Workshop on Scientific Use of Machine Learning on Low-Power Devices: Applications and Advanced Topics

Marco Zennaro,
mzennaro@ictp.it

About myself

Research Scientist at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy.

I have been working on IoT since 2004.

Organized training activities in IoT in +30 countries.

Workshop Team

Marco Zennaro
ICTP

Brian Plancher
Barnard College, Columbia University

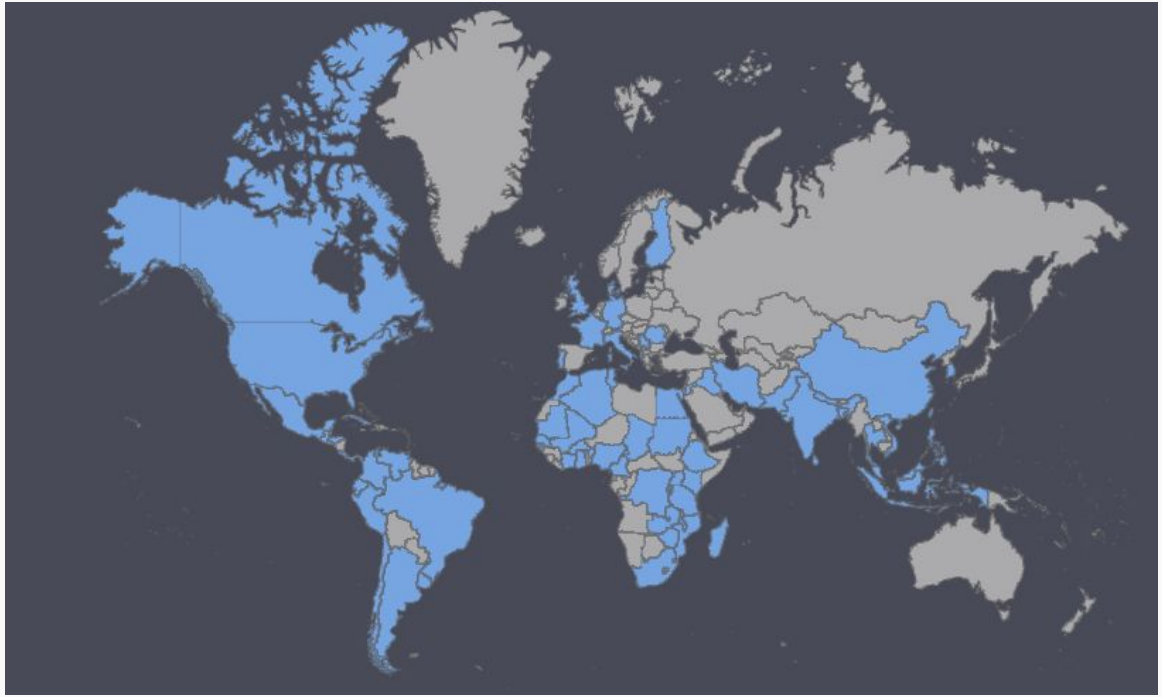
Vijay Janapa Reddi
Harvard University

Marcelo Rovai
UNIFEI
Brazil

Organizers

15 Great Speakers!

418 participants from 72 countries



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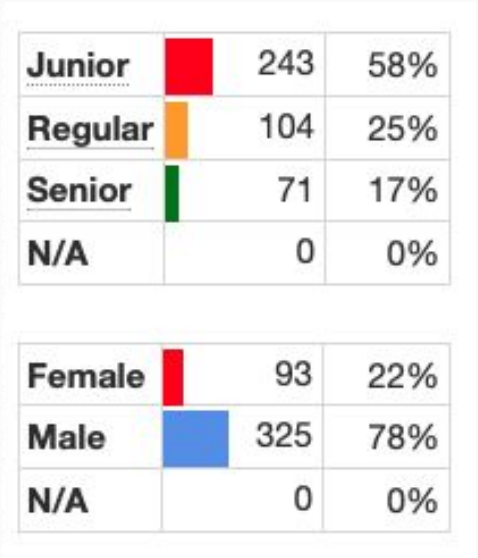
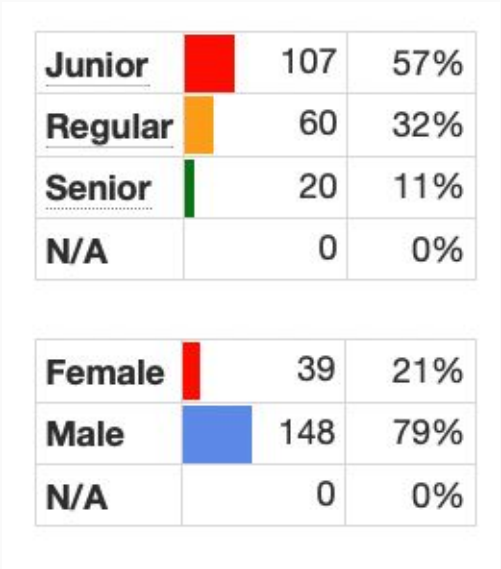


