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Post-doctoral Edge Preprocessing for Machine Learning in the Cloud

Ecole/Institution/Société:
University de São Paulo , **Brazil / Sao Paulo**

Discipline:
Machine Learning

Type d'emploi::
Full-time

Date de publication:
2021-10-16

Personne à contacter:
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Post-doctoral Edge Preprocessing for Machine Learning in the Cloud

Job Categories

- Post-Doc

Academic Fields

- Mechatronics
- Computer Engineering
- Aerospace/Aeronautical/Astronautics
- Engineering - Other

Abstract

In this proposal, a combination of edge and cloud framework will be adopted, implemented and tested in the context of GHG emissions data collection and analysis. The critical issue of the proposed edge cloud architecture investigated in this project is that it should provide a discussion of the division of tasks that must be performed in the cloud and the tasks implemented close to the user or data source at the edge of the network.

The target processes of the study are trajectory planning algorithms for autonomous aerial exploration using robotic platforms.

The proposed planner employs an optimization scheme with a decreasing horizon: in an online environment, the path to be taken must optimize the search, observing quantities of interest such as computed trails, temperature, pollution, deforestation, etc. to find the best route, the quality of which is determined by the amount of unmapped space that can be explored, taking into account the aircraft range restrictions.

The proposed planner must be able to be processed online, aboard a UAV with limited resources. Its high performance is evaluated in detailed simulation studies as well as a challenging real-world experiment using a helicopter micro air vehicle. Analysis of the computational complexity of the algorithm must also be analyzed to verify the proposal's ability to deal with large-scale issues.

The system must take into account the capacity of data storage, communication and computational

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division of tasks with a base station and also with cloud storage and processing technology.

Description

The development of the work can be described in the following steps:

- Literature Review: A. How GHG emission requirements can be measured by aircraft – range, mission, geometry, architecture, desired flight height, payload (sensors), robustness, etc. B. Candidate embedded technologies C. Candidate propulsion technologies.
- Virtual set design. Design of different candidate aircraft – computer modeling and implementation to perform simulations and performance tests
- Development of experiments and testing of subsets for feasibility analysis
- Design and implement division of tasks between embedded system, edge computer and cloud system
- Design, implement and test prototype of an embedded system connected to sensors of interest to GHG.
- Design and implement an edge system prototype connected to sensors of interest to GHG.
- Prototyping cloud structure for receiving data streaming, organizing and processing
- Test the proposals with a simulated scenario of Amazon GHG emission data.

Requirements to fill the position.

This project is suitable for a highly motivated candidate and requires knowledge of aircraft design, autonomous systems, embedded systems, deep neural network, machine learning, C/C++ and Python computer languages. The candidate must have a PhD in Engineering.

The candidate must have obtained a doctorate degree less than seven years ago, priority for candidates who have just completed the Doctorate, within the regular duration, with an excellent academic record in postgraduate studies.

INFORMATION ABOUT FELLOWSHIP:

This Postdoc fellowship is funded by FAPESP. The fellowship will cover a standard maintenance stipend of R$ 7.373,10 per month.

MORE INFORMATION:

https://www.rcgi.poli.usp.br/opportunities/

Position: Post-Doctoral REF: 21PDR127

Contact

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