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The SynapticCity Phenomenon

When All Foundation Models Marry Federated Learning and Blockchain

December 15th,
NeurIPS 2024

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Artificial Intelligence Systems for Industrial Process

Naval. Preventive Maintenance
Discovery of new materials. Batteries
Space. Remote sensing

Security. Critical Infrastructures
Health. Remote Monitoring
Energy. Intelligent Energy Networks

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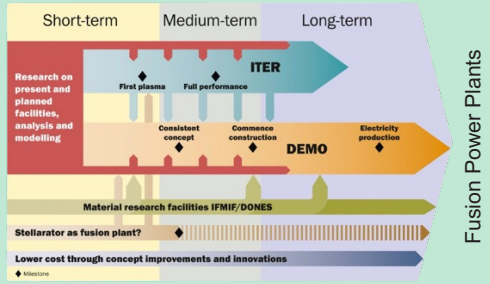
dones flux

Projects AI · Navy
MAPRE · 2021-2023

AI applied to Fusion energy

Industrial technology research project aimed at optimizing the efficiency of a large scientific fusion facility, such as IFMIF-DONES.

Funded by the European Union NextGenerationEU



GREEN

Projects · Smart Cities
GREEN [2022-2024]

Collaborative intelligence for sustainable cities

Industrial AI platform that combines Federated Learning, Blockchain and Smart Contracts technologies. GREEN is an initiative based on both respecting citizens' privacy and optimizing resources, which will make cities more sustainable and accessible for their inhabitants.

Application: AI platform for optimizing Smart Contracts (SC) between IoT in a secure way, using Federated Learning (FL) and Blockchain.

Electrolineras Partner: Naturgy

Naturgy

SEDA

Projects AI · Space · SEDA [Satellite Data AI]

Automatic Search for Information in Satellite images and data using AI

SEDA is the Spanish Defense R&D project whose mission is the automation of satellite data observation. It offers an integrated solution for defense intelligence analysts.

ENIGMA

Projects AI · Energy · ENIGMA
[Electric Grid AI] · 2020-2022

Artificial Intelligence to increase the efficiency of renewable sources

HI-IBERIA in collaboration with the companies PRYSMA and INGELECTUS proposes a paradigm shift in the control of the electrical system through the use of artificial intelligence methodologies.

prysma

ingelectus
Innovative electrical solutions

RED ELÉCTRICA DE ESPAÑA

eit InnoEnergy

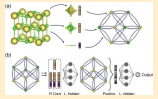
LiOn-HD

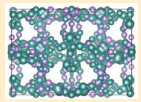
Projects AI · Materials
LiOn-HD

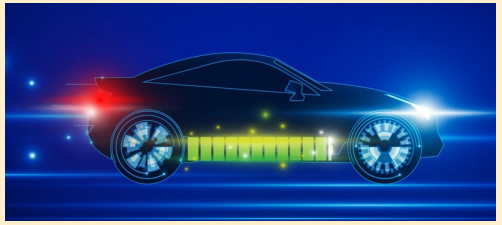
Creation of new materials

The LiOn-HD project is included in the call of the "Misiones Ciencia e Innovación 2020" program of the Centro para el Desarrollo Tecnológico Industrial (CDTI). It is a project that includes a diverse consortium collaborating to achieve the overall objective: to significantly improve the energy density, reduce the cost and increase the sustainability of lithium-ion batteries.

CGCNN







Application: AI technologies to search for new cathode materials.
Scientific Partner: Institute of Materials Science of CSIC.

GREENER group
CSIC
icmm

Challenges

Solving these challenges is crucial for the industrial development of the future.

Main obstacles related to Smart Cities and improvement in the industrial sector.

Fragmented Data

Isolated datasets across urban systems hinder effective collaboration and decision-making

01

Centralized Systems

Citizen data stored in single locations is increasingly vulnerable to breaches and misuse.

02

Outdated Models

Existing predictive systems fail to scale and adapt to the dynamic needs of growing cities.

