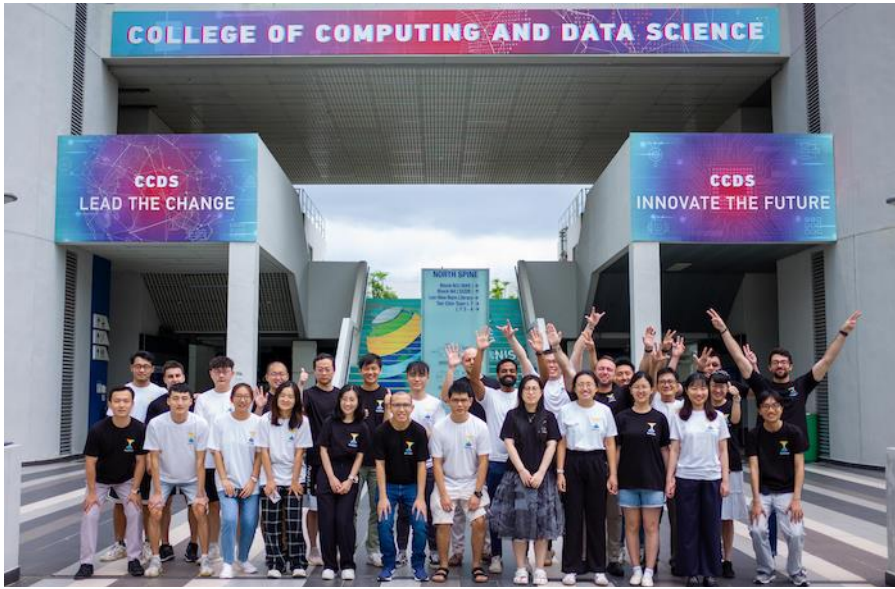
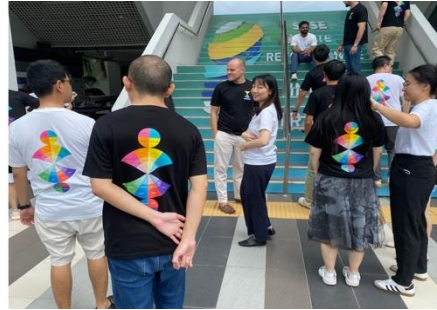
All Levels:

- Cybersecurity
- Cryptography
- Digital Trust and AI Safety



Interested applicants are welcome to apply for the faculty positions using the above QR codes. For enquiries, please email at AD-Fac-CCDS@ntu.edu.sg.

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<https://sentic.net/team>

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Eligibility:

- Bachelor's / Master's Students Graduating in 2025
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Programmes



- Graduate Programmes
- Interdisciplinary Graduate Programme
- Industrial Postgraduate Programme (IPP)
- Joint PhD Programmes
- Joint/Dual Master's Programmes
- Integrated Programme

Scholarships



- Nanyang President's Graduate Scholarship
- Provost Graduate Award
- NTU Research Scholarship
- VinGroup Graduate Scholarship
- Singapore International Graduate Award (SINGA)

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Spinoffs



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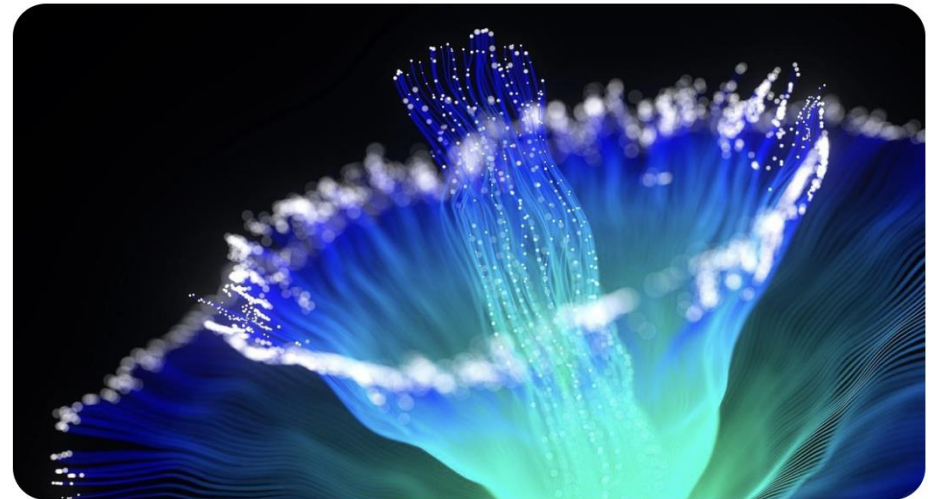


