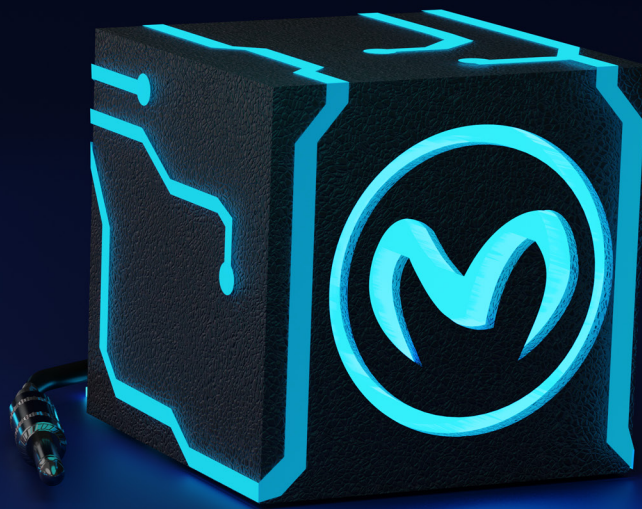


MAKARENA

LABS



**Machine Learning and
Artificial Intelligence:**
From PoC to Production

Hardware Acceleration:
Exploiting all problems
features using Xilinx
technology

Cloud Architecture:
Leveraging remote
distributed architectures



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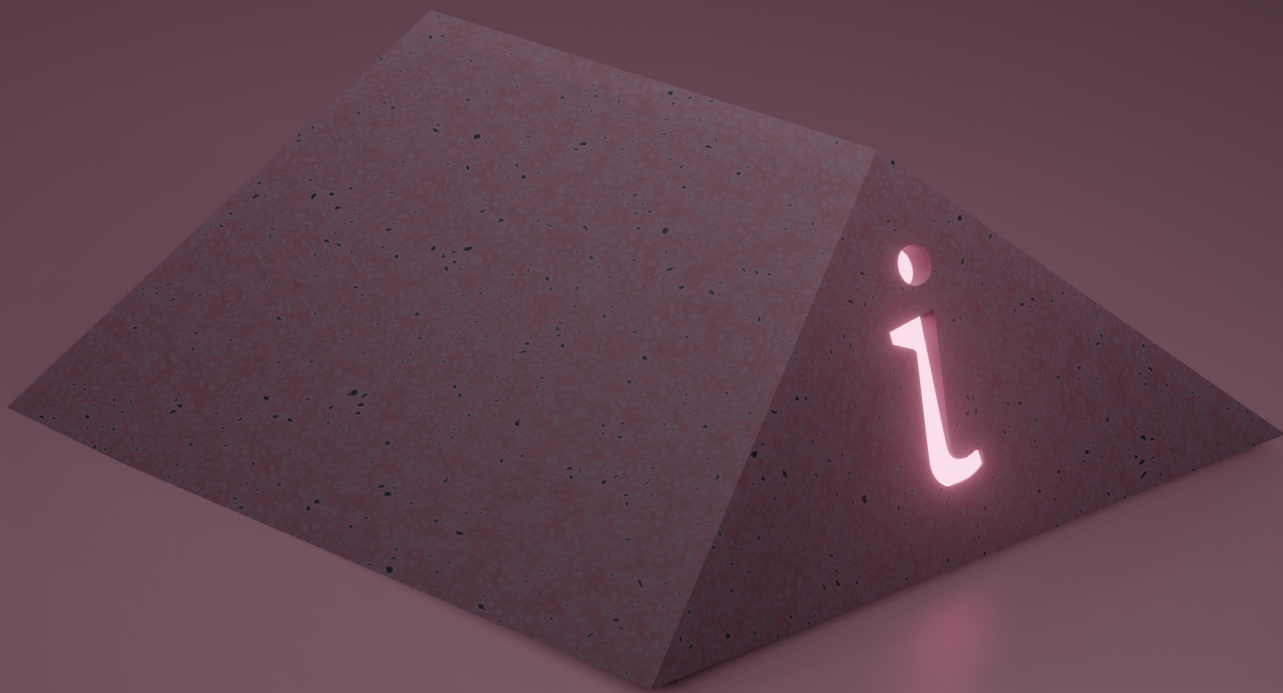


Contacts

About

MakarenaLabs was founded in December 2015.

The company's goal and the guideline consists in proposing appropriate and cutting-edge technologies and IT solutions according to the customers' requests. Furthermore, it proposes innovative, commercial softwares and research activities.



Who we are

Our team consists of competent people, trained in various fields, from IT to communication. In fact, it is composed of:

Developers and engineers with wide range of expertise in various fields



Researchers with a lot of scientific publications



Various partners for marketing and consultancy



MakarenaLabs introduces itself as a company specializing in cutting-edge information technologies in the field of embedded cloud design, artificial intelligence, hardware acceleration and multimedia systems. It also introduces itself as an ICT partner to bring the development of a project from the first embryonic phase of PoC, to the development of the demo up to the final production. MakarenaLabs enjoys important European and non-European partnerships that lead to propose cutting-edge innovative technologies.

What we do

Research

Bringing technological innovation on digital signal recognition. Doing scientific research regarding multimedia recognition and feature extractions

Development

Implementing multimedia recognition systems that are completely automated and accelerated on FPGA

Focus

Following the customer step by step for seamless system integration

Time To Market

Optimizing Time to Market with fast-paced implementations based on our rich tech stack



Our partner

Unity is strength. Each and every MakarenaLabs partnership is born following a common and specific ideal: mutual growth and added value.

