

«ARISE»

Ai-based medical swaRm learnIng prototype for SEcurity and analysis optimization on multicentric clinical data

Funded by the European Union - NextGenerationEU through the cascade call of ALMA MATER STUDIORUM - University of Bologna within the HEAL ITALIA program, funded by the PNRR - "Partnerships extended to Universities, research centers, companies and financing of research projects", D.D. 341 of 15/03/2022, CUP: J33C22002920006. Mission 4 "Education and Research", Component 2 "From Research to Business", Investment 1.3, Spoke 2 Intelligent Health.



Finanziato
dall'Unione europea
NextGenerationEU



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dell'Università
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ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Beneficiary organization description

VET S.r.l. has extensive know-how in research and development and many years of experience in managing complex innovative projects in various fields and topics like those foreseen within the ARISE project: telemedicine, predictive diagnostics through AI, decision support systems, cybersecurity and big data.

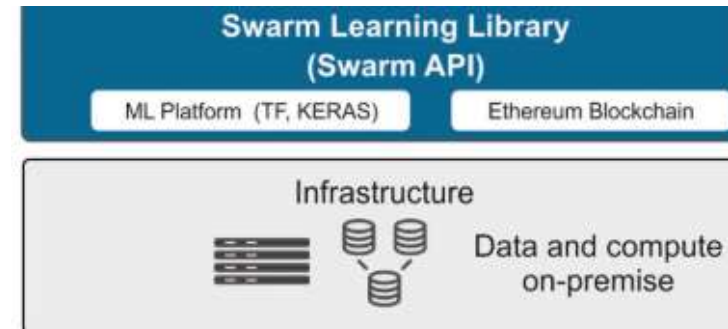
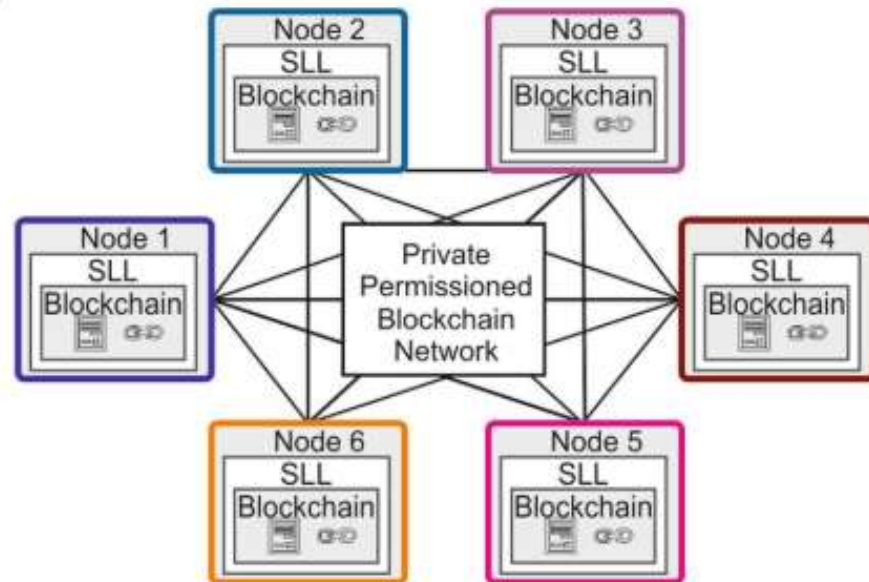
Website: www.vetsrl.com

VET Products/Services:

- Integrated system for the mobility of the visually impaired support
- DMIS platform (DIRAC Monitor Iot System) that integrates IoT, cloud, big data analytics, machine learning and digital twin for the optimization of energy-intensive systems
- Monitoring, data analysis and reporting algorithms in Industry 4.0 contexts for heterogeneous electromechanical equipment

Project objectives

Develop an innovative prototype of a hardware-software platform based on **swarm learning**, using **blockchain** and **artificial intelligence** to optimize multicenter clinical data processing and security. The goal is to improve diagnostic accuracy and treatment personalization in precision medicine, through: (1) OBJ1: Development of the ARISE middleware, (2) OBJ2: Development of AI/ML applications for precision medicine, (3) OBJ3: Integration and demonstration of the ARISE technology in a tri-institutional network composed by three nodes at the Universities of Rome, Verona and Bologna.



Projects contributes

With the **Spoke Research Program**:

1. development of an innovative open-source distributed prototype system based on swarm learning and blockchain, in line with the specific objective of the Spoke research theme (“development of an open-source swarm learning framework for integrated and decentralized biomedical data processing”)
2. implementation of 4.0 technological innovations and KETs applied to Precision Medicine
3. consistency with the smart specialization strategy (S3) of the Puglia Region by intercepting two of the key principles (“human and environmental health” and “digital, creative and inclusive communities”) and two of the drivers of change (“information technologies for industry and society” and “life sciences and technologies for health”)

With the **HEAL ITALIA Program and Precision Medicine**:

1. provide new predictive, advantageous, personalized and non-invasive diagnostic pathways, based on more effective predictions of complex models
2. identify and minimize adverse events by optimizing therapies
3. monitor patients more quickly, ensuring economic and reliable tools
4. improve accessibility and equity in health care delivery

Initial Gantt chart

Below the gantt chart and the correspondence between objectives and WP.

WP/T	Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
WP0: Project management	-	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
WP1: ARISE middleware layer	IR/ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T1.1: SOTA and requirements analysis	IR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T1.2: Architectural design	IR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T1.3: Code framework development and testing	ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
WP2: ARISE AI/ML application layer	IR/ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T2.1: SOTA and requirements analysis	IR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T2.2: Architectural design	IR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T2.3: Code framework development and testing	ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
WP3: ARISE integration and technology demonstration in relevant environment	ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T3.1: Tor Vergata ARISE-edge deployment and testing	ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T3.2: Bologna ARISE-edge deployment and testing	ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T3.3: Verona ARISE-edge deployment and testing	ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
T3.4: Framework integration and technology demonstration in relevant environment (tri-institutional network)	ED	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
WP4: Dissemination of scientific and research results	IR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█