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Seven Umbrellas



Explainable
Sentiment Analysis



Personalized
Sentiment Analysis



Multimodal
Sentiment Analysis



Multilingual
Sentiment Analysis



Multitask
Sentiment Analysis



Financial
Sentiment Analysis



Conversational
Sentiment Analysis

<https://sentic.net/publications>

Seven Projects



AI for Business Intelligence



AI for Social Media Monitoring



AI for Education



AI for Social Good



AI for Healthcare



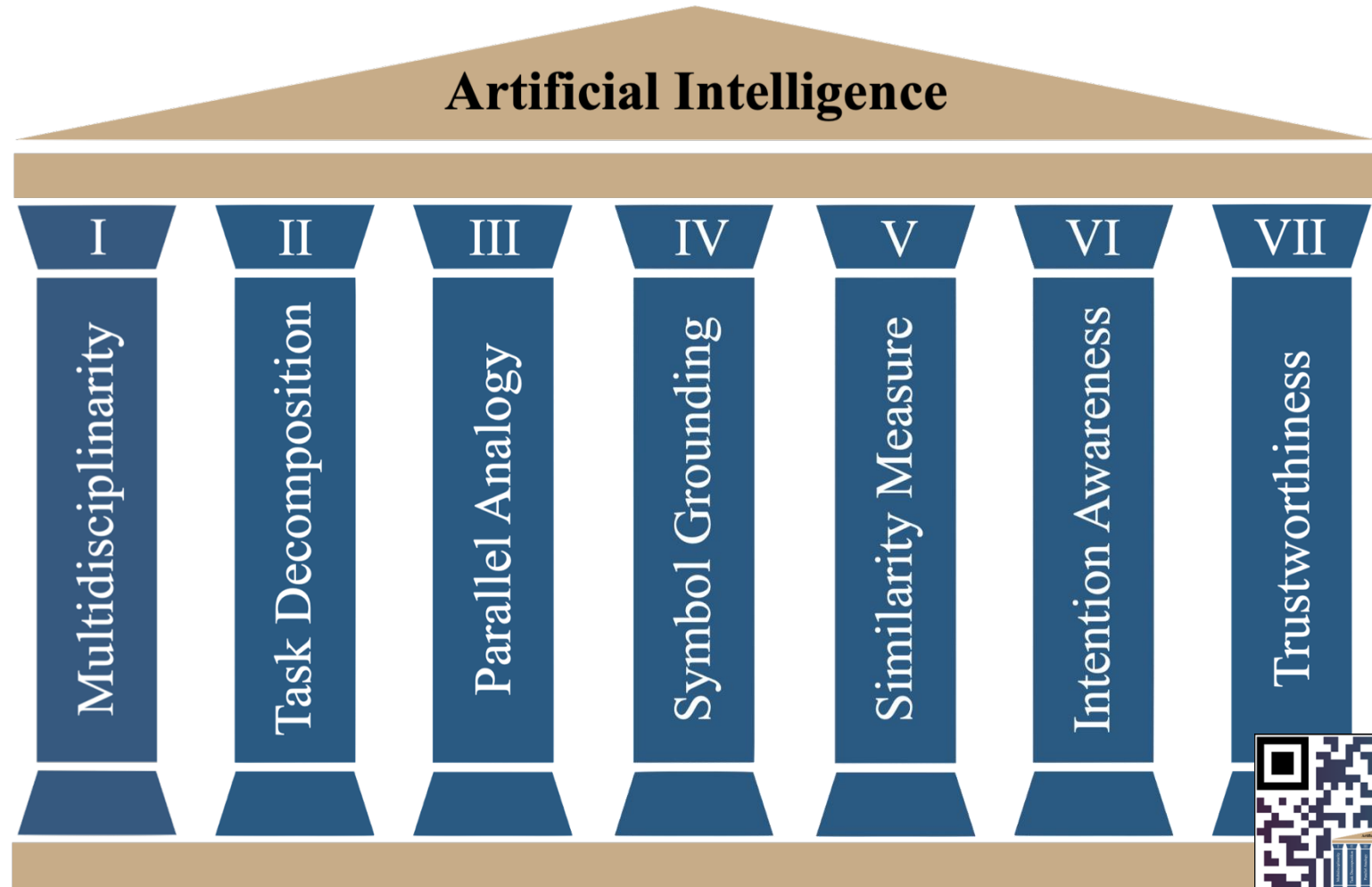
AI for Online Safety



AI for the Arts

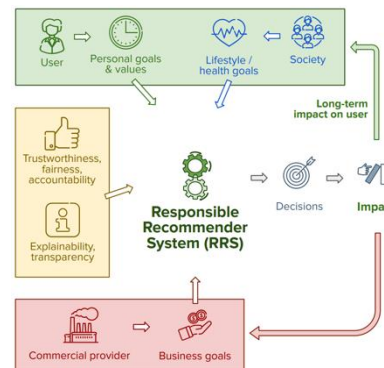
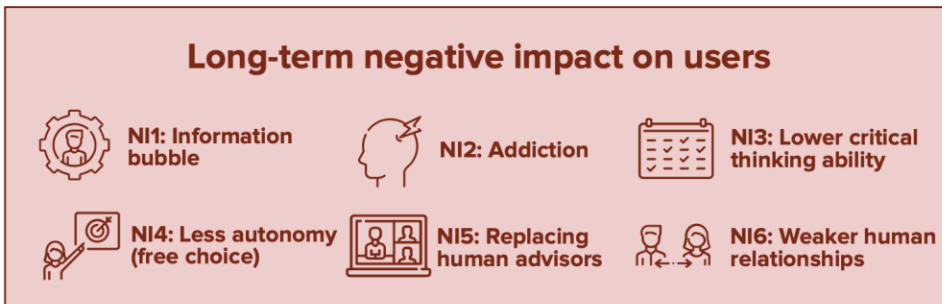
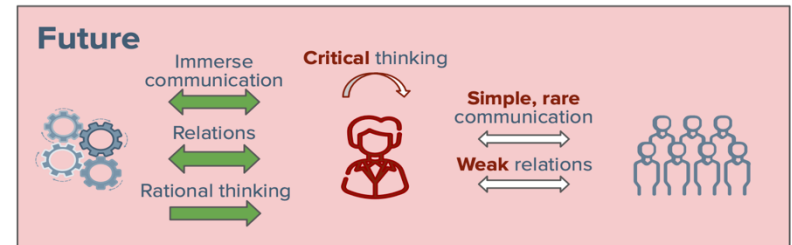
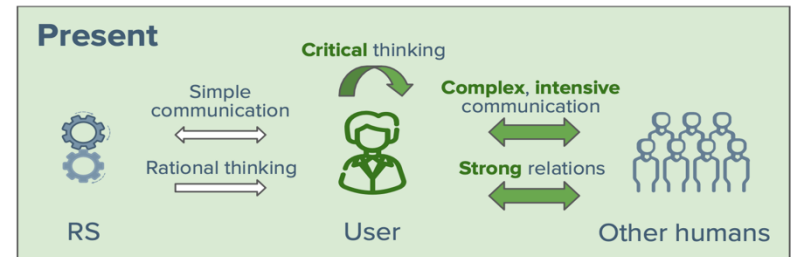
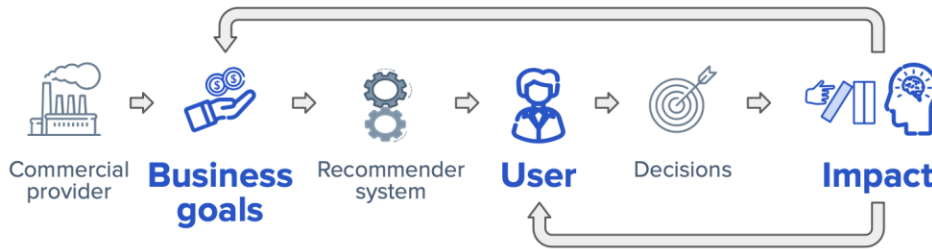
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Towards Reliable AI