Xilinx

Xilinx is an American technology company that is primarily a supplier of programmable logic devices. The company invented the first commercially viable field-programmable gate array (FPGA). It is the semiconductor company that created the first fabless manufacturing model.



iWave System Technologies Pvt. Ltd.

Product engineering organization offering an extensive portfolio of high-performance System On Modules, FPGA IP Cores, comprehensive Engineering design, and software development.

Athena SRL

Athena provides wireless connectivity solutions based on structured projects together with the customer, for example telecommunications systems, connectivity technologies, Antennas, electronic cards for radio communications, mechanical structures.



NZT Solutions

NZT is a software company and the main business concerns in the creation of data mining solutions and big data collection solutions for the planning of online stores and cloud solutions.

Latlantide s.n.c.

Publishing company for music production, Radio and TV broadcasting and advertisement, and musical press office.



Our partner

Silicio Visual

Brand strategy company for cutting edge media and design.

Silicio cutting edge media & design



M3BS

M3BS is a company which creates and commercializes innovative products in the fields of IoT, Manufacturing, Digital Marketing and Cognitive Systems.

RECMedia s.a.s.

Music press office company for Radio and TV broadcasting and advertisement.



EBV Elektronik

EBV Elektronik, founded in 1969, is a specialist in semiconductor distribution.

Commercial support is guaranteed by more than 260 dedicated customer staff, while technical support is provided by a group of more than 120 specialized engineers.



Hema Electronic GmbH

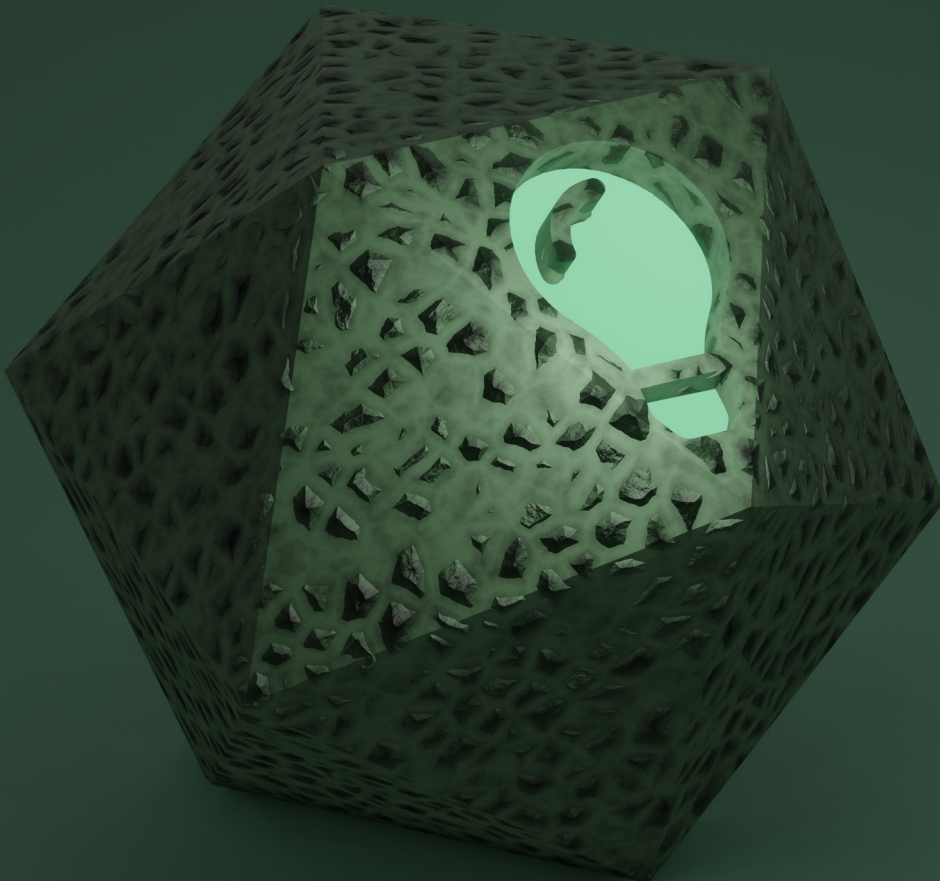
Leading development service provider for the electronics industry in the field of hardware and software design for embedded vision boards and systems for applications in industrial automation technology, defense and security technology.



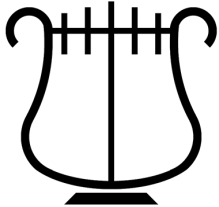


► Products

Internal innovation, best effort
MakarenaLabs is not only a service company. We always invest our budget in research and development, producing high quality products.



Our products



MuseBox

MuseBox is a FPGA Machine Learning Based System For Real-Time applications.



MRadio

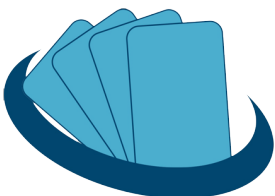
MRadio is an online stream analyzer and audio tracks recognizer that offers custom and automatic reports on radio.



ALOE

Artificial Environment Framework For Benchmarks And Training.

