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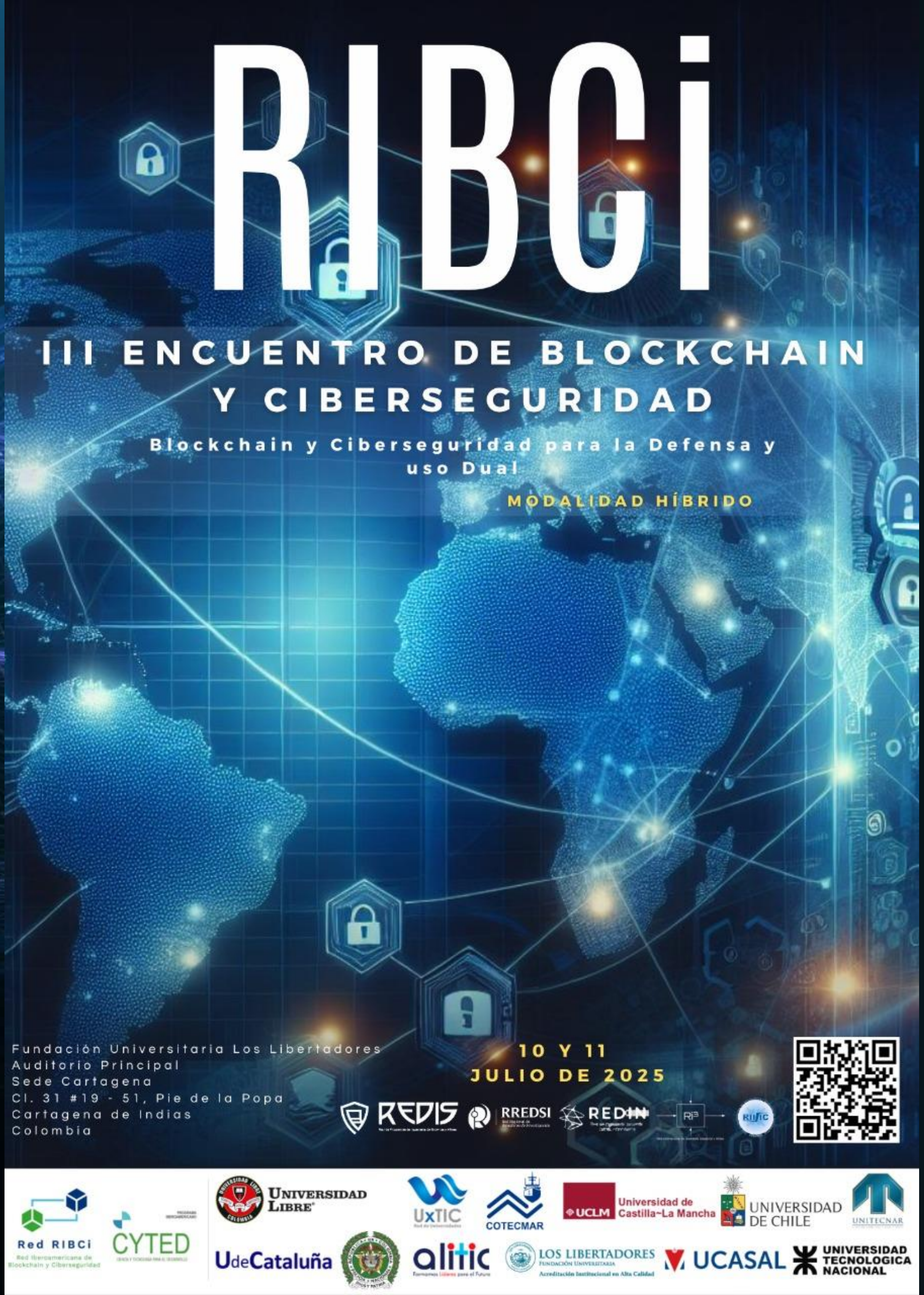
PROGRAMA IBEROAMERICANO
CYTED
CIENCIA Y TECNOLOGÍA PARA EL DESARROLLO



RIBCi

III ENCUENTRO DE BLOCKCHAIN Y CIBERSEGURIDAD

Blockchain y Ciberseguridad para la Defensa y uso Dual

MODALIDAD HÍBRIDO

Fundación Universitaria Los Libertadores
Auditorio Principal
Sede Cartagena
Cl. 31 #19 - 51, Pie de la Popa
Cartagena de Indias
Colombia

10 Y 11
JULIO DE 2025

REDIS
RREDSI
REDIN
RI3
RIITIC
Red RIBCi
Red Iberoamericana de Blockchain y Ciberseguridad
CYTED
Universidad Libre
UxTIC
COTECMAR
UCLM Universidad de Castilla~La Mancha
Universidad de Chile
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Los Libertadores Fundación Universitaria
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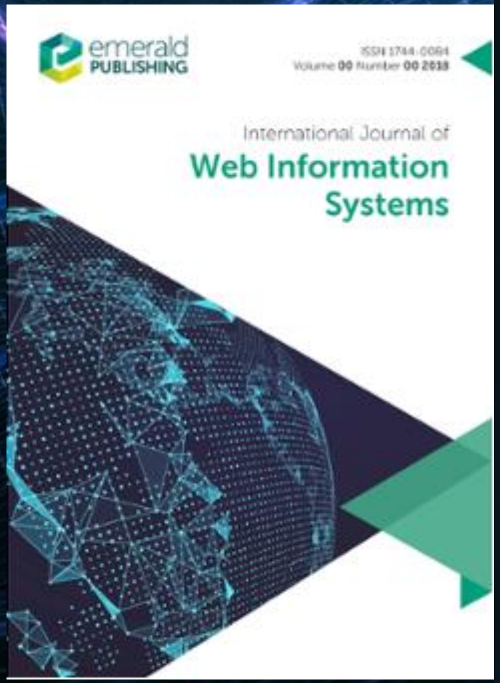
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ISSN 1744-0084
Volume 00 Number 00 2018
International Journal of Web Information Systems

IJWIS Special Issue
Distributed Ledger Technologies and Artificial Intelligence

International Journal of Web Information Systems

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OM **Dr. Oscar Carlos Medina**
Coordinador Red RIBCi-CYTED

Cartagena, Julio 2025

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   Universidad Tecnológica Nacional, Córdoba, Argentina.

Temas principales

1. **Convergencia Tecnológica**

   DLTs y AI se unen para transformar sistemas web.

2. **Gestión de Datos**

   El volumen de datos es crucial en sistemas de información.

3. **Tendencias Clave**

   DLTs más eficientes y sustentables, Federated Learning y grafos de conocimiento.