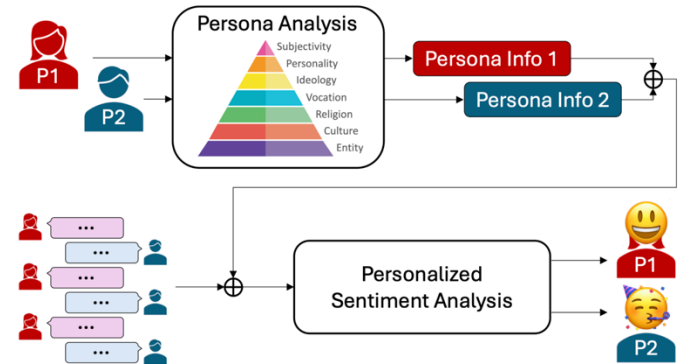
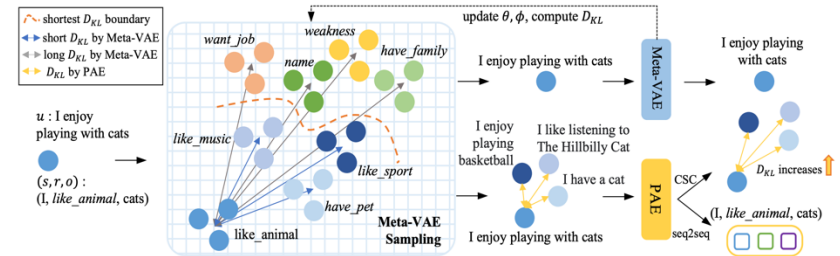
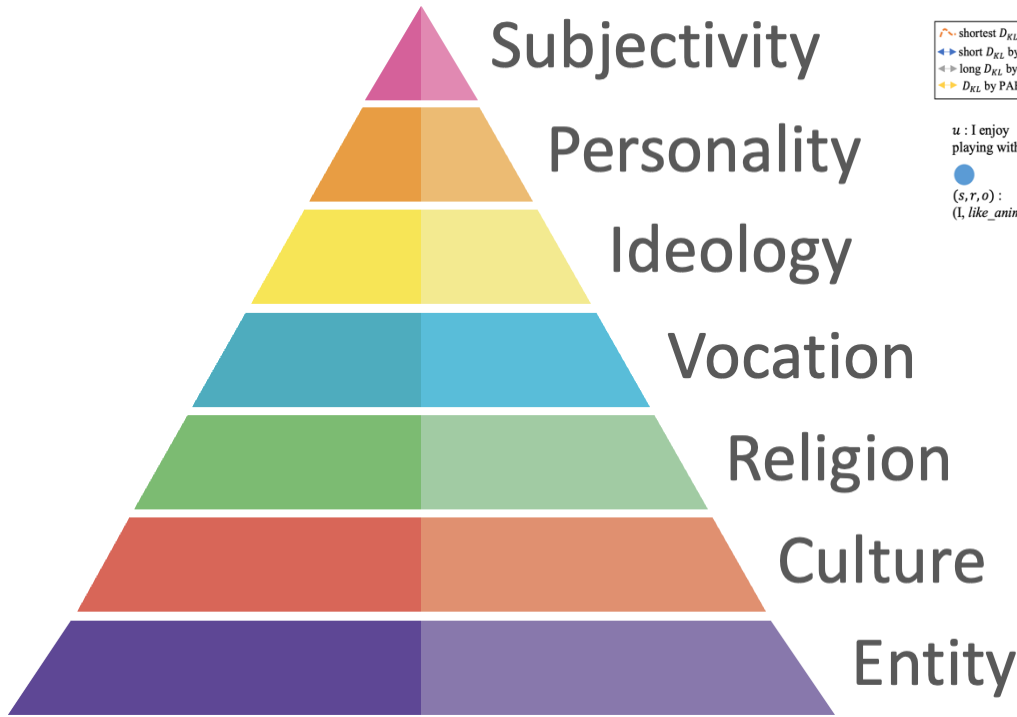
<https://sentic.net/7-pillars-for-the-future-of-ai.pdf>

Towards Responsible AI



<https://sentic.net/responsible-recommender-systems.pdf>

Towards Personalized AI



Erik Cambria

Understanding Natural Language Understanding

About half a century ago, AI pioneers like Marvin Minsky embarked on the ambitious project of emulating how the human mind encodes and decodes meaning. While today we have a better understanding of the brain thanks to neuroscience, we are still far from unlocking the secrets of the mind, especially when it comes to language, the prime example of human intelligence. “Understanding natural language understanding”, i.e., understanding how the mind encodes and decodes meaning through language, is a significant milestone in our journey towards creating machines that genuinely comprehend human language. Large language models (LLMs) such as GPT-4 have astounded us with their ability to generate coherent, contextually relevant text, seemingly bridging the gap between human and machine communication. Yet, despite their impressive capabilities, these models operate on statistical patterns rather than true comprehension.

This textbook delves into the nuanced differences between these two paradigms and explores the future of AI as we strive to achieve true natural language understanding (NLU). LLMs excel at identifying and replicating patterns within vast datasets, producing responses that appear intelligent and meaningful. They can generate text that mimics human writing styles, provide summaries of complex documents, and even engage in extended dialogues with users. However, their limitations become evident when they encounter tasks that require deeper understanding, reasoning, and contextual knowledge. An NLU system that deconstructs meaning leveraging linguistics and semiotics (on top of statistical analysis) represents a more profound level of language comprehension. It involves understanding context in a manner similar to human cognition, discerning subtle meanings, implications, and nuances that current LLMs might miss or misinterpret. NLU grasps the semantics behind words and sentences, comprehending synonyms, metaphors, idioms, and abstract concepts with precision.

This textbook explores the current state of LLMs, their capabilities and limitations, and contrasts them with the aspirational goals of NLU. The author delves into the technical foundations required for achieving true NLU, including advanced knowledge representation, hybrid AI systems, and neurosymbolic integration, while also examining the ethical implications and societal impacts of developing AI systems that genuinely understand human language. Containing exercises, a final assignment and a comprehensive quiz, the textbook is meant as a reference for courses on information retrieval, AI, NLP, data analytics, data mining and more.