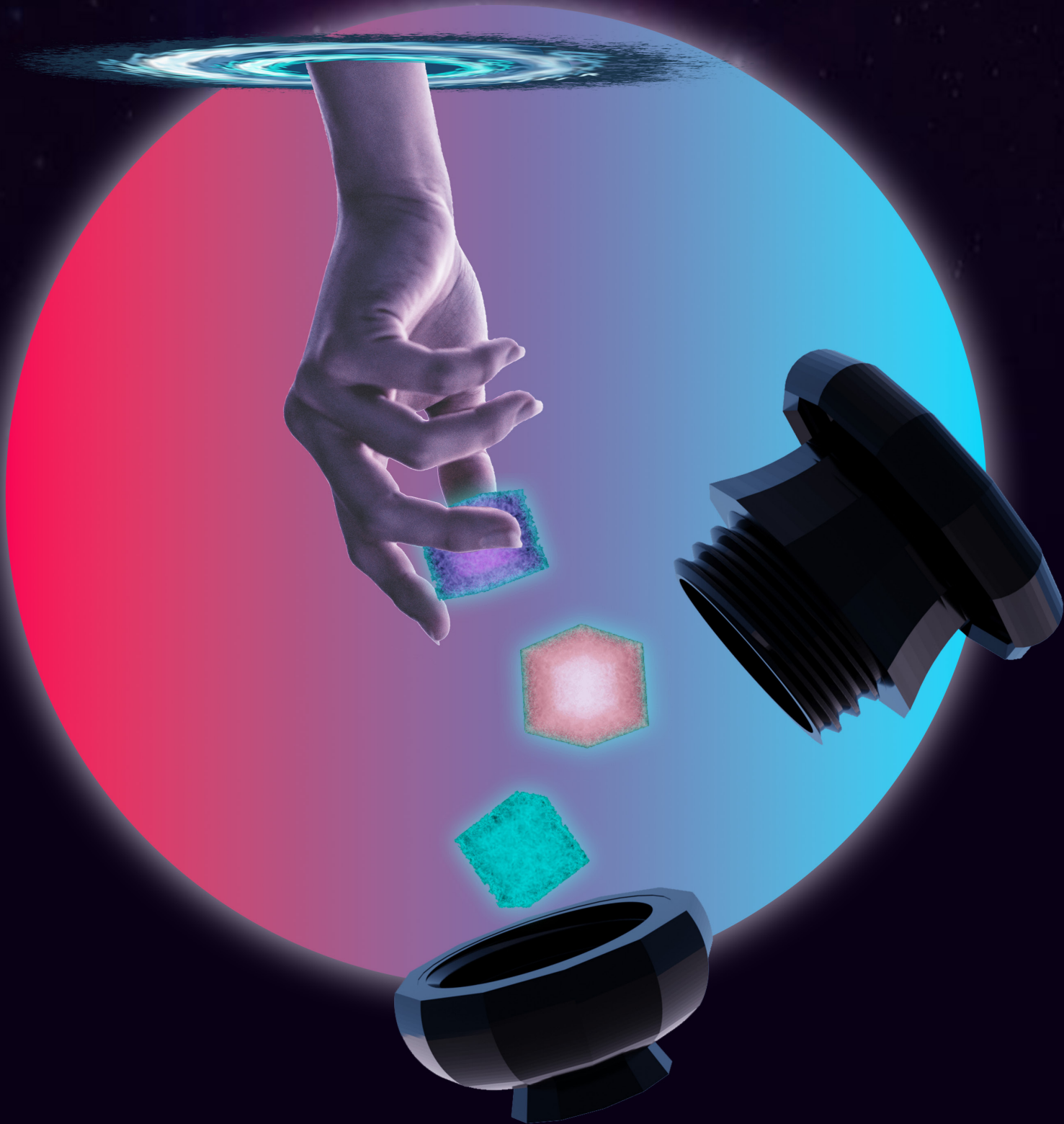
It can generate a virtual scene that represents a specific use



Tick@Me

Is a ticketing product for the management of ticket collections, using different methods for ID retrieval (NFC card reader, QR Code and Barcode) card data.

MuseBox FutureAge



MuseBox

MuseBox is a machine learning system designed for real-time applications.



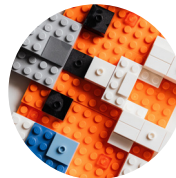
Service-ready for web and cloud application



Ready as on-premise or edge solution

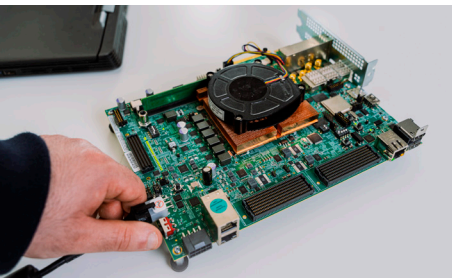


Xilinx FPGA & ACAP based for real-time inference and low power consumption



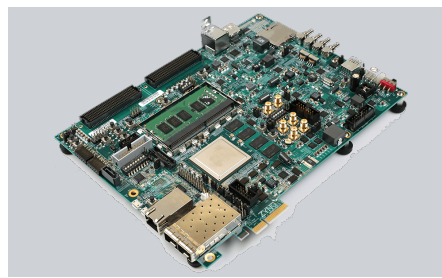
Modular service as “LEGO bricks”, compose your application based on a huge number of AI models available

Deployable-ready on every Xilinx FPGA



VERSAL

For maximum performances cloud and on-premise AI Applications



Zynq Ultrascale+

For edge and embedded AI applications



ALVEO

For cloud and on-premise AI Applications

Musebox can work with live streams, for interactive or live applications and also with local storages or on-premise solutions, when the data is needed to be processed offline or in the local network.