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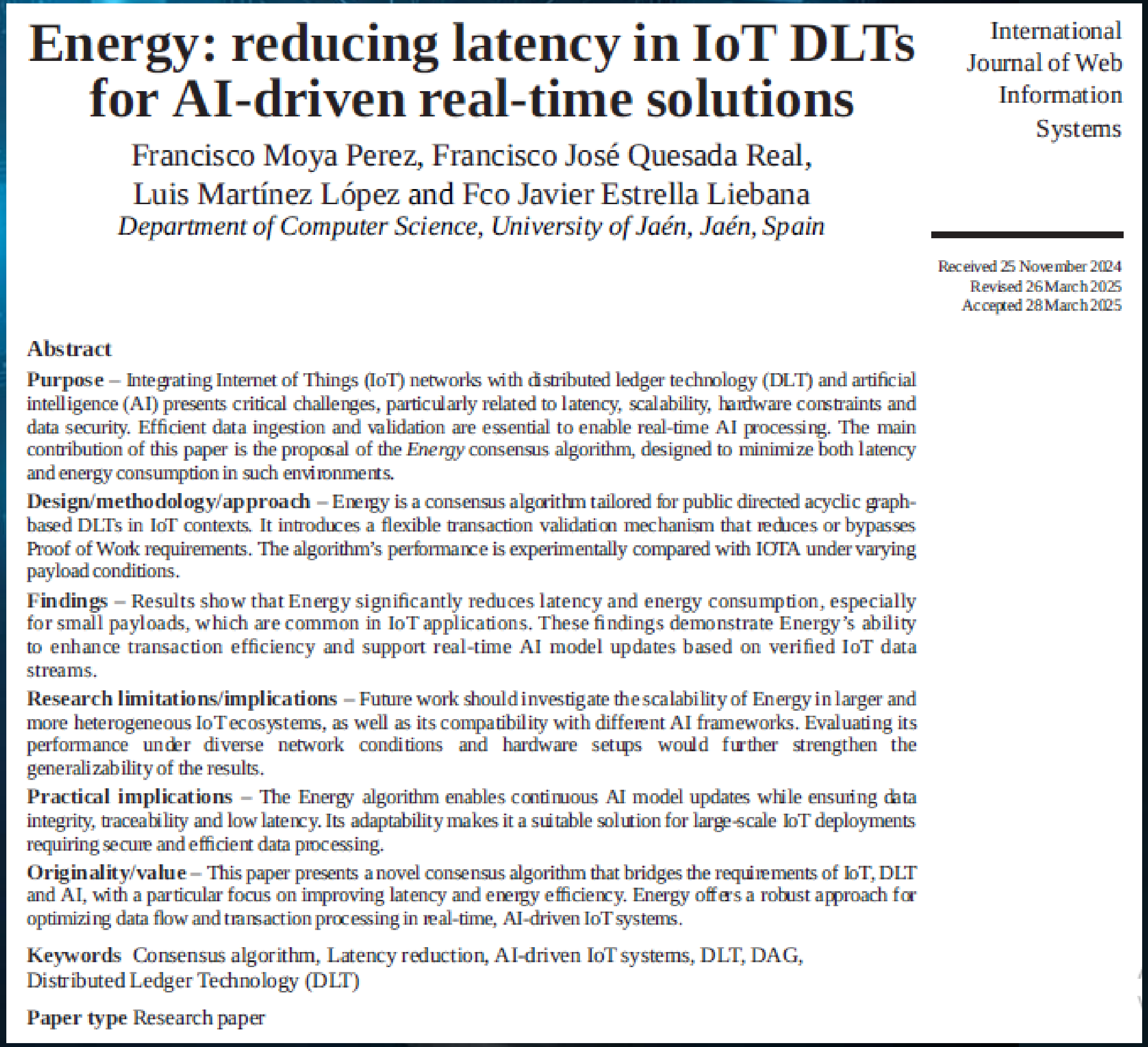
Energy: Reducing Latency in IoT DLTs for AI-Driven Real-Time Solutions



Energy: reducing latency in IoT DLTs for AI-driven real-time solutions

International
Journal of Web
Information
Systems

Francisco Moya Perez, Francisco José Quesada Real,
Luis Martínez López and Fco Javier Estrella Liebana
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Abstract

Purpose – Integrating Internet of Things (IoT) networks with distributed ledger technology (DLT) and artificial intelligence (AI) presents critical challenges, particularly related to latency, scalability, hardware constraints and data security. Efficient data ingestion and validation are essential to enable real-time AI processing. The main contribution of this paper is the proposal of the *Energy* consensus algorithm, designed to minimize both latency and energy consumption in such environments.

Design/methodology/approach – Energy is a consensus algorithm tailored for public directed acyclic graph-based DLTs in IoT contexts. It introduces a flexible transaction validation mechanism that reduces or bypasses Proof of Work requirements. The algorithm's performance is experimentally compared with IOTA under varying payload conditions.

Findings – Results show that Energy significantly reduces latency and energy consumption, especially for small payloads, which are common in IoT applications. These findings demonstrate Energy's ability to enhance transaction efficiency and support real-time AI model updates based on verified IoT data streams.

Research limitations/implications – Future work should investigate the scalability of Energy in larger and more heterogeneous IoT ecosystems, as well as its compatibility with different AI frameworks. Evaluating its performance under diverse network conditions and hardware setups would further strengthen the generalizability of the results.

Practical implications – The Energy algorithm enables continuous AI model updates while ensuring data integrity, traceability and low latency. Its adaptability makes it a suitable solution for large-scale IoT deployments requiring secure and efficient data processing.

Originality/value – This paper presents a novel consensus algorithm that bridges the requirements of IoT, DLT and AI, with a particular focus on improving latency and energy efficiency. Energy offers a robust approach for optimizing data flow and transaction processing in real-time, AI-driven IoT systems.

Keywords Consensus algorithm, Latency reduction, AI-driven IoT systems, DLT, DAG, Distributed Ledger Technology (DLT)

Paper type Research paper

Universidad de Jaén, España

https://www.emerald.com/insight/content/doi/10.1108/ijwis-11-2024-0332/full/html

Energy: Reduciendo la Latencia en IoT DLTs

Algoritmo Energy

Nuevo consenso para IoT, DLT y AI en tiempo real.

Eficiencia

Reduce latencia y consumo energético con tarifas por tamaño.

Optimización

Ideal para hardware limitado y entrenamiento continuo de IA.