Cambria



Understanding Natural Language Understanding

Erik Cambria

Understanding Natural Language Understanding



[springer.com/9783031739736](https://www.springer.com/9783031739736)

 Springer

Sentic codes



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Popular repositories

personality-detection

Public

Implementation of a hierarchical CNN based model to detect Big Five personality traits

Python 481 stars 171 forks

IARM

Public

IARM: Inter-Aspect Relation Modeling with Memory Networks in Aspect-Based Sentiment Analysis, EMNLP 2018

Python 49 stars 18 forks

multimodal-sentiment-detection

Public

This code has been developed for detecting sentiment in videos using Convolutional Neural Network and Multiple Kernel Learning.

Python 27 stars 8 forks

context2vec

Public

This code extracts context embedding from sentence

Python 26 stars 12 forks

sentic-lstm

Public

Sentic Long Short Term Memory

Python 22 stars 8 forks

concept-parser

Public

concept parser

Python 18 stars 8 forks

People



Top languages

Python Jupyter Notebook
MATLAB Java PureBasic

Most used topics

lstm sentiment-analysis

<https://github.com/senticnet>

Sentic UI



Thrilled about investing in Tesla—pioneering the future of clean energy!
Not so keen on ExxonMobil with the shift away from fossil fuels...



POSITIVE



Confidence score: 100%

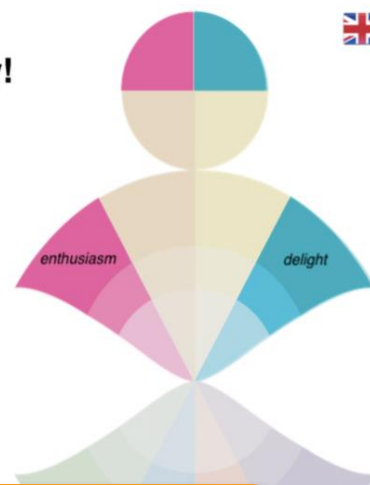
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EMOTIONS: delight (72.58%) & enthusiasm (36.97%)

ASPECT TERMS: tesla (pioneer), exxonmobil (-keen)

ASPECT CATEGORIES: GREEN STOCK BROWN STOCK

carcasm: 0% depression: 0% toxicity: 0% engagement: 50% well-being: 50%



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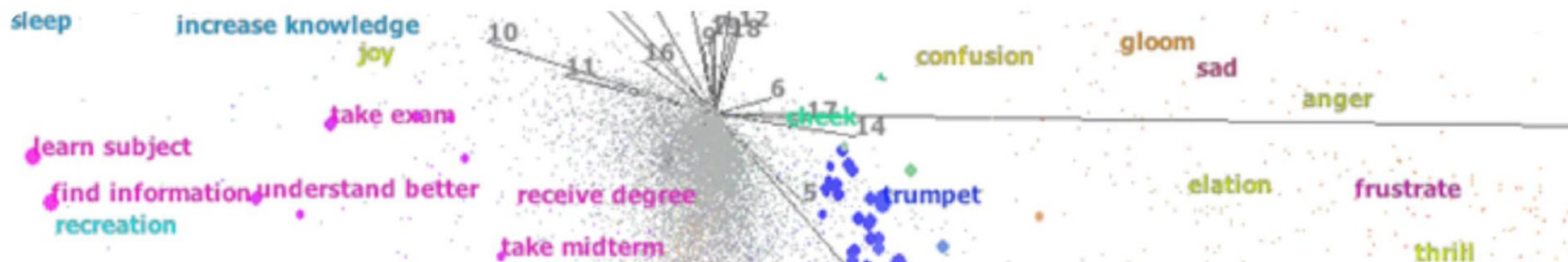
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. thrill . energy
. eager. DELIGHT
. invest . clean
. pioneer . ENTHUSIASM

- Concept Parsing
- Polarity Classification
- Intensity Ranking
- Emotion Recognition
- Aspect Extraction
- Personality Prediction

Sentic channel



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Latest Popular Oldest

Experiments and Analysis

- Binary classification Analysis
 - Both VLM's achieve higher accuracy in sentiment polarity classification (EMOTIC-C)
 - Performance drops greater than 15% on engagement analysis tasks
 - Indication of difficulty in engagement understanding of VLM's due to absence of advanced contextual reasoning

Model	LLaVA	GPT
SCB-C	67.23%	72.85%
EMOTIC-C	82.79%	99.48%
EMOTIC-E	88.89%	91.38%

7:31

Evaluating Vision Language Models in Detecting Learning Engagement

12 views · 6 days ago

Sentiment Score Over Time

12:11

Sentiment Analysis on Climate Change for Sustainable Investment (Sentic Labcast by...)