MuseBox is based on Xilinx FPGA & ACAP for multimedia elaboration and for Machine Learning elaboration, for application span-

ning from the Edge to Datacenter Inference

You can also connect the core system to your existing industrial system through a standard protocol or frameworks like ZMQ, RabbitMQ or ROS

MuseBox supports Vitis AI 1.0+ .

Why MuseBox?

Following tables and charts which compare MuseBox with other solution offered by other technology provider or companies:



Low power consumption

Maximum TDP 225W



Best performances/ Watt

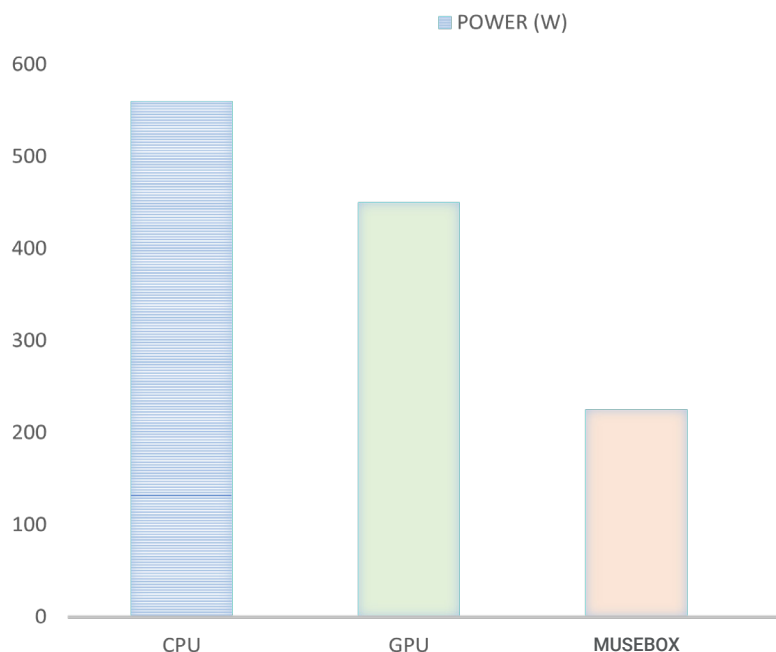
According to competitors'



All-in-One

Add the AI application to your system thanks to FPGA flexibility

Performance/Watt comparison



Reference HW:

- Intel Xeon Gold 5315Y Processor
 - TDP 140W * 4
- nVidia Tesla V100
 - TDP 300W * 1,5
- Xilinx ALVEO U200
 - TDP 225W

For CPU, the same performances with an ALVEO U200 are obtained with 4 units (and 4 server systems).

The nVidia GPU meets the same performances of an ALVEO U200 with an increase of 50% of the clock frequency.

Why MuseBox?

Let's target a frame-rate for a specific application, what are the direct and indirect costs of using MuseBox with respect to other competitors?



In this example we targeted a Face Recognition task, which consists in extracting the feature of a specific set of faces. This operation is generally very heavy as the AI model used in this application has a high numbers of operations to perform.

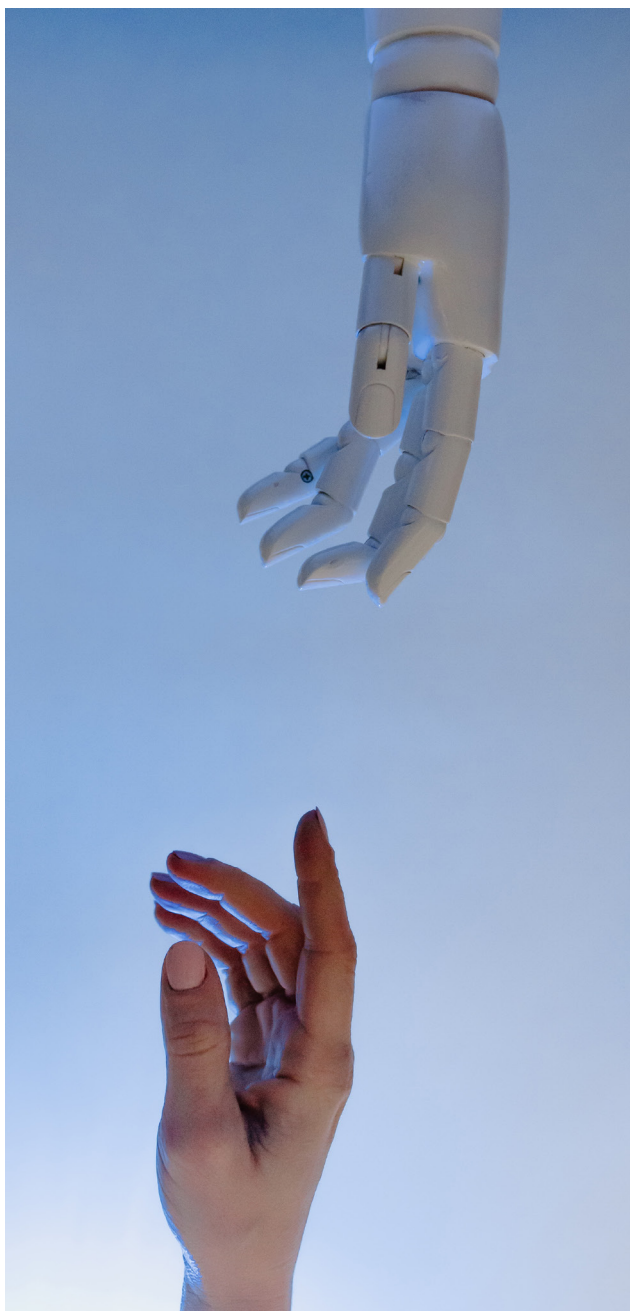
By direct costs we mean the amount of money used to buy the AI infrastructure. By indirect costs we mean the operational costs of maintaining the infrastructure, and the heaviest one is definitely the power consumed by the infrastructure itself to work.