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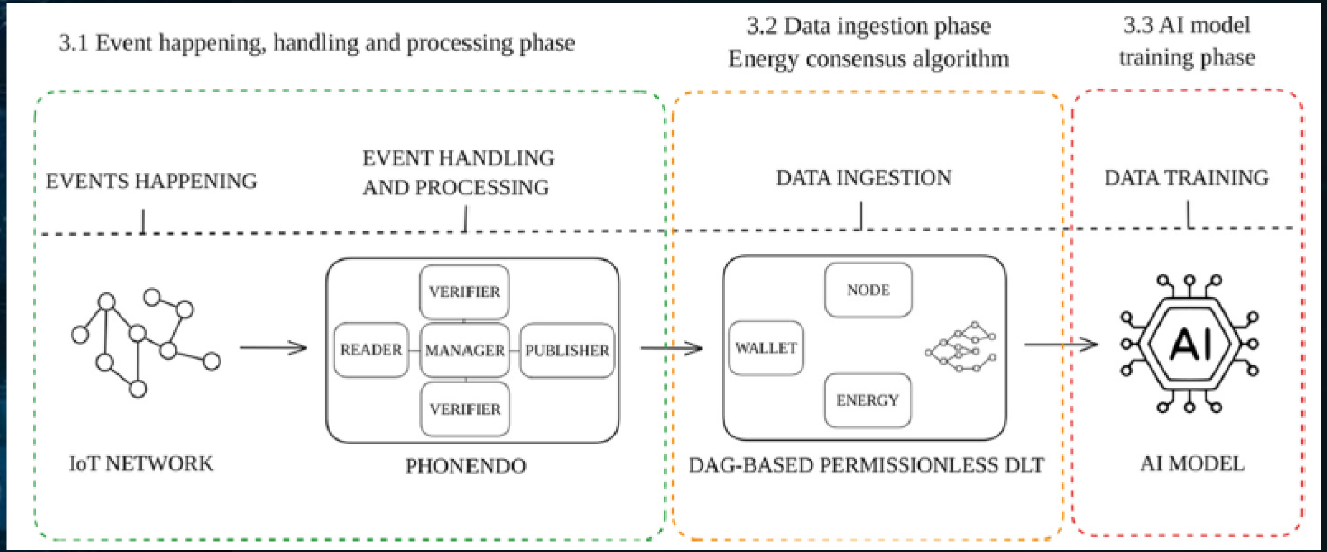
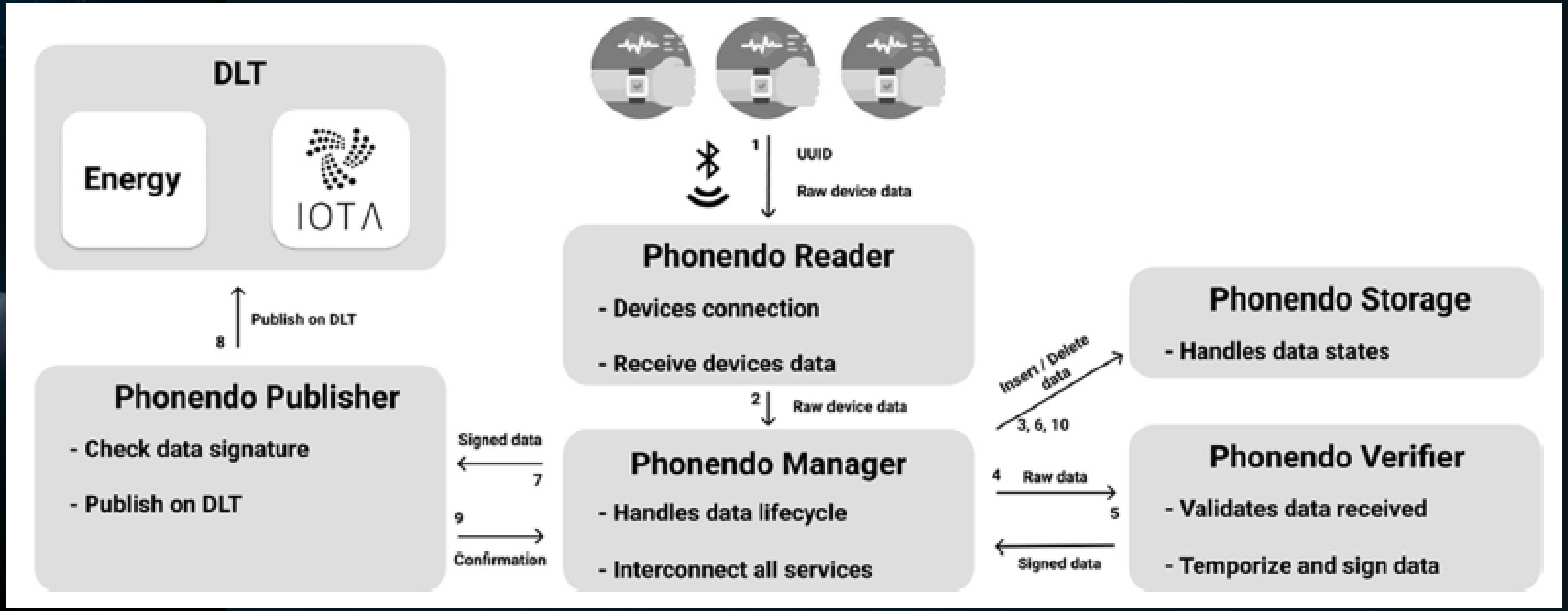
Energy: Reduciendo la Latencia en IoT DLTs


3.1 Event happening, handling and processing phase
3.2 Data ingestion phase
Energy consensus algorithm
3.3 AI model
training phase
EVENTS HAPPENING
EVENT HANDLING
AND PROCESSING
DATA INGESTION
DATA TRAINING
VERIFIER
READER
MANAGER
PUBLISHER
VERIFIER
NODE
WALLET
ENERGY
AI
IoT NETWORK
PHONENDO
DAG-BASED PERMISSIONLESS DLT
AI MODEL


DLT
Energy
IOTA
1
UUID
Raw device data
Phonendo Reader
- Devices connection
- Receive devices data
2
Raw device data
Phonendo Storage
- Handles data states
Insert / Delete data
3, 6, 10
8
Publish on DLT
Phonendo Publisher
- Check data signature
- Publish on DLT
Signed data
7
9
Confirmation
Phonendo Manager
- Handles data lifecycle
- Interconnect all services
4
Raw data
5
Signed data
Phonendo Verifier
- Validates data received
- Temporize and sign data

