

Listă lucrări științifice

1. Performance of LLMs on Computing Systems for Deployment in IoT Devices

Autori

Theodor-Radu Grumeza, Thomas-Andrei Lazăr, Alexandra-Emilia Fortiș

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Carte

International Conference on Broadband and Wireless Computing, Communication and Applications

Pagini

252-262

Editor

Springer Nature Switzerland

Descriere

In this study, the authors explore the performance of different Large Language Models such as BART-Base, GPT Neo and DistilGPT-2 on hardware devices. These models are fine-tuned on a general dataset and tested on systems with various computing capabilities, from high-end servers and cloud infrastructures to more resource-constrained embedded devices. The main objective is to determine how fast a model can handle the input when given, the precision of text summarisation and the similarity between the machine-generated translation and the reference translations. The novelty of this research lies in finding the compromise between the speed of processing and the precision in generating the output. This approach aims to determine which model and system performs the best for future deployment in Internet of Things (IoT) devices.

2. A Case Study in Generating 3D Maps with Collaborative Robots

Autori

Theodor-Radu Grumeza, Thomas-Andrei Lazăr, Isabela Drămnesc, Gabor Kusper, Konstantinos Papadopoulos, Ioannis Lefkos, Nikolaos Fachantidis

Data publicării

2024/11/4

Conferință	2024 4th International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME)
Pagini	1-8
Editor	IEEE
Descriere	<p>This research presents a case study on the creation of detailed 3D maps using the Agilex Scout Mini robot equipped with a 3D LiDAR, aimed at improving autonomous navigation in indoor environments. ROS (Robot Operating System) is employed for real-time data acquisition and processing, and the DBSCAN clustering algorithm for segmenting point cloud data. These maps were subsequently integrated into the humanoid robot Pepper, developed by Aldebaran Robotics, enabling Pepper to navigate autonomously and deliver location-based services at the West University of Timisoara. Our results show a point cloud density of approximately 5,000 points per cubic meter, highlighting the LiDAR sensor's capability to capture fine environmental details. Efficient clustering was achieved with an average computation time of 3 seconds per chunk, and path planning demonstrated a high smoothness score of 0.8.</p>

3. Integration of LLM in Expiration Date Scanning for Visually Impaired People

Autori	Theodor Grumeza, Bogdan Bozga, Grigore-Liviu Staniloiu
Data publicării	2024/10/1
Jurnal	Scalable Computing: Practice and Experience
Volumul	25
Numărul	6
Pagini	5722–5733-5722–5733
Descriere	<p>In this study, the authors explore an approach to detect expiration dates of food products using a live feed stream and the integration with Large Language Models in</p>

order to improve accessibility for visually impaired people. The main objective is to enhance their capacity to engage in common tasks like grocery shopping autonomously. The novelty of this research lies in employing Meta LLAMA 2, a large language model, and experimenting with both traditional and a new OCR solution to find the expiration date using image processing. This approach offers audio information about whether the product has expired or when it will expire, helping in shopping and product recognition for visually challenged customers. The proposed solution consists of optical character recognition, mainly the EasyOCR library, fine-tuned on cropped images containing only the expiration dates and a validation phase that filters and checks the extracted data.

4. Integration of LLM in Barcode Scanning for Visually Impaired People

Autori

Theodor-Radu Grumeza, Richard Baczur, Alexandra-Emilia Forti

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Carte

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447-458

Editor

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Descriere

In this study, the authors explore the integration of Large Language Models in barcode scanning applications to improve accessibility for visually impaired people. The main objective is to enhance their capacity to autonomously engage in common tasks like grocery shopping. The novelty of this research lies in employing Meta LLAMA 2, a large language model, into barcode scanning using image processing. This approach aims to offer audio information about food products, helping in shopping and product recognition for visually challenged customers, giving information that may be complicated to get otherwise.

5. Social Robots and Edge Computing: Integrating Cloud Robotics in Social Interaction

Autori

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Data publicării

2024/4/10

Carte

International Conference on Advanced Information Networking and Applications

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55-64

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Descriere

In this study, the authors explore the integration of cloud robotics for social interactions using the SoftBank Robotics Pepper robot in relation with an academic environment. The main objective is to enhance social robots ability to interact with humans by providing guidance and information using the Pepper robot as a case study. The initial steps assess Pepper's language processing capabilities, identifying limitations in its vocabulary. The novelty of this research lies in employing Meta LLAMA 2, a large language model, trained on educational content, to enhance audio-to-text conversion. This approach aims to boost Pepper's comprehension and response to human inquiries, marking a step forward in the practical application of cloud-edge robotics in social contexts.

6. A Case Study in Building 2D Maps with Robots

Autori

Theodor-Radu Grumeza, Thomas-Andrei Lazar, Isabela Dramnesc, Gabor Kusper, Konstantinos Papadopoulos, Nikolaos Fachantidis, Ioannis Lefkos

Descriere

In this paper, the authors are doing experimental work on generating 2D maps using the Agilex Scout Mini to utilize Pepper as an autonomous robot for guiding individuals within their university. This necessity arises from the lack of environmental data required for Pepper's navigation. Accurate and detailed maps are important for Pepper to orient itself effectively and provide reliable guidance. This process involves equipping Pepper to explore and document the university's physical layout, enabling autonomous movement and precise assistance for people. Key considerations include determining potential issues when using the two robots, the Scout with LiDAR and Pepper with Sonar, for map generation. Selecting an appropriate algorithm for noise reduction in the mapping points is a key feature for ensuring high-quality maps.