The comparison consists in analyzing the costs by selecting the Face Recognition running at 100 FPS (the pink bar). The direct costs are express by the green bar, and are to be taken in account as a one

time fee, as it is supposed that the hardware infrastructure to be bought just once.

The indirect costs are instead represented by the dark-yellow bar. This bar is representing the costs of having the infrastructure working, which is the amount of energy it absorbs to work. We can clearly see that the FPGA technology which MuseBox is relying on, is the one which has the least operational costs for the companies.

MuseBox Users



Web developers

MuseBox supports also companies that are oriented to web solutions but would like to exploit the possibilities of integrating AI in their systems. For this reason MuseBox offers bindings with the most common backend Web languages and a WordPress plugin.

Multimedia content analysts

MuseBox can ingest into the system different sources of inputs, from digital to analog ones, thus it fits perfectly the necessities of the companies which need specific products for AV applications or Smart Cities applications where the AI tasks need to be performed across a wide range of different input sources, from IP cameras to analog radio.

Musebox enables companies to create AI tasks by providing custom AI models and a software integration stack with user-friendly APIs.

Moreover MuseBox already supports different pre-composed tasks for Video Analytics such as Face Recognition, People Counting, People Behavioural Detection.



MuseBox Users

Robotics and Logistics

Makarenalabs offers ready-made IPs and algorithms to integrate 2D and 3D computer vision and AI models for robotic tasks spreading from industrial to defense ones. For logistic applications MuseBox offers a wide range of AI models and pre-composed tasks for leveraging automation in warehouse management, inventory and security and safety policies for employees.





MRadio

MRadio is an online stream analyzer and audio tracks recognizer that offers custom, automatic reports on radio airplays. Based on the MuseBox system, it is a perfect tool for copyright enforcement and protection, radio promotion and marketing analysis.

MRadio is perfect for:



Artists who want to protect their copyrighted work



Promoters who need to measure the effectiveness of their radio promotions



Radio stations who need a precise and detailed report of their daily broadcast schedule



MRadio is a complex system which brings together several years of research and development in the field of audio signal analysis and engineering skills to create an architecture capable of supporting the processing of a large amount of data. At the base there are the streams, which are characterized by a specific URL and represent the source of the system data. The streams can consist of podcasts or radio broadcasters which, in addition to transmitting their programming on FM frequencies, also broad-

cast their contents via web. The component that deals with grabbing and analyzing the streams is MuseBox and it represents the support base for all other services. MRadio is the main webservice that uses MuseBox's audio APIs and its task is to connect the business logic to the end user through a wide range of additional services.

What is it MRadio?



It is mainly a “super partes” analysis tool because it is detached and not affiliated with any Web Radio and / or employed by similar services.

MRadio represents an “outsider” in the music market that has reached a maturity which makes it able to offer a varied and customizable offer based on the user’s necessities. The main features are listed below:

- Realtime reporting
- Stream quality checking
- Tracks monitoring for composers and artists to check the number of radio passages
- Quality check of music promotion

Currently the system analyzes the most important Italian radios according to Nielsen. The system dedicates to both independent and / or self-produced artists or artists and record companies. These figures are in need of maximizing their expenses for radio promotion with the highest number of passages using the least amount of money.

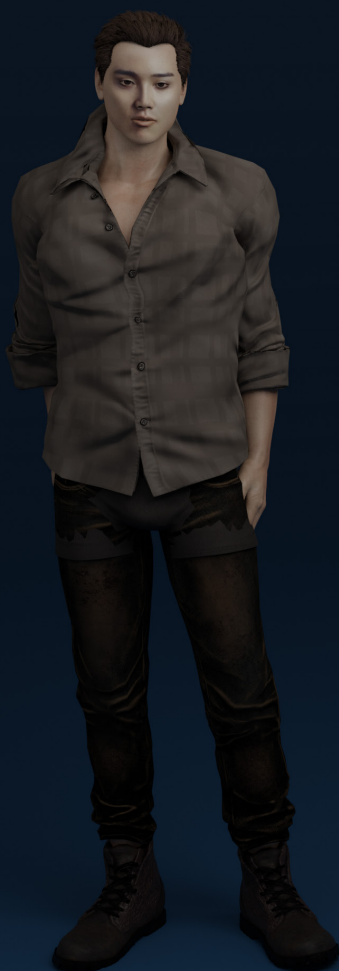
MRadio is able to monitor the audio streams without the support of external agencies and to report the results on the web portal within 30 seconds from the transmission with an accuracy greater than 99%. This

allows an artist or a record company to summarize the effectiveness of a sponsorship within a certain time frame, or rather to verify that the radio passages that are due from the sponsorship have actually taken place.

