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NEWSLETTER 12/2024

TALON PROJECT



TALON

Autonomous and self-organised artificial intelligent
orchestrator for a greener industry 5.0

talon-project.eu

EDITORIAL

T This newsletter presents a summary of the primary dissemination outcomes of the project, which include organization of events and technological developments. Specifically, one (1) publication, one (1) participation in a live event, and one (1) insight by TALON partners.

Stylianos Trevlakis, InnoCube

HAPPY NEW YEAR

🎉 Happy New Year from TALON! 🎉

As we welcome 2024, we want to take a moment to thank our partners, clients, and supporters for being an integral part of the TALON journey. This past year has been full of growth, innovation, and collaboration, and we're excited to build on that momentum in the year ahead.

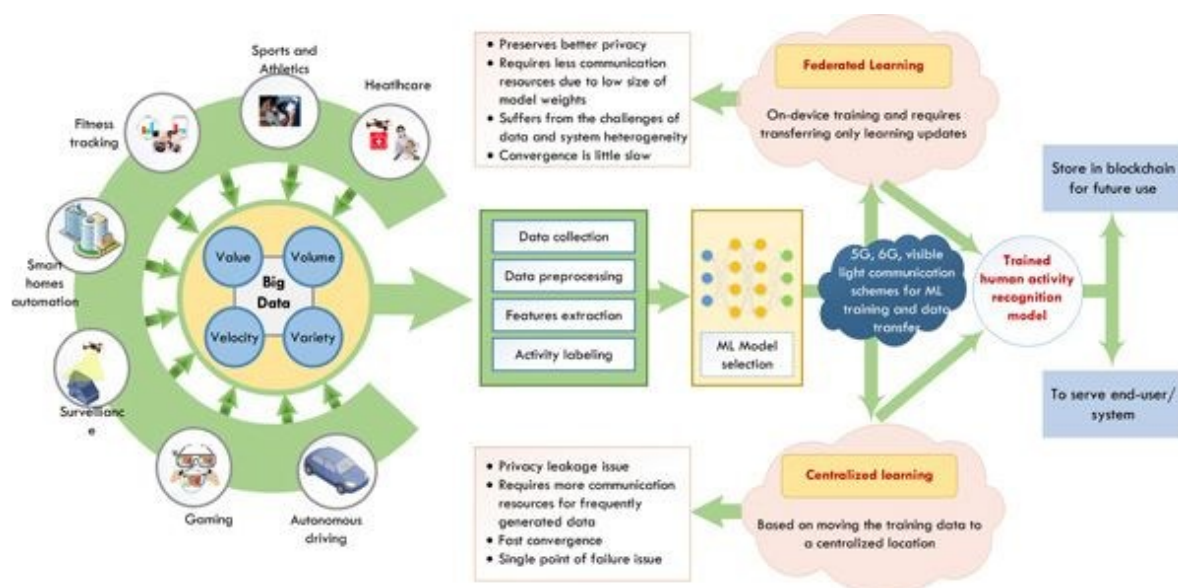
We look forward to achieving new milestones, delivering even greater value, and continuing to strengthen our partnership both within TALON and with other initiatives.

Our best wishes for a successful, prosperous, and fulfilling 2025 to all!



FEDERATED LEARNING FOR HUMAN ACTIVITY RECOGNITION: OVERVIEW, ADVANCES, AND CHALLENGES

Abstract: Human Activity Recognition (HAR) has seen remarkable advances in recent years, driven by the widespread use of wearable devices and the increasing demand for personalized healthcare and activity tracking. Federated Learning (FL) is a promising paradigm for HAR that enables the collaborative training of machine learning models on decentralized devices while preserving data privacy. It improves not only data privacy but also training efficiency as it utilizes the computing power and data of potentially millions of smart devices for parallel training. In addition, it helps end-user devices avoid sending users' private data to the cloud, eliminates the need for a network connection, and saves the latency of back-and-forth communication. FL also offers significant advantages for communication by reducing the amount of data transmitted over the network, alleviating network congestion and reducing communication costs. By distributing the training process across devices, FL minimizes the need for centralized data storage and processing, leading to more scalable and resilient systems. This paper provides a comprehensive survey of the integration of FL into HAR applications. Unlike existing reviews, this paper uniquely focuses on the intersection of FL and HAR, providing an in-depth analysis of recent advances and their practical implications. We explore key advances in FL-based HAR methodologies, including model architectures, optimization techniques, and different applications. Furthermore, we highlight the major challenges and future research questions in this domain, such as model personalization and robustness, privacy concerns, concept drift, and the limited capacity of edge devices.



TALON @ DATA WEEK 2024

🔔 Data Week 2024 session: "Building the Future of Decision-Making: Human-AI Collaboration, Trust and Compliance in the Age of AI" !

Moderator: John Soldatos

Speakers: Evangelia Markidou, Davide Dalle Carbonare, Thanasis Poulakidas, Vrettos Moulos, Kristina Livitckaia

📍 Studio B, Novotel Luxembourg Kirchberg

Check out the programme 👉 <https://lnkd.in/e-DMB8rt>

Hahn Thomas, Laure Le Bars, Valerio Frascolla, Edward Curry, Ana Garcia Robles, Freek Bomhof, Joost Geurts, Dr. Juan Bernabe Moreno, Andrejs Vasiljevs, Tuomo Tuikka, Richard Lloyd Stevens, Rob Smeets, Harald Schöning, Daniel Sáez Domingo, Antonis Ramfos, Jeanette Nilsson, Till Christopher Lech, Davide Dalle Carbonare, Robert Seidl, Sergio Gusmeroli



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ORCHESTRATION CHALLENGES @ TALON

Orchestration Challenges in TALON

Perhaps one of the most elaborate objectives in the TALON vision is accomplishing effective orchestration. Here is why:

- ◊ Federated Scheduling: It uses a "federated scheduling" approach whereby TALON treats edge and cloud resources uniformly as a common pool hosting cloud-native service graphs.
- ◊ Resource Sharing: This resource pool supports multiple service graphs having diverse activated policies, which typically contributes to complexities in sharing those resources efficiently.
- ◊ Contradictive Management: Service graphs using both edge and cloud resources may require conflicting management actions to fulfill their SLOs.

Given the aforementioned challenges, the Application Lifecycle Manager performs the following:

- ◊ It monitors, decides and orchestrates the service graph deployment process;
- ◊ Ensures that the applied SLOs are maintained and triggers the respective corrective actions;
- ◊ Provides an abstraction model for runtime adaptations, such as elasticity or security actions;
- ◊ Keeps a constant view over the physical resources, their energy and their reservation status.
- ◊ Predict and resolve conflicts resulting from divergent policy actions.

The power of the Application Lifecycle Manager ensures orchestration efficiency to enable frictionless dynamic and scalable cloud-native environments.

Read more: <https://lnkd.in/dGsCnwj2>



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