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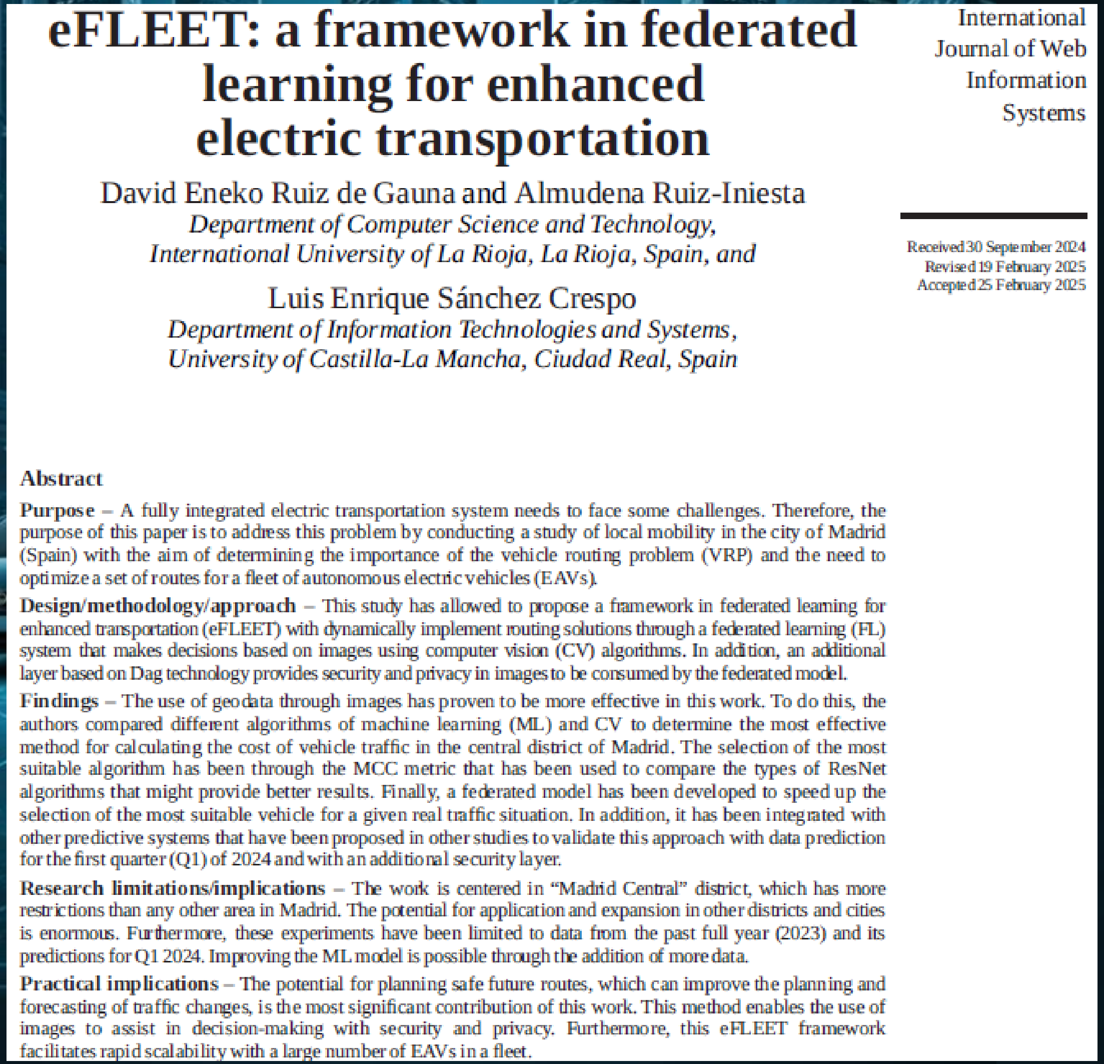
eFLEET: A framework in federated learning for enhanced electric transportation



eFLEET: a framework in federated learning for enhanced electric transportation

International
Journal of Web
Information
Systems

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University of Castilla-La Mancha, Ciudad Real, Spain

Received 30 September 2024
Revised 19 February 2025
Accepted 25 February 2025

Abstract

Purpose – A fully integrated electric transportation system needs to face some challenges. Therefore, the purpose of this paper is to address this problem by conducting a study of local mobility in the city of Madrid (Spain) with the aim of determining the importance of the vehicle routing problem (VRP) and the need to optimize a set of routes for a fleet of autonomous electric vehicles (EAVs).

Design/methodology/approach – This study has allowed to propose a framework in federated learning for enhanced transportation (eFLEET) with dynamically implement routing solutions through a federated learning (FL) system that makes decisions based on images using computer vision (CV) algorithms. In addition, an additional layer based on Dag technology provides security and privacy in images to be consumed by the federated model.

Findings – The use of geodata through images has proven to be more effective in this work. To do this, the authors compared different algorithms of machine learning (ML) and CV to determine the most effective method for calculating the cost of vehicle traffic in the central district of Madrid. The selection of the most suitable algorithm has been through the MCC metric that has been used to compare the types of ResNet algorithms that might provide better results. Finally, a federated model has been developed to speed up the selection of the most suitable vehicle for a given real traffic situation. In addition, it has been integrated with other predictive systems that have been proposed in other studies to validate this approach with data prediction for the first quarter (Q1) of 2024 and with an additional security layer.

Research limitations/implications – The work is centered in “Madrid Central” district, which has more restrictions than any other area in Madrid. The potential for application and expansion in other districts and cities is enormous. Furthermore, these experiments have been limited to data from the past full year (2023) and its predictions for Q1 2024. Improving the ML model is possible through the addition of more data.

Practical implications – The potential for planning safe future routes, which can improve the planning and forecasting of traffic changes, is the most significant contribution of this work. This method enables the use of images to assist in decision-making with security and privacy. Furthermore, this eFLEET framework facilitates rapid scalability with a large number of EAVs in a fleet.

Universidades de La Rioja y Castilla-La Mancha, España

https://www.emerald.com/insight/content/doi/10.1108/ijwis-09-2024-0281/full/html

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CIENCIA Y TECNOLOGÍA PARA EL DESARROLLO

eFLEET: Transporte eléctrico mejorado

Plataforma eFLEET

Framework para transporte eléctrico, probado en Madrid.

Privacidad y Seguridad

No comparte datos crudos, usa capa DAG para seguridad.

Eficiencia Energética

Predice rutas eficientes, reduciendo emisiones.

