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Youssef Amraoui; Zahra Oughannou; Imane Halkhams; Abdennabi Morchid; Rachid El Alami; Mohammed Ouazzani Jamil; Hassan Qjidaa
Publication Year: 2024 , Page(s): 1 - 6
Abstract HTML

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Sina Baya; Mustapha Bahich; Lahsen Boulmane
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Cited by: Papers (2)
Abstract HTML

Improving Alexa's response with sentiment analysis and comparing various machine learning models
Dipankar Roy; Aparna Bhaduri; Kalyan Maji; Mithu Mal; Joyjit Patra; Subir Gupta
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Abstract HTML

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Rohit Beniwal; Sachin Sachin; Satyam Satyam; Saroj Kumar
Publication Year: 2024 , Page(s): 1 - 6
Abstract HTML

The Role of Universities in AI-Driven Innovation for Sustainable Development
Nasim Salim Ziyad Al Balushi
Publication Year: 2024 , Page(s): 1 - 4
Abstract HTML

Literature Review: NLP Techniques for Arabic Dialect Recognition
Yassine El Kaneb; Mohcine Kodad
Publication Year: 2024 , Page(s): 1 - 5
Cited by: Papers (1)
Abstract HTML

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Zakaria Babaalla; El Mahi Bouziane; Abdeslam Jakimi; Moahmed Oualla
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Cited by: Papers (2)
Abstract HTML

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Cited by: Papers (5)
Abstract HTML

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Cited by: Papers (2)
Abstract HTML

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Cited by: Papers (5)
Abstract HTML

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Cited by: Papers (11)
Abstract HTML

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Zineb Sqalli Houssaini; Younes Balboul; Anas Bouayad
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Cited by: Papers (1)
Abstract HTML

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Abstract HTML

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Cited by: Papers (3)
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Hassan Tabti; Hamid El Bourakkadi; Abdelhakim Chemlal; Abdellatif Jarjar; Said Najah; Khalid Zenkouar
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Abstract HTML

Evaluating Image Segmentation Algorithms: Mean Shift, K-means, and Multi-Otsu on BSDS500 with Human-Annotated Reference
Oussama El Haouari; Lahbib Khrissi; Nabil El Akkad; Mouarad Hana
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Abstract HTML

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Abdelhakim Chemlal; Hamid El Bourakkadi; Hassan Tabti; Mariem Jarjar; Abdellatif Jarjar; Abdelhamid Benazzi
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Cited by: Papers (1)
Abstract HTML

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Naufal Safiq Tama; Rice Novita
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Abstract HTML

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Mohamed Amine Ouassil; Mohammed Jebbari; Rabia Rachidi; Mouaad Errami; Bouchaib Cherradi; Abdelhadi Raihani
Publication Year: 2024 , Page(s): 1 - 7
Cited by: Papers (1)
Abstract HTML

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Abstract HTML

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Publication Year: 2024 , Page(s): 1 - 6
Cited by: Papers (3)
Abstract HTML

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Moulay Said Khattab; Tarik Touiss; Ilyass El Kadmiri; Driss Bria
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Abstract HTML

Performance analysis of zirconium sulfide (ZrS2) as a buffer layer for Sb2Se3 solar cells: numerical modeling
Abdelmajid El Khalfi; Kaoutar Ridani; Lhoussayne Et-Taya; Najim Mansour; Abderrahman El Boukili; Lahoucine Elmaimouni; Abdellah Benami
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Abstract HTML

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Improving Alexa's response with sentiment analysis and comparing various machine learning models

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3 Cites in Papers

74 Full Text Views

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Document Sections

I. Introduction

II. Literature Review

III. Methodology

IV. Result

V. Conclusion

Authors

Figures

References

Citations

Keywords

Metrics

More Like This

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I. Introduction

The rapid evolution of voice-activated technology, particularly with platforms like Amazon's Alexa, marks a significant shift in how technology integrates into daily life and business operations[1]. Alexa, which started as a device capable of performing basic tasks such as playing music or setting timers, has now morphed into a complex system capable of executing a wide range of actions, from controlling smart home devices to facilitating shopping and customer service interactions[2]. This evolution highlights a broader trend in technology's movement towards more natural user interfaces, reshaping the interaction between humans and machines. Despite the advances in voice-activated technology, there remains a significant gap in how these systems process and respond to the nuances of human emotion and sentiment[Sign in to Continue Reading and engagement. Current systems are adept at recognizing commands and performing tasks but cannot understand underlying sentiments in user communications, which can lead to misinterpretations and unsatisfactory user interactions[4]. This limitation is crucial in the commercial sector, where understanding customer sentiment is critical to maintaining brand reputation and customer loyalty[5]. Sentiment analysis traditionally relies on textual data to gauge emotions and opinions, which can be limiting given the complex expressions used in spoken language. The integration of

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Figures

References

Citations

Keywords

Metrics

Back to Results

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