

Proposal Evaluation Form

	EUROPEAN COMMISSION Horizon Europe (HORIZON)	Evaluation Summary Report - Research and innovation actions
---	--	--

Call:	HORIZON-KDT-JU-2022-2-RIA
Type of action:	HORIZON-JU-RIA
Proposal number:	101112268
Proposal acronym:	NEUROKIT2E
Duration (months):	36
Proposal title:	Open source deep learning platform dedicated to Embedded hardware and Europe
Activity:	HORIZON-KDT-JU-2022-2-RIA-Topic-1

N.	Proposer name	Country	Total eligible costs	%	Grant Requested	%
1	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	2,342,095.25	11.86%	819,733.34	13.00%
2	NANOXPLORE	FR	1,280,625	6.48%	448,218.75	7.11%
3	THALES	FR	1,385,257.5	7.01%	346,314.38	5.49%
4	DOLPHIN DESIGN SAS	FR	1,023,958.75	5.18%	255,989.69	4.06%
5	KOMPAI ROBOTICS	FR	341,250	1.73%	119,437.5	1.89%
6	STICHTING IMEC NEDERLAND	NL	1,047,347.5	5.30%	366,571.63	5.81%
7	GRAI MATTER LABS BV	NL	193,750	0.98%	67,812.5	1.08%
8	TECHNISCHE UNIVERSITEIT DELFT	NL	590,117.5	2.99%	206,541.13	3.28%
9	ALMENDE BV	NL	691,875	3.50%	242,156.25	3.84%
10	SILICON AUSTRIA LABS GMBH	AT	990,083.75	5.01%	346,529.31	5.50%
11	Spiki GmbH	AT	279,000	1.41%	97,650	1.55%
12	TTTECH AUTO AG	AT	856,187.5	4.33%	214,046.88	3.40%
13	TTTECH COMPUTERTECHNIK AG	AT	750,750	3.80%	187,687.5	2.98%
14	FH-CAMPUS WIEN - VEREIN ZUR FORDERUNG DES FACHHOCHSCHUL-, ENTWICKLUNGS- UND FORSCHUNGSZENTRUMS IM SUDEN WIENS	AT	423,111.25	2.14%	148,088.94	2.35%
15	STMICROELECTRONICS SRL	IT	300,000	1.52%	75,000	1.19%
16	DEEPSENSING S.R.L.	IT	53,750	0.27%	18,812.5	0.30%
17	High Technology Systems s.r.l.	IT	793,750	4.02%	277,812.5	4.41%
18	FONDAZIONE BRUNO KESSLER	IT	200,000	1.01%	70,000	1.11%
19	UNIVERSITA DEGLI STUDI DI CATANIA	IT	200,000	1.01%	70,000	1.11%
20	UNIVERSITA DEGLI STUDI DI PALERMO	IT	300,000	1.52%	105,000	1.67%
21	UNIVERSITA DEGLI STUDI DI MESSINA	IT	500,000	2.53%	175,000	2.78%
22	Sensity B.V.	NL	609,437.5	3.09%	213,303.13	3.38%
23	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	DE	711,231.25	3.60%	248,930.94	3.95%
24	INFINEON TECHNOLOGIES AG	DE	1,769,560	8.96%	442,390	7.02%
25	CODASIP GMBH	DE	941,415	4.77%	329,495.25	5.23%
26	BRANDENBURGISCHE TECHNISCHE UNIVERSITAT COTTBUS-SENFTENBERG	DE	338,250	1.71%	118,387.5	1.88%
27	SORAMA BV	NL	837,780	4.24%	293,223	4.65%