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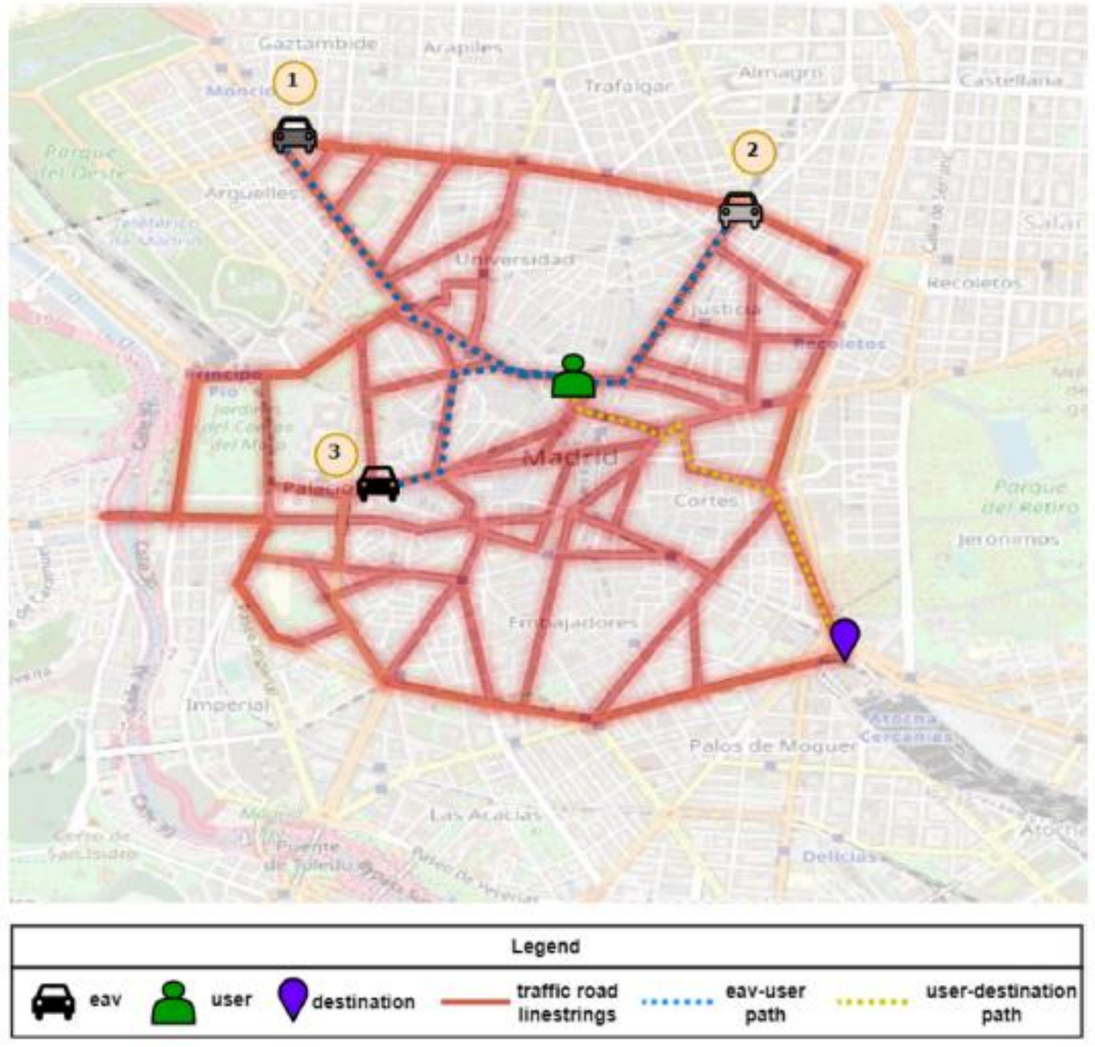
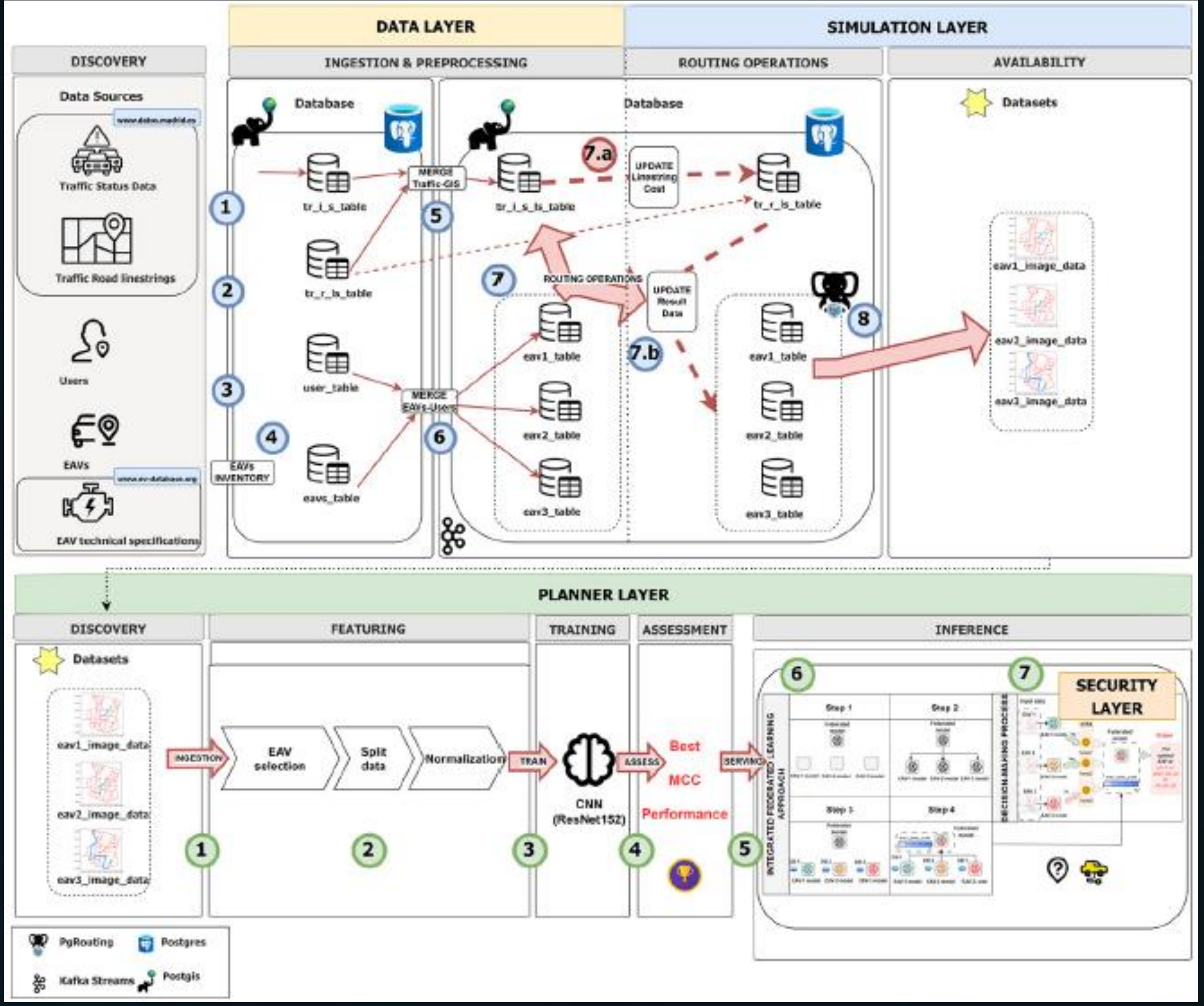
eFLEET: Transporte eléctrico mejorado


1
2
3
Gaztambide
Arapiles
Almagro
Trafalgar
Castellana
Moncloa
Parque del Oeste
Argüelles
Universidad
Justicia
Recoletos
Principe Pío
Palacio
Madrid
Cortes
Parque del Retiro
Jerónimos
Embajadores
Imperial
Palos de Moguer
Las Acacias
Delicias
Legend
eav
user
destination
traffic road linestrings
eav-user path
user-destination path


DATA LAYER
SIMULATION LAYER
DISCOVERY
INGESTION & PREPROCESSING
ROUTING OPERATIONS
AVAILABILITY
Data Sources
Traffic Status Data
Traffic Road linestrings
Users
EAVs
EAV technical specifications
Database
tr_i_s_table
tr_r_ls_table
user_table
eavs_table
EAVs INVENTORY
MERGE Traffic-GIS
MERGE EAVs-Users
1
2
3
4
5
6
7
7.a
7.b
8
tr_i_s_ls_table
UPDATE Linestring Cost
tr_r_ls_table
ROUTING OPERATIONS
UPDATE Result Data
eav1_table
eav2_table
eav3_table
Datasets
eav1_image_data
eav2_image_data
eav3_image_data
PLANNER LAYER
DISCOVERY
FEATURING
TRAINING
ASSESSMENT
INFERENCE
Datasets
INGESTION
EAV selection
Split data
Normalization
TRAIN
CNN (ResNet152)
ASSESS
Best
MCC
Performance
SERVING
INTEGRATED FEDERATED LEARNING APPROACH
Step 1
Step 2
Step 3
Step 4
DECISION MAKING PROCESS
SECURITY LAYER
PgRouting
Postgres
Kafka Streams
Postgis