Another feature is aimed at entities dealing with maintaining and guaranteeing the audio stream service. The MRadio system is able to detect and track errors related to transmission on the stream and possibly report the disruption to the managing entities.



ALOE



ALOE

Artificial Environment Framework For Benchmarks And Training

Every engineer and scientist have difficulties to find videos or photos for the training and the testing of AI models. For GDPR and privacy policies, it is difficult to use videos taken from the internet or private videos, especially for non-academic purposes. Therefore, we propose ALOE, a framework to overcome this problem.



Detail of an obstacle on a rail



Artificial person in a shop



Train cabin for railway application



Entrance to a shop

ALOE

Virtual Emulation of a Scene

ALOE is a framework that allows the user to create a scene from which a synthetic dataset can be extracted from.

The scene is created in Unity, a wide spreaded tool used for simulation and gaming. Unity has its own physics engine for what concerns the dynamic of the scene and also a tool used for graphics and rendering. Unity also allows the user to import models generated from other famous tools like Blender. This feature is important because of the possibility of the physics reality of the single objects in the scene itself.

The genuineness of the scene is important when it comes both for training and inference of the Neural Networks.



Testing people counting

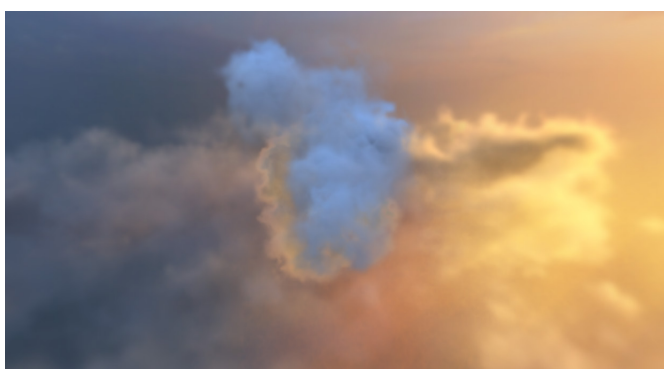
ALOE



ALOE details



A character of the new release



Cloud details of climate change system in the new release

Generation of artificial dataset

The dataset created from the emulated scene can be exported for example as an .mp4 video with the meta-data tagged. That is why it is important to have a graphic and a physics closer to an actual situation possible. Moreover the videos can also have different perspectives thanks to the possibility of Unity to change the position and orientation of the camera. Having different videos from different perspectives of a specific scene has two advantages:

1. Increase the dimension of the datasets. In fact, generally speaking, a bigger dataset results in a better inference from the Neural Network.
2. Teach to the networks that a particular phenomena is invariant under affine transformations.

Tick@Me

**take your
lucky ticket**

lucky ticket

lucky ticket

lucky ticket

lucky ticket

lucky ticket

lucky ticket

lucky ticket

Tick@Me

Your Best Ticket System Manager

Tick@Me is a finished product that can be customized for:

- The management and saving of point collections
- Management of points and NFC card data for:
 - Creation
 - Update
 - Changes
- Printing of customizable and brandable receipts for:
 - Discounts
 - To collect points if you do not have a card
 - QRcode and / or barcode for useful information
- Has a very wide usage, it is aimed at many business categories, especially those that interface with the public
- Intuitive, versatile, iconographic, easy to assemble system
- Simple to use
- Simple graphics
- Possibility of touch screen usage
- Central board and interchangeable peripherals
- Fidelize customers with point collections, awards, contests