20 views · 7 days ago

Background- Social platforms

17:12

Multimodal Aspect-Based Sentiment Analysis (Sentic Labcast by Luwei Xiao)

41 views · 1 month ago

Understanding Natural Language Understanding

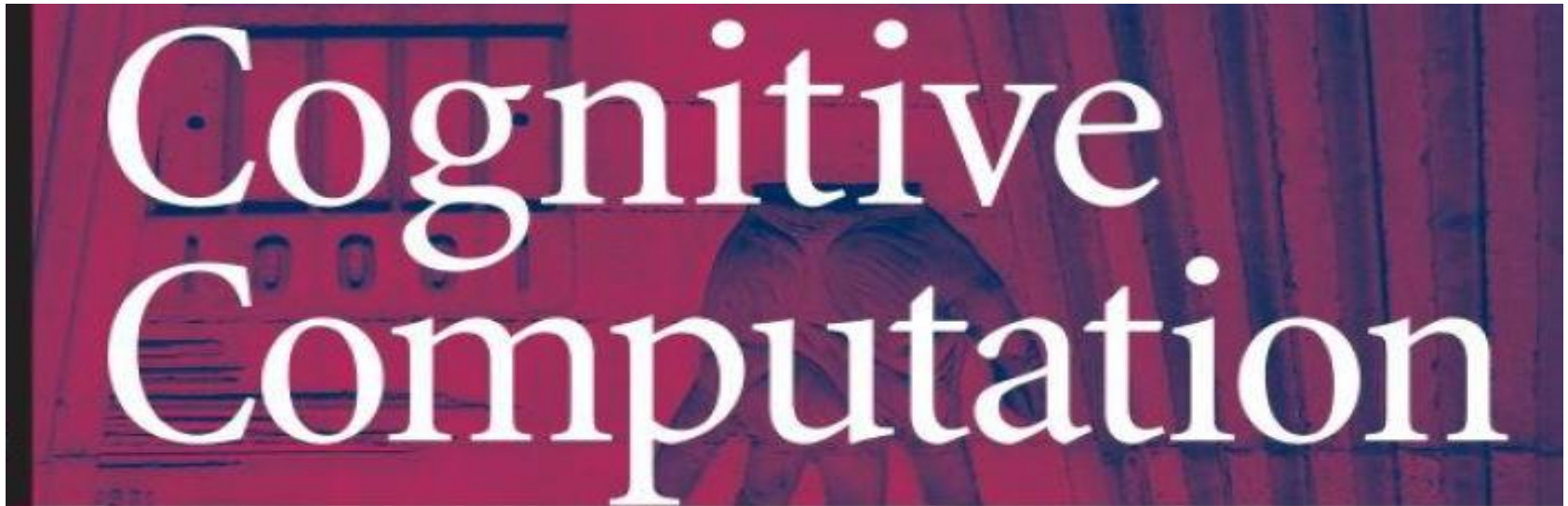
2:26

Understanding Natural Language Understanding

372 views · 2 months ago

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Sentic Special Section



If you use any sentic algorithm or resource, consider submitting to our Special Section on Cognitive Computation (4.3 impact factor)

<https://sentic.net/scs.pdf>



Book series

Socio-Affective Computing

 [Editors](#)

About this book series

Description

This exciting series publishes state-of-the-art research on socially intelligent, affective, and multimodal human-machine interaction and systems. It emphasizes the role of affect in social interactions and the humanistic side of affective computing by promoting publications at the crossroads between computer science, engineering and the human sciences (including biological, social, and cultural aspects of human life).

Three broad domains of social and affective computing will be covered by the book series: social computing; affective computing; and the interplay of these domains (for example, augmenting social interaction through affective computing).

Examples of the first domain include all types of social interactions that contribute to meaning, interest, and richness in our daily life, e.g., information produced by a group of people used to provide or enhance the functioning of a system. Examples of the second domain include computational and psychological models of emotions, bodily manifestations of affect (facial expressions, posture, behavior, physiology), and affective interfaces and applications, e.g., dialogue systems, games, and learning.

Research monographs, introductory- and advanced-level textbooks, and edited volumes are considered for the series.

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Electronic ISSN

2509-5714

Print ISSN

2509-5706

Series Editor

Amir Hussain, Erik Cambria

[springer.com/series/13199](https://www.springer.com/series/13199)



INTERNATIONAL JOINT CONFERENCE ON NEURAL NETWORKS

IJCNN 2025

30 JUNE - 5 JULY 2025 | **ROME, ITALY**



INTERNATIONAL NEURAL NETWORK SOCIETY

Special Session: AI for Social Good

IJCNN 2025 Website:

The submission template and entrance can be found from IJCNN Website: <https://2025.ijcnn.org/>
In the CMT submission system, please create a new submission under the “**Main Track**” and then select “**AI for Social Good**” as the primary subject area.