03

The Network

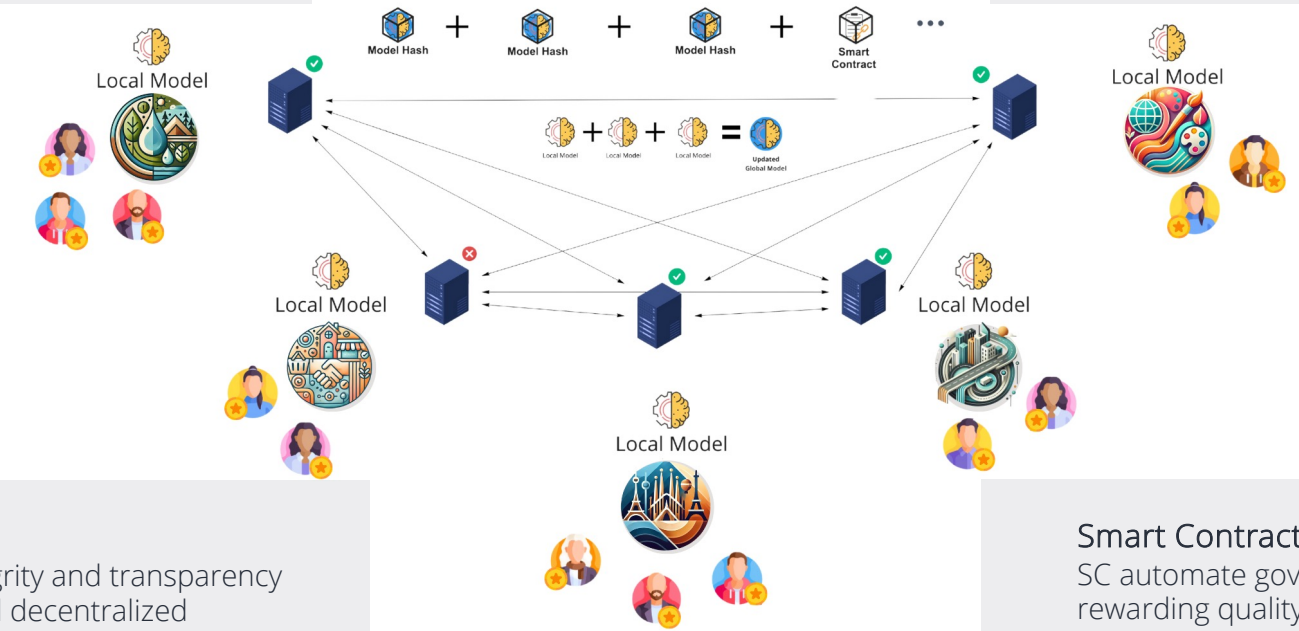
Foundation Models, Federated Learning & Blockchain

Foundation Models

FMs provide advanced analytics by processing diverse urban data, including traffic, energy, and citizen behaviour.

Federated Learning

FL protects privacy by keeping data on local devices while enabling decentralized model training, reducing the risk of data breaches.



Blockchain Network

Blockchain ensures data integrity and transparency with an immutable ledger and decentralized governance, preventing failures.

Smart Contracts

SC automate governance by enforcing rules, rewarding quality contributions, ensuring fair participation, and penalizing bad behavior.

This is not simply a solution; it's a **transformation**.