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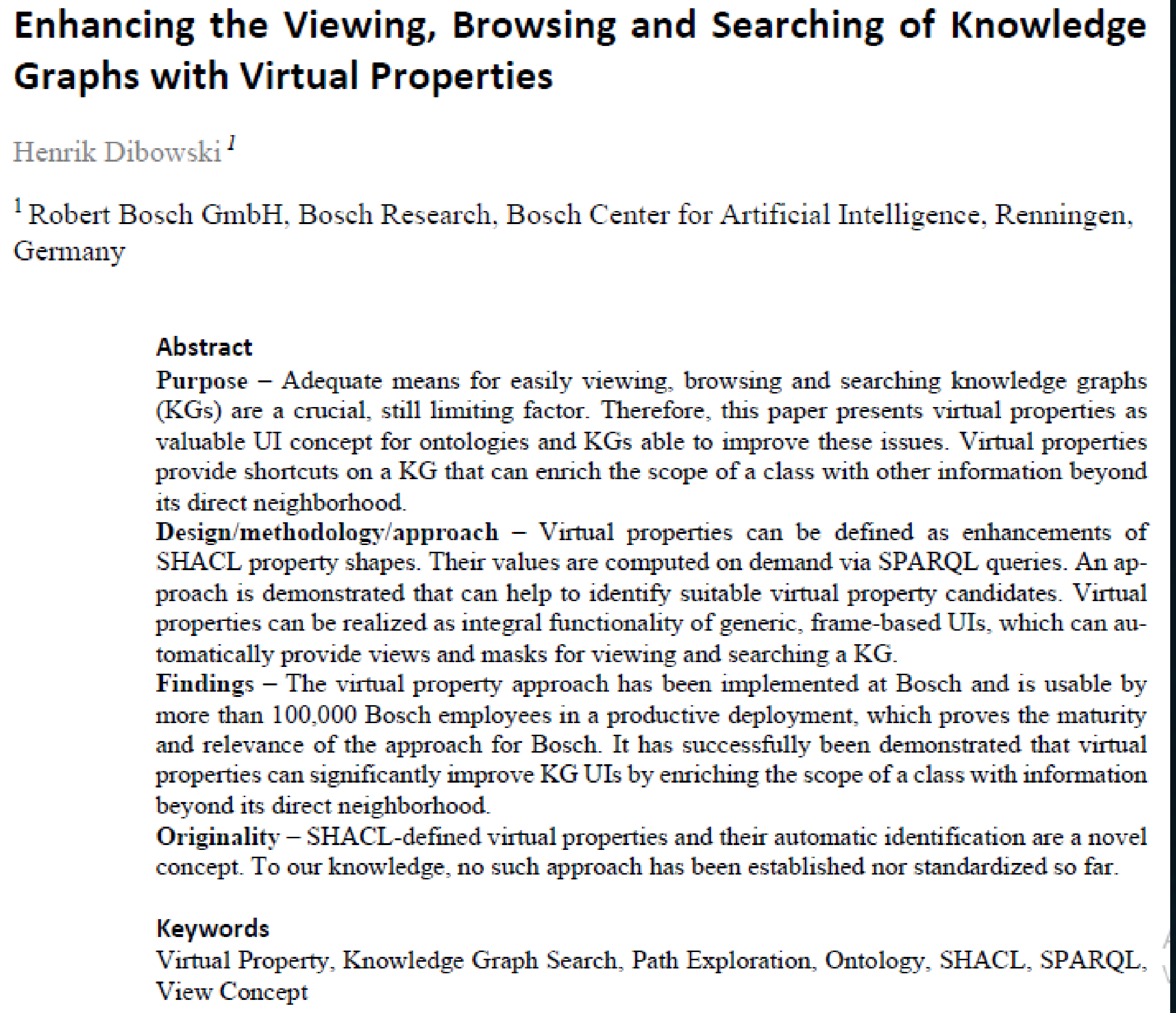
Enhancing the viewing, browsing and searching of knowledge graphs with virtual properties



Enhancing the Viewing, Browsing and Searching of Knowledge Graphs with Virtual Properties

Henrik Dibowski [1]

[1] Robert Bosch GmbH, Bosch Research, Bosch Center for Artificial Intelligence, Renningen, Germany

Abstract

Purpose – Adequate means for easily viewing, browsing and searching knowledge graphs (KGs) are a crucial, still limiting factor. Therefore, this paper presents virtual properties as valuable UI concept for ontologies and KGs able to improve these issues. Virtual properties provide shortcuts on a KG that can enrich the scope of a class with other information beyond its direct neighborhood.
Design/methodology/approach – Virtual properties can be defined as enhancements of SHACL property shapes. Their values are computed on demand via SPARQL queries. An approach is demonstrated that can help to identify suitable virtual property candidates. Virtual properties can be realized as integral functionality of generic, frame-based UIs, which can automatically provide views and masks for viewing and searching a KG.
Findings – The virtual property approach has been implemented at Bosch and is usable by more than 100,000 Bosch employees in a productive deployment, which proves the maturity and relevance of the approach for Bosch. It has successfully been demonstrated that virtual properties can significantly improve KG UIs by enriching the scope of a class with information beyond its direct neighborhood.
Originality – SHACL-defined virtual properties and their automatic identification are a novel concept. To our knowledge, no such approach has been established nor standardized so far.

Keywords
Virtual Property, Knowledge Graph Search, Path Exploration, Ontology, SHACL, SPARQL, View Concept