Background:

The potential of AI extends far beyond commercial applications, with a profound capability to address pressing societal challenges. From mitigating climate change and improving healthcare access to reducing poverty and enhancing education, AI has the power to create tangible benefits for humanity. However, significant gaps remain in aligning AI methods with social good initiatives, particularly in underrepresented areas such as disaster response, environmental sustainability, and equitable resource distribution. The challenge lies not only in developing AI technologies but in deploying them ethically, equitably, and effectively to address these critical issues.

Topics:

- AI for Climate Change Mitigation and Adaptation
- AI in Global Health
- AI for Inclusive Education, e.g., learners with disabilities, limited literacy, or lack of access to quality educational resources.
- Bias and Risk Mitigation in AI Systems
- AI-Powered Disaster Response and Recovery
- AI for Sustainable Agriculture, Business, and Finance
- AI for Social Governance
- AI in Combating Misinformation and Fake News
- AI for Accessible and Assistive Technologies
- AI for Poverty Alleviation and Resource Distribution
- AI for Urban Sustainability and Smart Cities

Special Session Chairs:

Rui Mao (rui.mao@ntu.edu.sg, Research Scientist), Xulang Zhang (Research Fellow), Erik Cambria (Professor), Nanyang Technological University, Singapore

Zhaoxia Wang (Assoc. Professor), Singapore Management University, Singapore

Seng-Beng Ho (Chief AI Scientist), AI Institute Global, Singapore

Important Dates:

- Paper Submission Deadline: 15 January 2025
- Paper Acceptance Notification: 31 March 2025
- Camera-Ready Paper Submission Deadline: 1 May 2025
- Early Registration Deadline: 1 May 2025

IEEE Intelligent Systems



Special Issue on **Explicable Artificial Intelligence for Affective Computing**

<https://sentic.net/eai4ac.pdf>

Important Dates:

- Submission deadline: 1 February 2025
- Publication date: Sep/Oct 2025

Topics:

- Explainable sentiment analysis, emotion detection, and figurative language processing
- Neurosymbolic affective computing
- Multimodal affective computing with explainability
- Affective intention awareness AI
- Trustworthy AI for affective computing
- Affective computing involves multidisciplinary ensemble & explainability
- Affective computing for science research, e.g., healthcare, education, behavioural, cognitive and social science
- Granular task decomposition for affective computing
- Ethical analysis pertains to Explicable AI for affective computing.

Highlights:

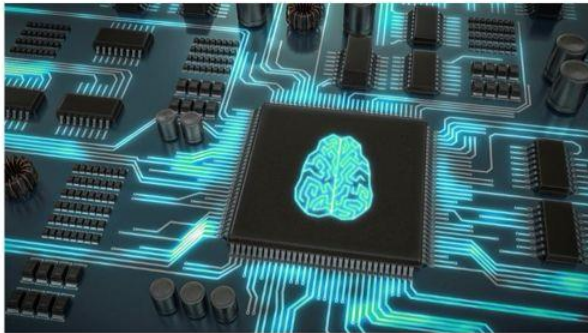
The Special Issue will consider papers on the mentioned topics that demonstrate humanitarian value. While achieving state-of-the-art performance is commendable, acceptance priority will be given to works that contribute to advancement of seven pillars for future AI, including Multidisciplinarity, Task Decomposition, Parallel Analogy, Symbol Grounding, Similarity Measure, Intention Awareness, & Trustworthiness.

Guest Editors:

- Rui Mao (Lead Guest Editor, rui.mao@ntu.edu.sg), Nanyang Technological University, Singapore
- Erik Cambria, Nanyang Technological University, Singapore
- Yang Li, Northwestern Polytechnical University, China
- Newton Howard, University of Oxford, UK

Call for Papers

Neurosymbolic AI



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Guest Editors

- ❑ **Rui Mao** (rui.mao@ntu.edu.sg), Nanyang Technological University, Singapore
- ❑ **Erik Cambria**, Nanyang Technological University, Singapore
- ❑ **Björn Schuller**, Technical University of Munich, Germany

Neurosymbolic AI is an emerging approach in the field of artificial intelligence that combines the strengths of subsymbolic reasoning (e.g., deep neural networks and large language models) and symbolic reasoning (e.g., semantic networks and knowledge graphs). This hybrid method seeks to address some of the limitations of traditional AI systems by integrating the learning capabilities of neural networks with the structured reasoning capabilities of knowledge representations. It represents a promising direction for AI research and development, aiming to unify the strengths of neuro-driven learning and symbolic reasoning to create more powerful and interpretable AI systems.