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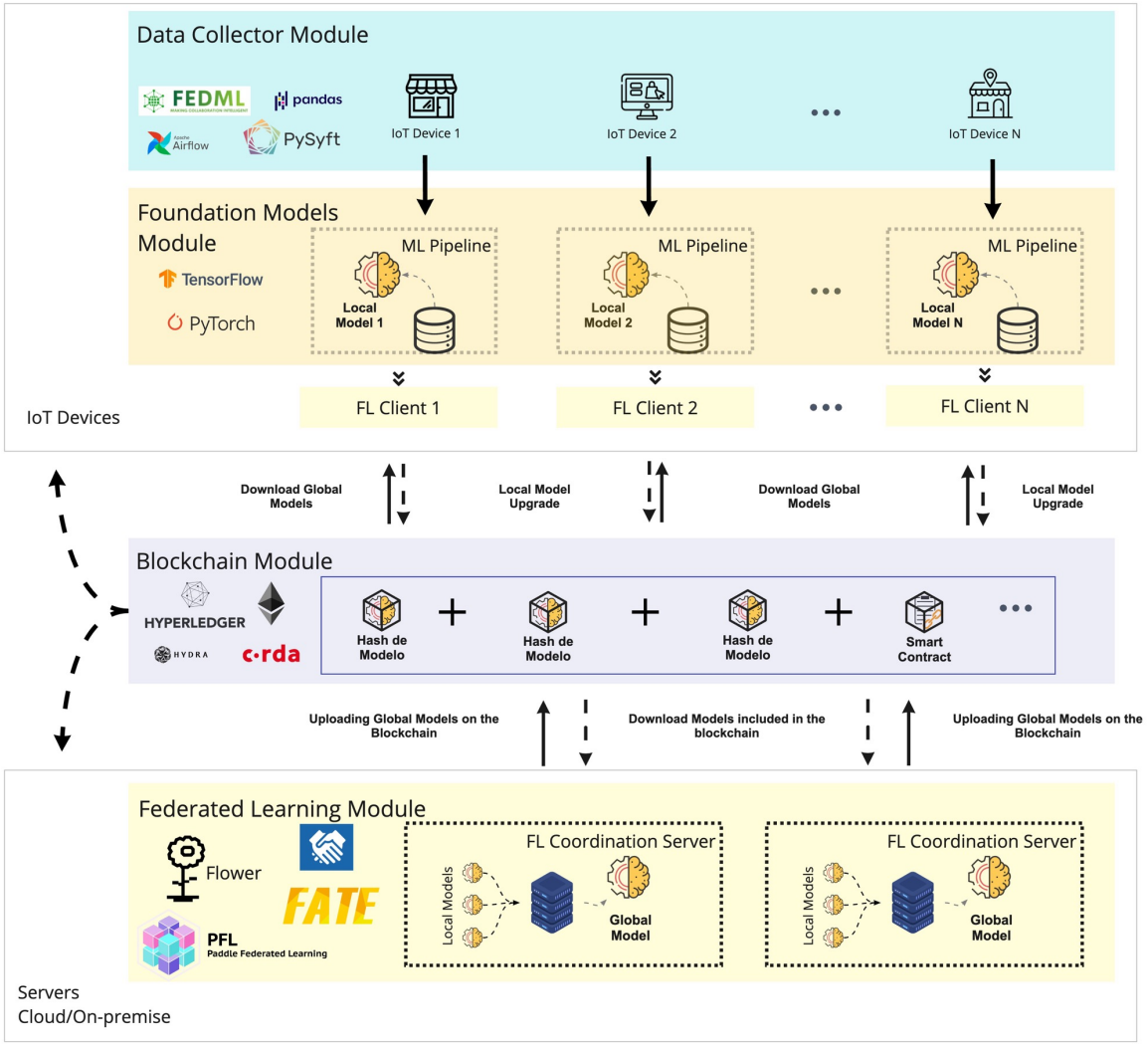
The Architecture

A Secure, Decentralized Framework for Real-Time Urban Management



IoT Connection

IoT devices across the city collecting diverse data streams in real time.

Local Data Processing

Data is preprocessed at local servers to ensure privacy through techniques like anonymization.

Security and Governance

Secure ledger for managing the global model updates and validating contributions.

Integrated Foundation Models

analyze the combined global data, enabling accurate predictions for urban management.