Total:	19,750,582.75	6,304,132.62	
--------	---------------	--------------	--

Abstract:  Associated with document Ref. Ares(2022)8504420 - 07/12/2022

The NEUROKIT2E project aims at proposing a Deep Learning Platform for Embedded Hardware around an established European value chain (providing AI hardware and software). This open source platform will provide the necessary tools for Europe to play on the same level with its American and Chinese competitors, and take the lead on a competitive aspect (still underdeveloped but which will quickly prove to be essential): embedded AI. The NEUROKIT2E's offer targets to serve European industry needs as a priority, enabling easy and fast Neural Network design, optimization and implementation on constrained hardware targets. This challenging development will be powered using N2D2 (for Neural Network Design & Deployment) platform, developed by CEA, Coordinator of NEUROKIT2E, for the exploration and development of AI applications, and embed specific hardware components from European players such as NX, ST, GML, all members of the NEUROKIT2E consortium.

NEUROKIT2E will provide essential outcomes such as the end of the dependence of EU stakeholders to American and Chinese tools, the valorisation of EU hardware technologies, the benchmark of hardware and architectures before implementation to ensure the success of embedded AI in devices from energy consumption to sparse resources exploitation, the capacity to overcome the heterogeneity of components through a single, open, sovereign platform while ensuring reliability, safety, transparency. The NEUROKIT2E framework will impact the AI landscape as the first one dedicated to embedded AI and will position EU stakeholders in this key market.

The NEUROKIT2E consortium relies on 5 EU countries active in the hardware and software activities, France, Netherlands, Austria, Germany and Italy, with a balance between private and public research: 12 private companies (5 large industries: THALES, Infineon, TTTECH, ST, DOLPHIN ; 6 SMEs: NX, GrAI, Almende, Spiki, Deep, HTS) ; 4 RTOs (CEA, IMEC, SAL, FBK).

Evaluation Summary Report

Evaluation Result

Total score: 14.30 (Threshold: 11)

Criterion 1 - Excellence

Score: **4.80** (Threshold: 3/5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the KDT JU work programme / ECS SRIA:

- Clarity and pertinence of the project's objectives, and the extent to which the proposed work is ambitious and goes beyond the state of the art.

The project's main ambition to accelerate the adoption of Deep Neural Networks (DNN) in European Industry is sound and is very well in line with ECS-SRIA 2022 as well as several specific Major Challenges of both the Foundational Technology Layers (FTL) and Cross-Sectional Technologies (CST) and targeted milestones.

The objectives are clearly formulated and articulated with well-defined and ambitious but realistic KPIs. All KPIs have clear and measurable targets.

However, the proposal does not consider the protection of ML models deployed on edge devices.

The progress beyond the state of the is well justified and is based on well-defined baselines.

Overall, the technical robustness of the proposed AI system is very good.

However, ambition 6 only partly substantiates how the technical robustness of embedded neural networks will be achieved.

- Soundness of the proposed methodology, including the underlying concepts, models, assumptions, inter-disciplinary approaches, appropriate consideration of the gender dimension in research and innovation content, and the quality of open science practices, including sharing and management of research outputs and engagement of citizens, civil society and end users where appropriate.

The methodology is driven by seven use cases with four demonstrators from different application domains. Overall, the proposal presents a well-defined methodology with clear concepts, models, and assumptions.

The AI- and privacy-related issues are carefully addressed in the proposal.

The use cases are overall well selected.

The role and position of the framework and how the framework will enable progress in the use cases are clearly described.

The target KPIs for the use cases are generally well-defined and ambitious.

Interdisciplinary aspects are considered within the ICT domain and are appropriate for the nature of the project.

The proposal pledges to foster open science practices and describes in concrete terms a set of tactics that will be applied to achieve that, which is very good.

The approach to the management of research outputs is well-elaborated.

Engagement of citizens, civil society, and end users is provided by the open-source nature of the framework and proactive tactics to increase awareness and involvement of the engineering and commercial communities.

Criterion 2 - Impact

Score: **4.70** (Threshold: 3/5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the KDT-JU work programme /ECS SRIA. The extent to which the outputs of the project should contribute at the European and/or International level to:

- Credibility of the pathways to achieve the expected outcomes and impacts specified in the work programme, and the likely scale and significance of the contributions from the project.