Topics

<https://nature.com/collections/ecjdhfaaij>

- ❑ Explainable AI
- ❑ Interpretable Machine Learning
- ❑ Commonsense Reasoning
- ❑ Natural Language Understanding and Generation
- ❑ Sentic Computing
- ❑ Cognitive Inspired Reasoning (e.g., System 1/System 2 integration)
- ❑ Multimodal Neurosymbolic Integration (e.g., vision language models)

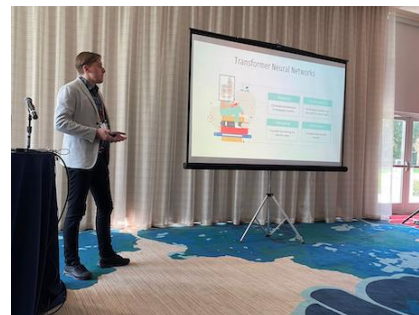


Submission Deadline: 12 September 2025

The workshop



- **SENTIRE'24 (ICDM 2024, December 9th, Abu Dhabi)**
- **SENTIRE'23 (ICDM 2023, December 1st, Shanghai)**
- **SENTIRE'22 (ICDM 2022, November 28th, Orlando)**
- **SENTIRE'21 (ICDM 2021, December 7th, Auckland)**
- **SENTIRE'20 (ICDM 2020, November 17th, Sorrento)**
- **SENTIRE'19 (ICDM 2019, November 8th, Beijing)**
- **SENTIRE'18 (ICDM 2018, November 17th, Singapore)**
- **SENTIRE'17 (ICDM 2017, November 18th, New Orleans)**
- **SENTIRE'16 (ICDM 2016, December 12th, Barcelona)**
- **SENTIRE'15 (ICDM 2015, November 14th, Atlantic City)**
- **SENTIRE'14 (ICDM 2014, December 14th, Shenzhen)**
- **SENTIRE'13 (ICDM 2013, December 7th, Dallas)**
- **SENTIRE'12 (ICDM 2012, December 10th, Brussels)**
- **SENTIRE'11 (ICDM 2011, December 11th, Vancouver)**



This year's programme



09:00-09:05 **Welcoming and introduction** (E Cambria)

09:05-09:30 **AI and Sentiment-Driven Policies for Industry 4.0 Transformation** (A Feraco)

09:30-09:45 **Into the Unknown: Self-Learning Large Language Models** (T Ferdinan)

09:45-10:00 **Personalized Large Language Models** (S Wozniak)

☕ COFFEE BREAK

10:30-10:45 **Sentiment Analysis of Polish Book Reviews Using Small Language Models** (A Karlinska)

10:45-11:00 **Small Language Models for Emotion Recognition in Polish Stock Market** (B Koptyra)

11:00-11:15 **Investigating the Role of Metaphors in Human-AI Conversation** (P Maheshwary)

11:15-11:30 **Sentiment Analysis on Climate Change for Sustainable Investment** (K Ong)

11:30-11:45 **Converting Vocal Performances into Sheet Music Leveraging LLMs** (N Teo)

11:45-12:00 **Multilingual Sentiment Analysis for Investigating Perceptions of Globalization** (A Ani)

🍽️ LUNCH BREAK

13:00-13:15 **Understanding the Hidden State of LLMs for Sentiment Analysis** (K Xue)

13:15-13:30 **Evaluating Vision Language Models in Detecting Learning Engagement** (J Teotia)

13:30-13:45 **A Silent Voice: A Longitudinal Analysis of Mahsa Amini's Movement** (M Nobakhtian)

13:45-14:00 **Neurosymbolic AI for Mining Key Aspects of Socially Responsible Investing** (R Goh)

14:00-14:15 **Information Extraction: Unstructured to Structured for ESG Reports** (Z Sun)

14:15-14:30 **Automating Maritime Risk Data Collection and Identification Leveraging LLMs** (D Huang)

14:30-14:35 **Concluding remarks** (E Cambria)

AI and Sentiment-Driven Policies for Industry 4.0 Transformation



As the manufacturing sector embarks on its Industry 4.0 journey, adopting transformative technologies like AI, IoT, and automation, the need for policies that foster trust, engagement, and resilience has never been greater. This keynote will delve into how sentiment analysis and related AI-driven insights can play a pivotal role in crafting policies and strategies that support safe, secure, and sustainable digital transformation. Leveraging sentiment analysis allows policymakers and industry leaders to tap into real-time, data-driven understanding of workforce and public attitudes toward emerging technologies. By using these insights, we can proactively address concerns around safety, data privacy, and job displacement, building a foundation of trust that encourages broader and more enthusiastic adoption of Industry 4.0 initiatives. Moreover, sentiment-driven policies can help identify opportunities to boost morale and engagement within the workforce, ensuring that the digital transformation process is both technically and emotionally supported. Attendees will learn how embracing sentiment analysis as part of policy co-development can enable a more human-centered approach to Industry 4.0.