Tick@Me by MakarenaLabs

▶code digit ☒ automatic

CODE

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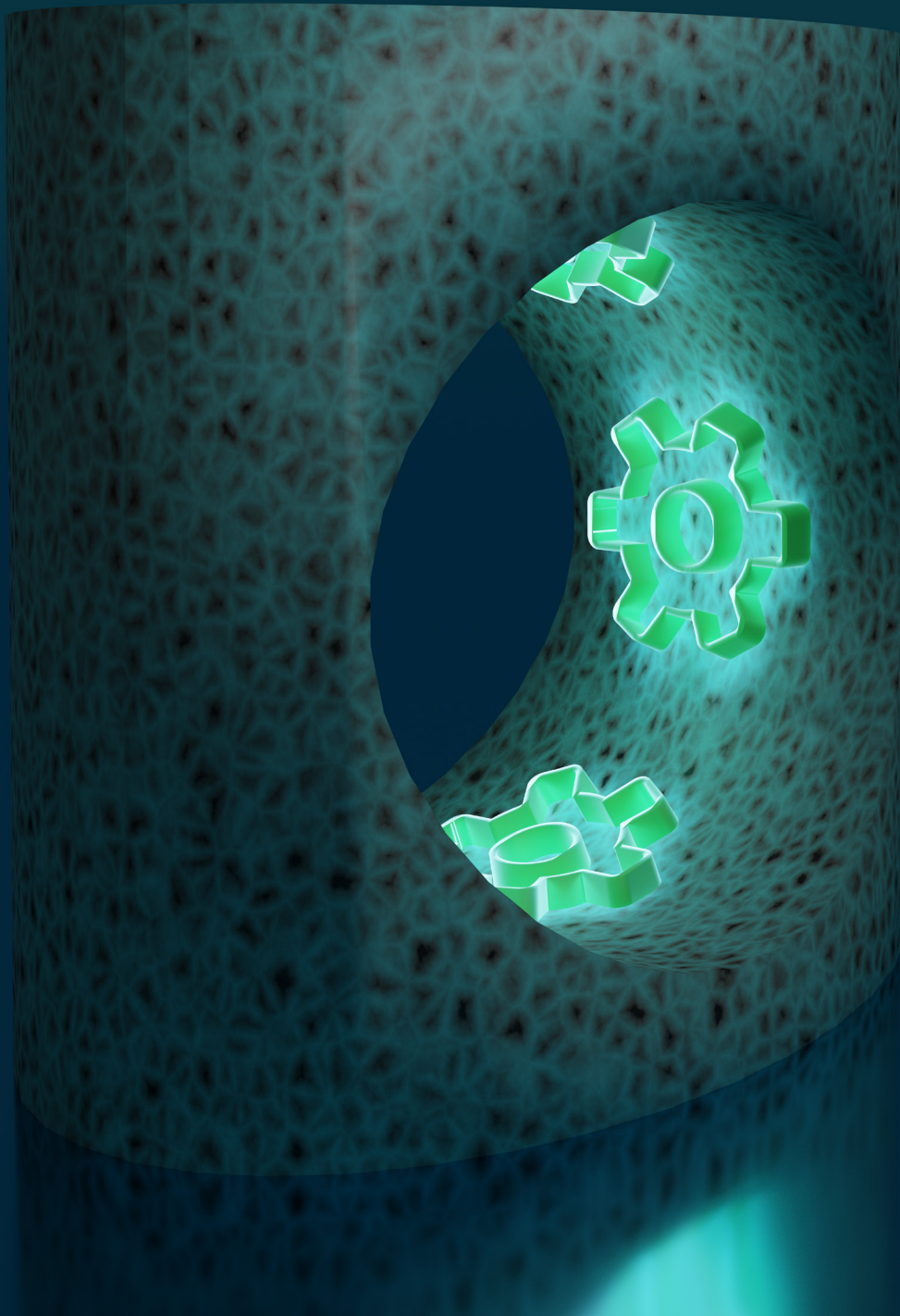
AC

History
Serial
TOTALE 0
PRINT

TAGS



Services



What We Offer



Development

Software design, development, analysis with cutting-edge technologies



AR/VR Technologies

Augmented reality and Virtual reality development, also applied to Game Development



Machine Learning

Digital Signal Processing and Multimedia software, Machine Learning consultancy



Teaching

Teaching courses about Digital Signal Processing, Machine Learning, Artificial Intelligence and Web based cloud design



Acceleration

Hardware acceleration with Xilinx tools and FPGAs



Product-Ready

Product-ready solutions or design services from Proof of Concept to the final product

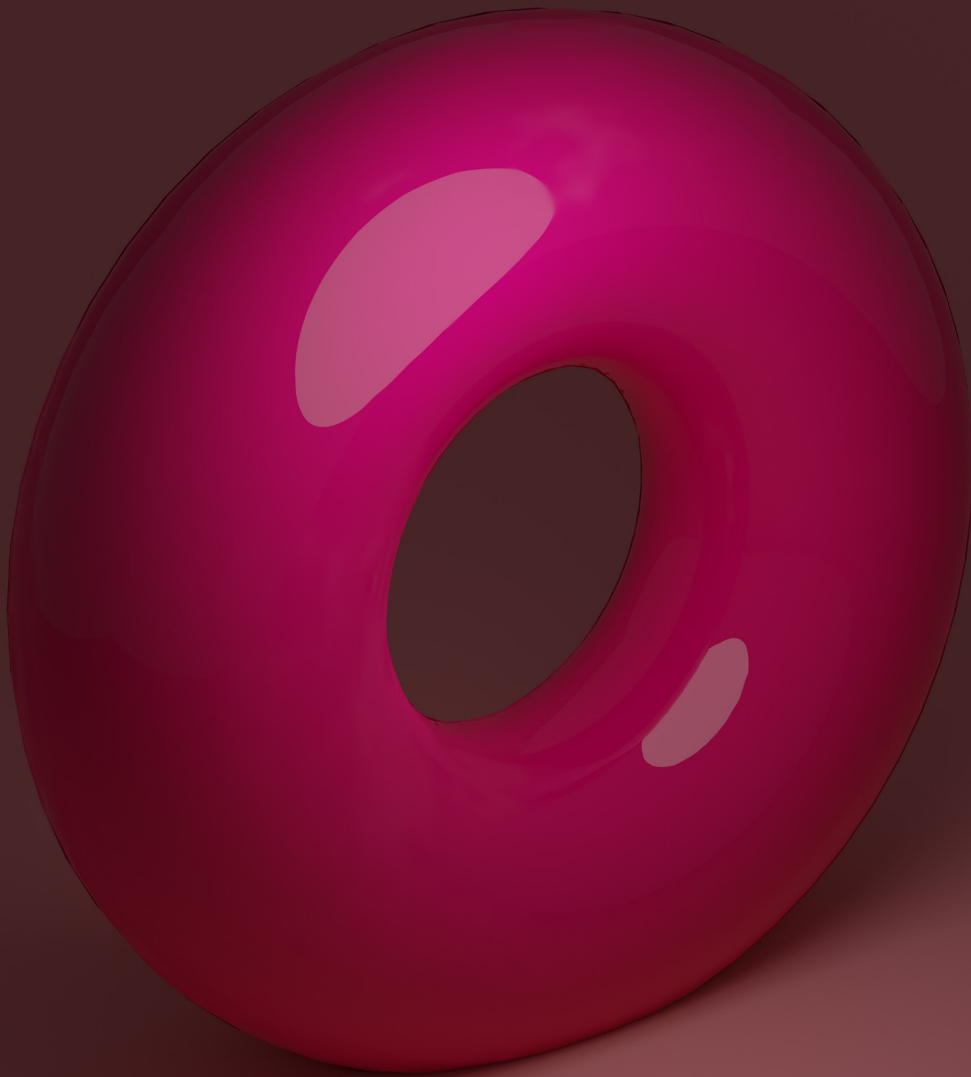
Why Us?