Key impacts, as well as the strategies, are clear and credible.

An up-to-date and thorough description of the competitors, as well as the project's advantages, is provided from a technology perspective.

The pathways to achieving mid-term impacts are credible and defined through expected developments and demonstration activities, and targets.

The innovation aspects are well supported by market research, and a wide impact is realistic.

The projected outcomes range from direct technical contributions and their impact on the industry to proactive measures to develop and invigorate the relevant communities, which is excellent.

However, outcome 4 and outcome 8 do not substantiate how the developed AI silicon will translate into a tangible impact on the chip design community.

Moreover, the scale of the expected outcomes in mid/long terms may be limited due to fierce competition in the area of edge AI.

The proposal identifies very well the embedded and edge AI as a gap at the International level that the European industry can be in the leading position to close.

The contribution and scale of the project are significant, as the proposal aims to deal with the heterogeneity of components for the development of European processors and accelerators and HW/SW of edge-AI-based systems.

Barriers to impact and strategies to mitigate them are well-elaborated and credible.

Some generic considerations at the geopolitical level are addressed, focusing on improving European sovereignty, which is appreciated.

- Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities. Ref. Ares(2022)8504420 - 07/12/2022

Overall the measures to maximize impact are seen as suitable and of high quality.

The dissemination and communication activities are well-defined.

All necessary stakeholders have been identified together with specific tactics for achieving targeted outcomes and impacts.

Suitable and measurable KPIs are identified and adapted to various identified target audiences.

The training activities are effectively integrated within the dissemination and communication strategy, which is excellent.

The exploitation strategy of commercial results is well thought out and clear both concerning the joint exploitation as well as at the individual partner level overall.

Total addressable markets and serviceable obtainable markets are estimated and quantified.

However, some individual exploitation plans are generic, e.g., partner 27 exploitation strategy is limited to the following description: "New use case developed and new market explored".

The exploitation strategy through open source and licensing for industrial partners' IPRs is well thought out. However, there are no sufficient details on how the project plans to maintain the open-source releases of the developed platform, especially after the project's lifetime.

Management of IPR is excellently addressed, including background IP, which is impressive and supports the overall credibility of the envisioned impacts.

Criterion 3 - Quality and efficiency of the implementation

Score: **4.80** (Threshold: 3/5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the KDT-JU work programme/ECS SRIA:

- Quality and effectiveness of the work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall.

The proposed work plan is well-structured, coherent, and effective.

It is consistent with the targeted objectives and use cases, and the task specifications are precise, clear, and well-elaborated, as are most of the descriptions of the roles of participants in the tasks.

Some deliverables lack an interim version to enable better monitoring of the WP progress, e.g., D3.2/D3.3/D3.4/D7.6

In the work plan, it is not clear how the consortium is planning to procure the training and bench marking data required to develop some of the necessary algorithms.

The milestones are clearly described and are appropriate to monitor the progress of the implementation of the proposed work.

Risk management is adequately described with overall appropriate risk-mitigation measures.

However, no risks are assessed as highly likely, which is unrealistic considering the nature of the project.

Some of the measures are generic, e.g., the kind of corrective actions is not detailed (e.g., if safety goals cannot be sufficiently covered), and for some high-severity risks, mitigation actions are not sufficiently proactive.

The overall resources allocated to the work packages are in line with their objectives and deliverables and the project's complexity.

- Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.

 Associated with document Ref. Ares(2022)8504420 - 07/12/2022

The consortium is excellent and holds all the expertise required for achieving the project goals, and the partners have complementary roles and skills.

The full value chain is well covered with balanced participation of industry in various domains and research centers/universities.

Each participant has a valid role in the project and the capacity to address their tasks and fulfill their role.