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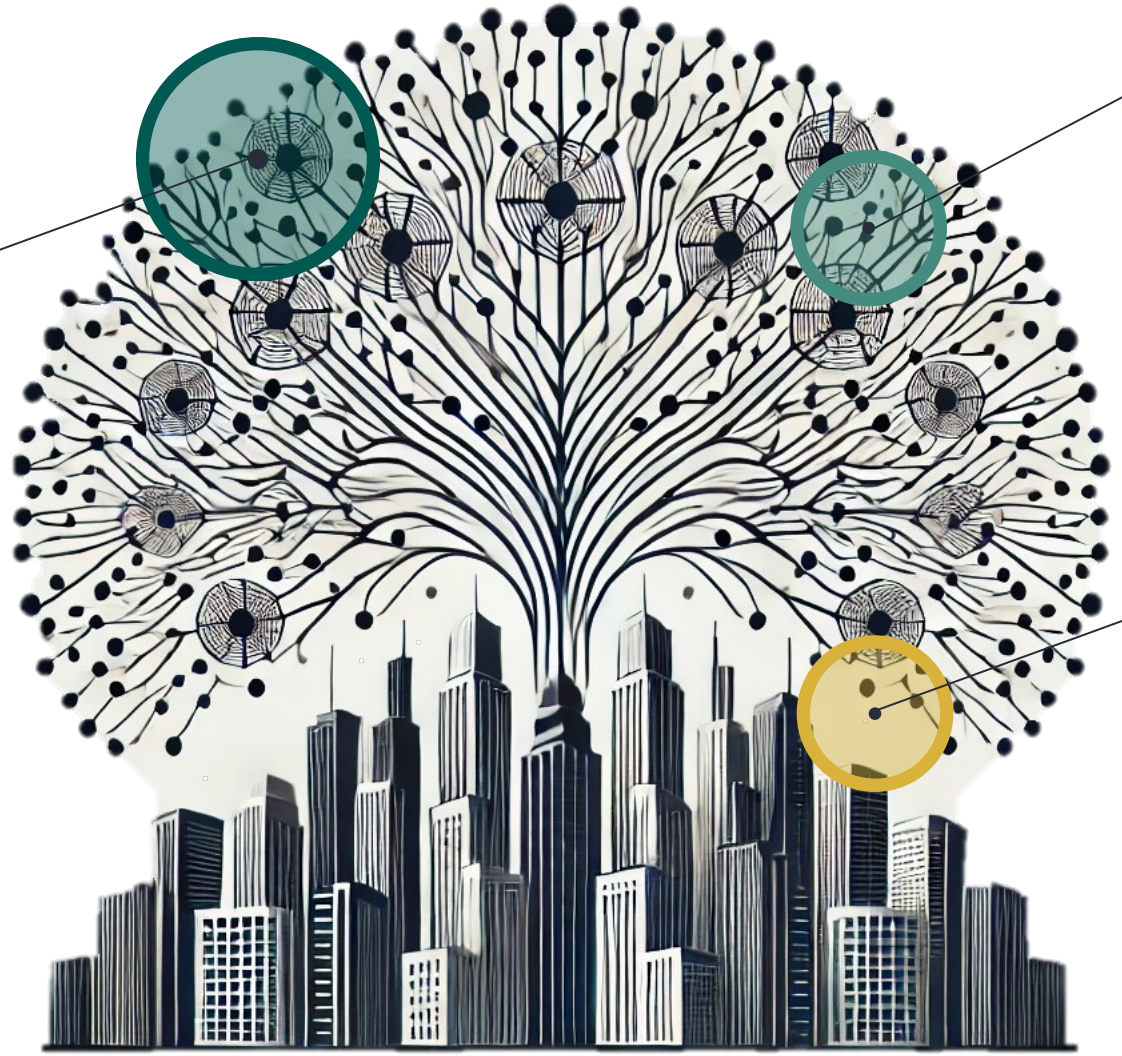
Federated Tokenization of Smart Cities Economy

How the Platform Transforms Smart City Businesses

Urban Infrastructure as Shared Value

The platform tokenizes essential urban systems, enabling citizens to access and enhance transportation, energy, and utilities through shared value tokens



Cultural Treasures Unlocked

Tokenization of the city's heritage, including monuments and arts, fosters citizen engagement and support for cultural activities

Resources for Collective Prosperity

Tokenizing natural assets like water and parks enhances management, ensuring equitable access and preservation for future generations

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Conclusions

Key Reflections for Industrial Innovation

Collaboration

Strengthening Bonds for Success

Immutability

The Guarantee of Data Integrity

Privacy

Confidentiality of Information

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Contact us at

AI Engineer: Sergio Zaera Mata
(szaera@hi-iberia.es)

AI Director: Roberto Gómez-Espinosa Martín
(robertogemartin@hi-iberia.es)

CEO: Juan Alberto Vecino
(jvecino@hi-iberia.es)