Proposing the cutting-edge solutions, we can transform an idea into a product, from a proof of concept to the final product, without exceeding the customer's budget.

We create solutions suitable for every need, especially the customer's budget needs. Professionalism is everything for us.

Trivia

For the sake of clarity, we called our company MakarenaLabs because we started as a Music Informations Retrieval startup, so we searched for a song that represents us. In particular, Makarena is composed by "Make", the build automation tool, and "Arena", which is the most famous monument of our region (Arena of Verona), so we think that was perfect for us. So that's it :-).



How To



Email: staff@makarenalabs.com



Phone number: +39 333 24 83 033

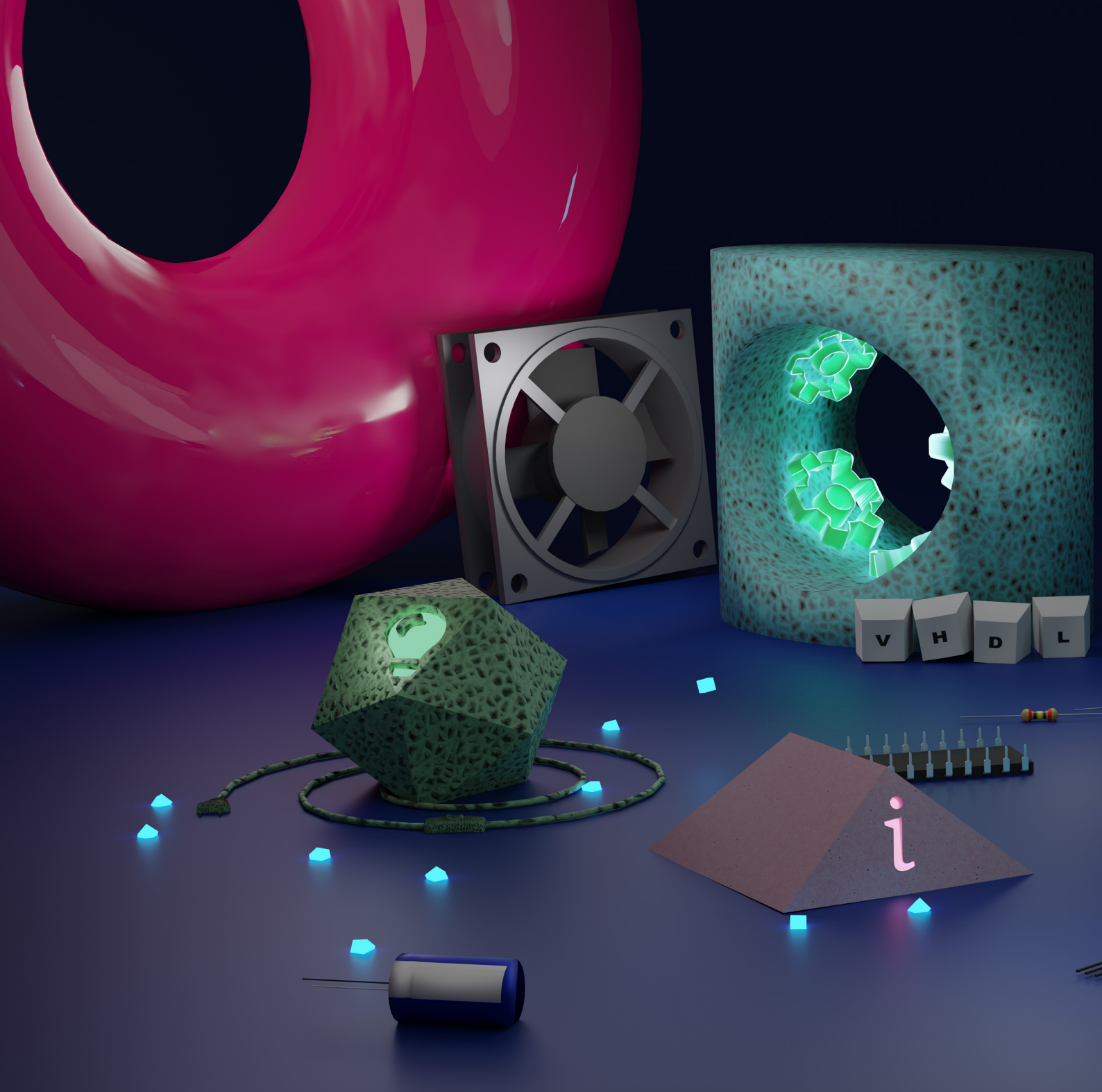


Web site: www.makarenalabs.com



Address: Via Mantovana 81, Verona, ZIP code 37137 (VR), Italy





**Embracing the technology
revolution**

for a better future