Scope of the application

Status: **Yes**

Comments (in case the proposal is out of scope)

Not provided

Exceptional funding

A third country participant/international organisation not listed in [the General Annex to the Main Work Programme](#) may exceptionally receive funding if their participation is essential for carrying out the project (for instance due to outstanding expertise, access to unique know-how, access to research infrastructure, access to particular geographical environments, possibility to involve key partners in emerging markets, access to data, etc.). (For more information, see the [HE programme guide](#))

Please list the concerned applicants and requested grant amount and explain the reasons why.

Based on the information provided, the following participants should receive exceptional funding:

Not provided

Based on the information provided, the following participants should NOT receive exceptional funding:

Not provided

Use of human embryonic stem cells (hESC)

Status: **No**

If YES, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please state if it cannot be assessed whether the use of hESC is necessary or not, because of a lack of information.

Not provided

Use of human embryos

Status: **No**

If YES, please explain how the human embryos will be used in the project.

Not provided

Activities excluded from funding

Status: **No**

If YES, please explain.

Not provided

Status: **Yes**

If Partially/No/Cannot be assessed please explain

Not provided

Exclusive focus on civil applications

Status: **Yes**

If NO, please explain.

Not provided

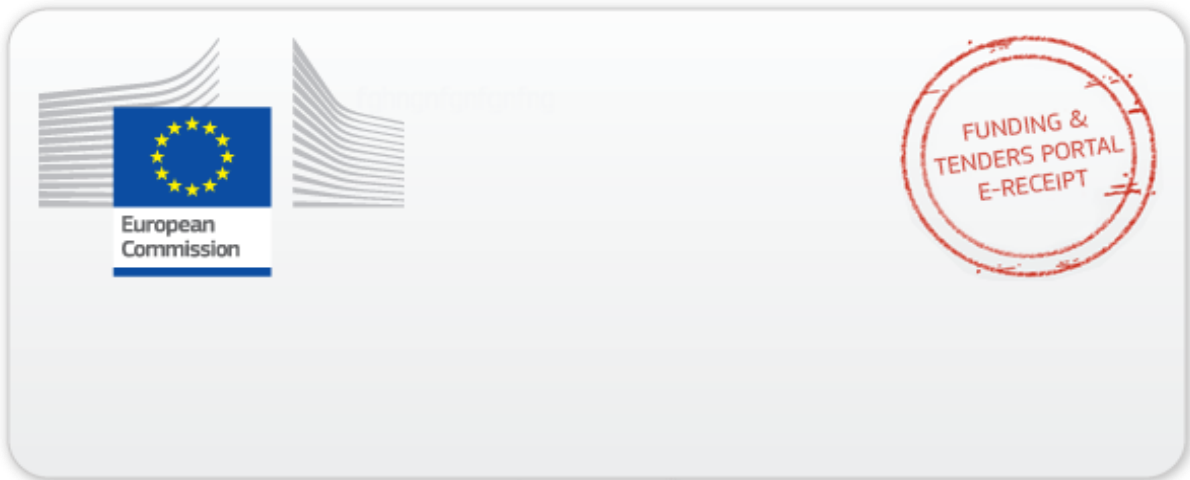
Artificial Intelligence

Status: **Yes**

If YES, the technical robustness of the proposed system must be evaluated under the appropriate criterion.

Overall comments

Not provided



This electronic receipt is a digitally signed version of the document submitted by your organisation. Both the content of the document and a set of metadata have been digitally sealed.

This digital signature mechanism, using a public-private key pair mechanism, uniquely binds this eReceipt to the modules of the Funding & Tenders Portal of the European Commission, to the transaction for which it was generated and ensures its full integrity. Therefore a complete digitally signed trail of the transaction is available both for your organisation and for the issuer of the eReceipt.

Any attempt to modify the content will lead to a break of the integrity of the electronic signature, which can be verified at any time by clicking on the eReceipt validation symbol.

More info about eReceipts can be found in the FAQ page of the Funding & Tenders Portal.

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/support/faq>