Universidad Técnica de Dresde, Alemania

https://www.emerald.com/insight/content/doi/10.1108/ijwis-02-2023-0027/full/html

Mejora de Grafos de Conocimiento

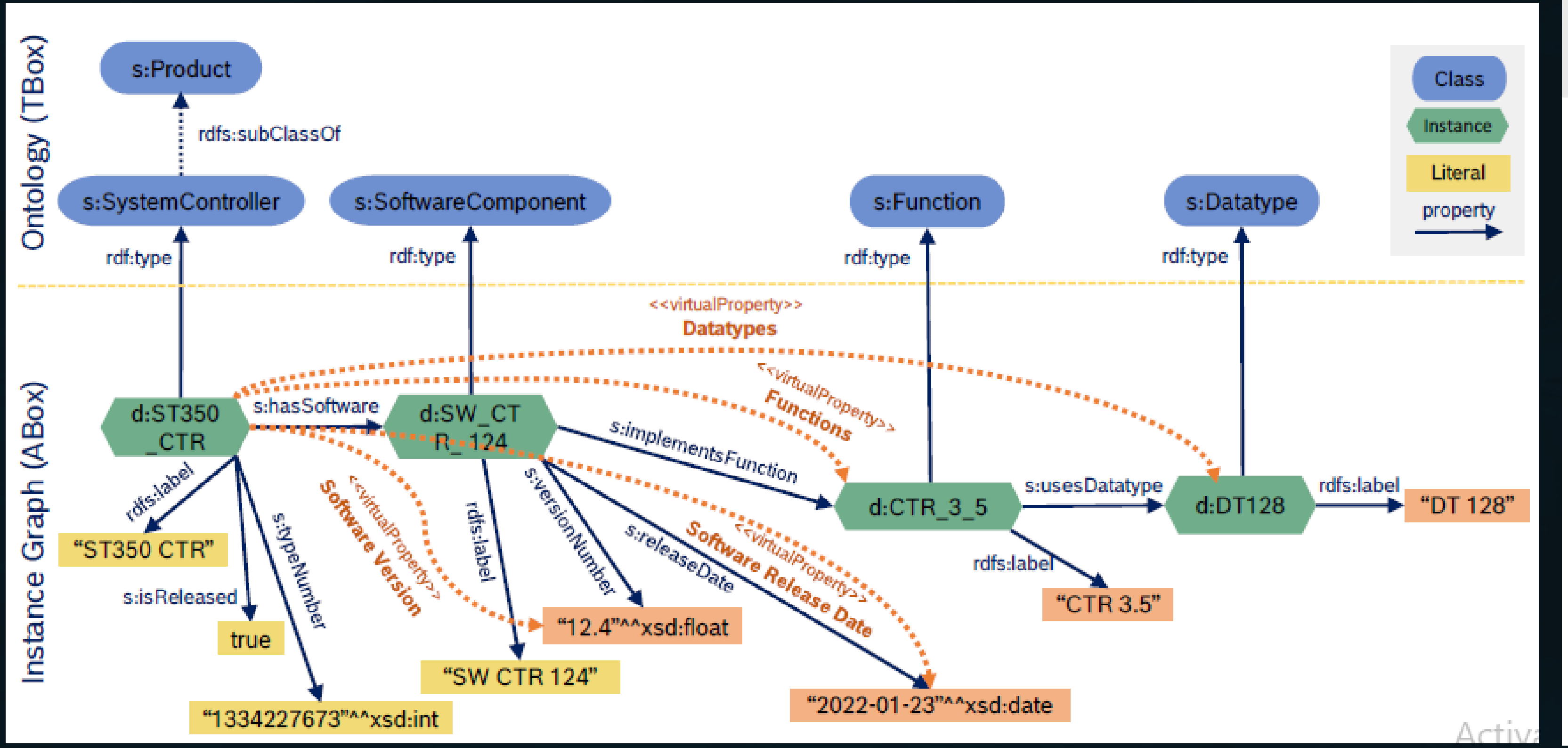
Propiedades Virtuales

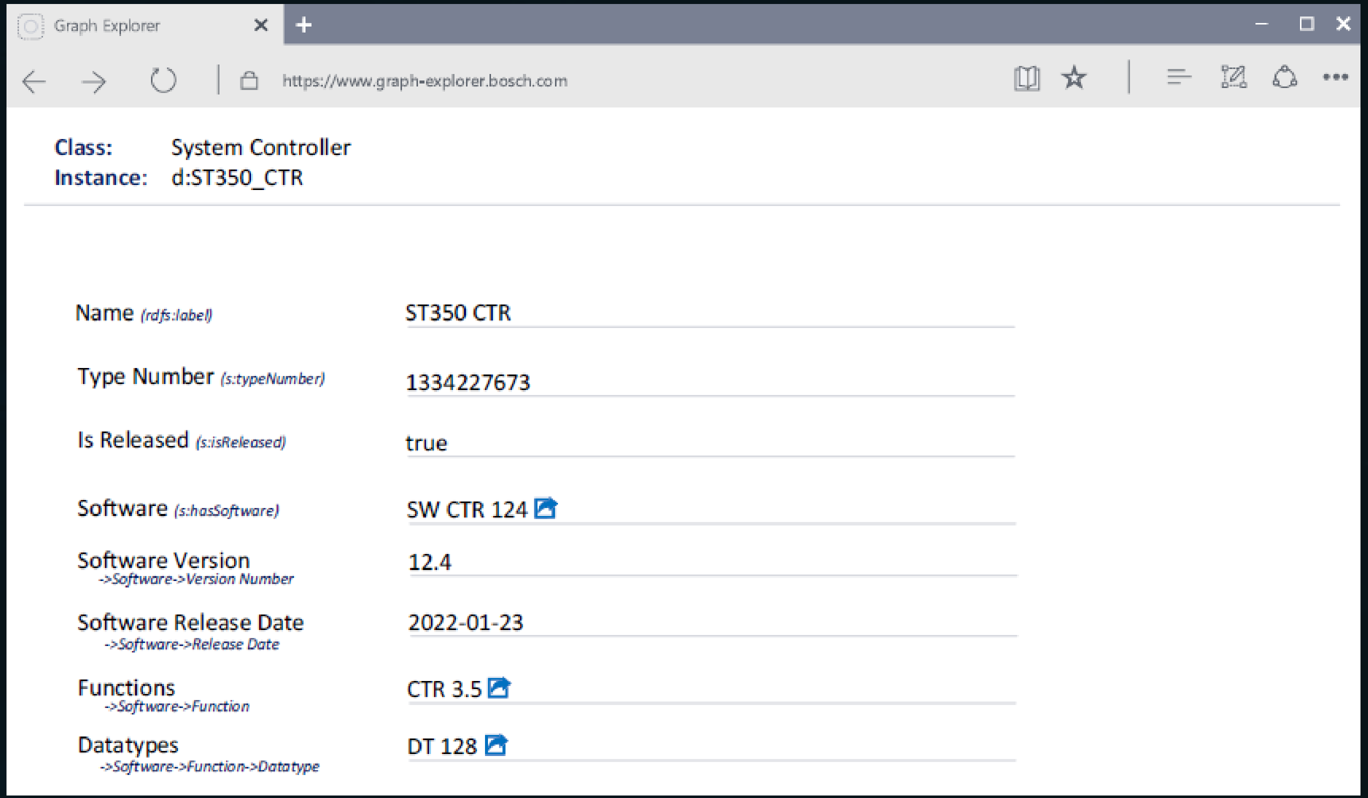
- ✓ Introduce propiedades virtuales con SHACL y SPARQL.
- ✓ Dos tipos: de dato (atributos visibles) y de objeto (vinculan entidades).

Caso Práctico Bosch

- ✓ Implementación en Bosch (100.000 usuarios).
- ✓ Mejora la UI y accesibilidad sin alterar la estructura interna.

Mejora de Grafos de Conocimiento


Ontology (TBox)
Instance Graph (ABox)
s:Product
rdfs:subClassOf
s:SystemController
s:SoftwareComponent
s:Function
s:Datatype
rdf:type
rdf:type
rdf:type
rdf:type
Class
Instance
Literal
property
<<virtualProperty>>
Datatypes
<<virtualProperty>>
Functions
d:ST350_CTR
s:hasSoftware
d:SW_CTR_124
s:implementsFunction
d:CTR_3_5
s:usesDatatype
d:DT128
rdfs:label
"DT 128"
rdfs:label
"ST350 CTR"
s:isReleased
true
s:typeNumber
"1334227673"^^xsd:int
<<virtualProperty>>
Software Version
rdfs:label
"SW CTR 124"
s:versionNumber
"12.4"^^xsd:float
s:releaseDate
<<virtualProperty>>
Software Release Date
"2022-01-23"^^xsd:date
rdfs:label
"CTR 3.5"


Graph Explorer
https://www.graph-explorer.bosch.com

Class: System Controller
Instance: d:ST350_CTR

Name *(rdfs:label)*	ST350 CTR
Type Number *(s:typeNumber)*	1334227673
Is Released *(s:isReleased)*	true
Software *(s:hasSoftware)*	SW CTR 124
Software Version *->Software->Version Number*	12.4
Software Release Date *->Software->Release Date*	2022-01-23
Functions *->Software->Function*	CTR 3.5
Datatypes *->Software->Function->Datatype*	DT 128

Síntesis Comparativa

Artículo	Tema central	Técnica clave	Contribución
Energy	IoT + Blockchain	Lógica difusa, DLT	Reducción latencia
eFLEET	Transporte + Federated learning	FL + DAG + EAV	Rutas seguras y eficientes
Grafos de conocimiento	Mejora UI y acceso	SHACL + SPARQL	Proyecto Catena-X

Conexión: datos distribuidos, procesamiento en el borde y visualización semántica.

Implicaciones y Reflexiones

1. **Infraestructuras Críticas**

   Trascendencia en gestión de energía y transporte.

2. **Enfoque Multidisciplinar**

   Combina IA, Blockchain, IoT y estándares semánticos.

3. **Escalabilidad**

   Desde nivel corporativo (Bosch) hasta sistemas urbanos (Madrid).

4. **Retos**

   Interoperabilidad, privacidad y estandarización.

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Debate – Próximos Pasos

- ¿Cómo equilibrar privacidad y eficiencia en DLTs?
- ¿Qué desafíos enfrenta la adopción comercial de Blockchain e IA en Iberoamérica?
- ¿Cuáles innovaciones son oportunas para Ciber-Defensa?

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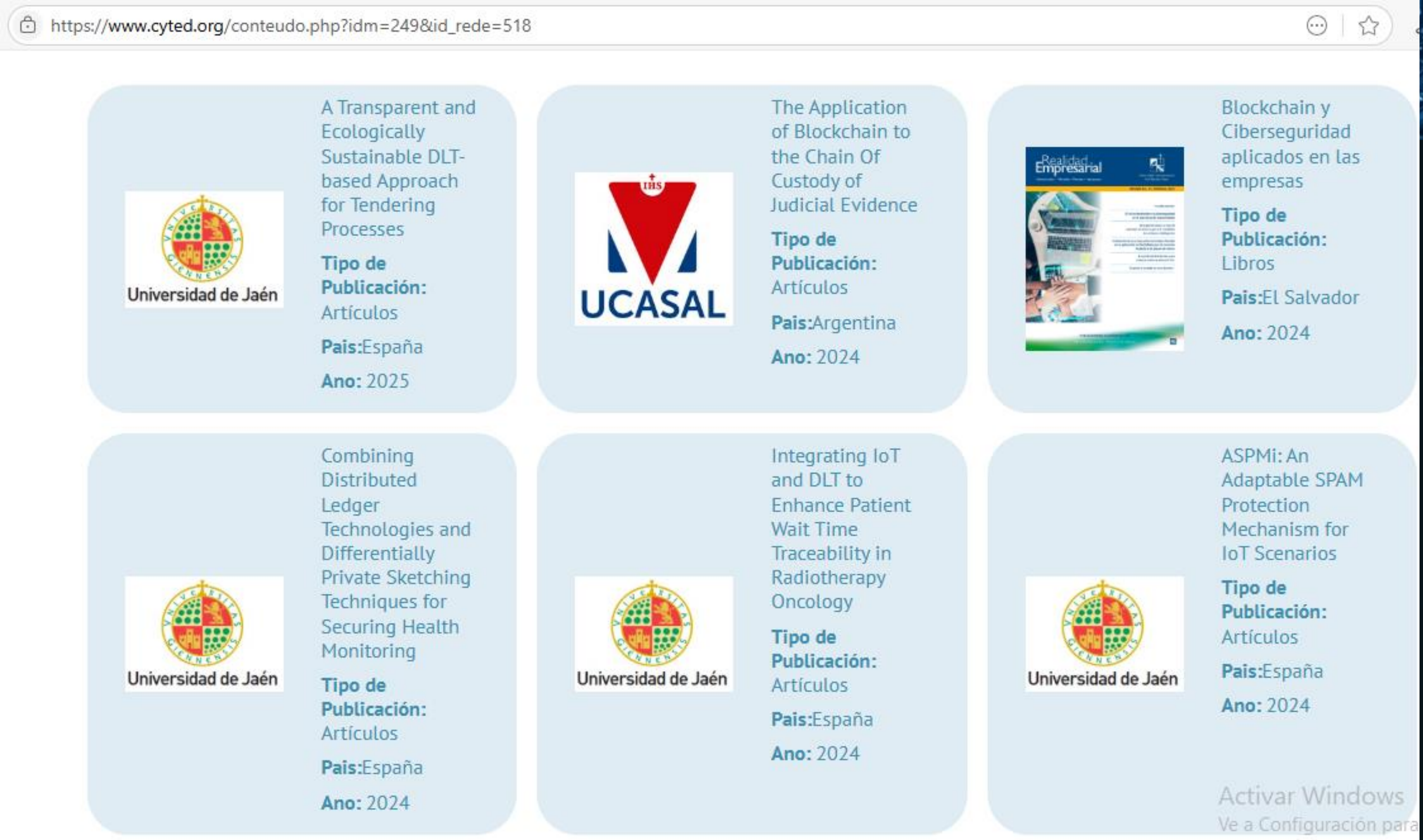

https://www.cyted.org/conteudo.php?idm=249&id_rede=518

A Transparent and Ecologically Sustainable DLT-based Approach for Tendering Processes

Tipo de Publicación: Artículos

Pais: España

Ano: 2025

The Application of Blockchain to the Chain Of Custody of Judicial Evidence

Tipo de Publicación: Artículos

Pais: Argentina

Ano: 2024

Blockchain y Ciberseguridad aplicados en las empresas

Tipo de Publicación: Libros

Pais: El Salvador

Ano: 2024

Combining Distributed Ledger Technologies and Differentially Private Sketching Techniques for Securing Health Monitoring

Tipo de Publicación: Artículos

Pais: España

Ano: 2024

Integrating IoT and DLT to Enhance Patient Wait Time Traceability in Radiotherapy Oncology

Tipo de Publicación: Artículos

Pais: España

Ano: 2024

ASPMi: An Adaptable SPAM Protection Mechanism for IoT Scenarios

Tipo de Publicación: Artículos

Pais: España

Ano: 2024

Activar Windows
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¡Muchas Gracias!

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UNITECNAR
UdeCataluña
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