Junior	243	58%
Regular	104	25%
Senior	71	17%
N/A	0	0%

Female	93	22%
Male	325	78%
N/A	0	0%

2023



Junior	107	57%
Regular	60	32%
Senior	20	11%
N/A	0	0%

Female	39	21%
Male	148	79%
N/A	0	0%

2022

Why a TinyML Academic Network

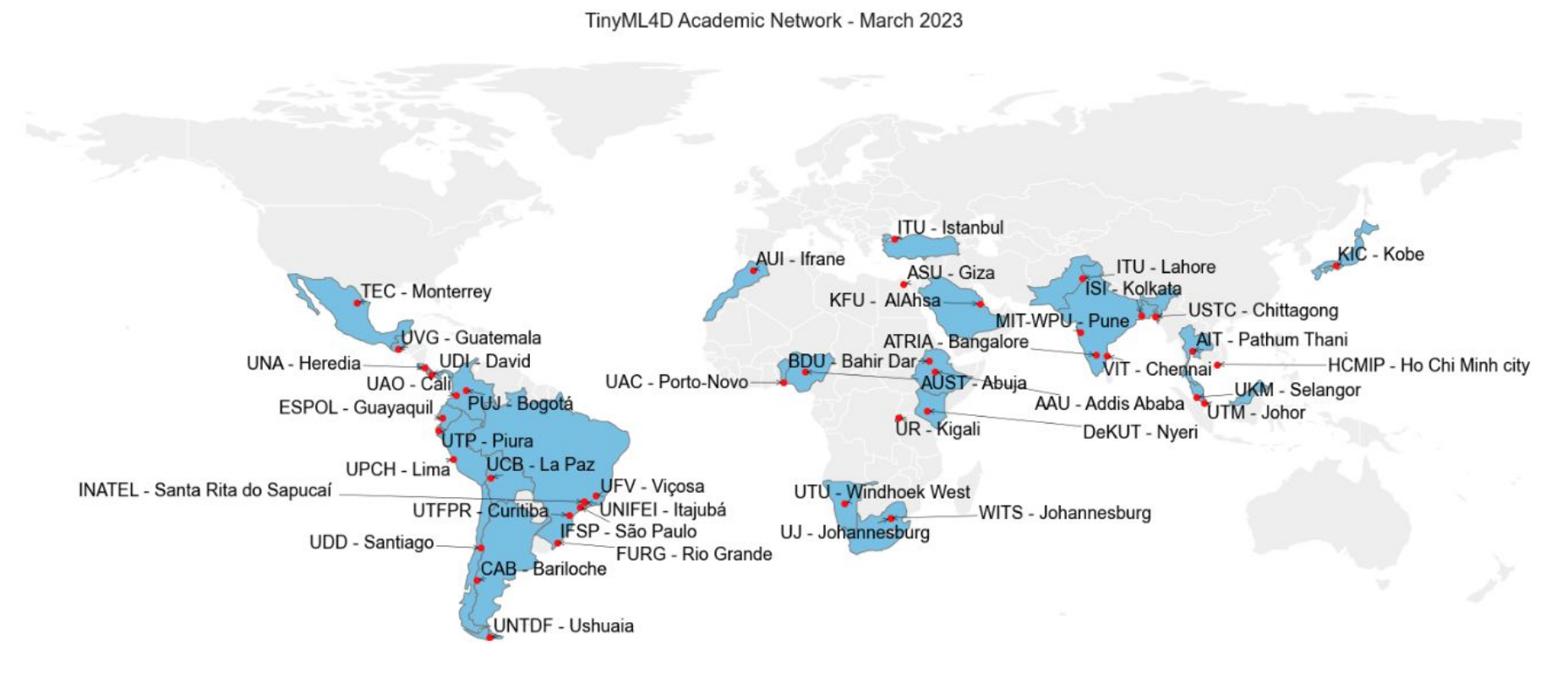
We aim to develop a **community of researchers and practitioners** focused on both improving **access to TinyML education** and **enabling innovative solutions** for the unique challenges faced by Developing Countries.

1. Joint **workshops and seminars** on TinyML with lab sessions
2. An **online forum** to consolidate the TinyML community
3. **Open exchange** of student projects, lesson plans, real-world deployments and outreach materials

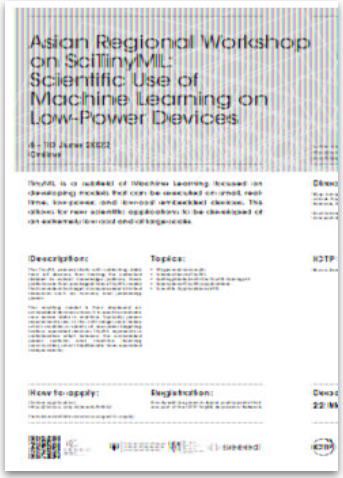
http://tinymledu.org

SCAN ME

TinyML academic network



TinyML academic network



https://tinymledu.org/teach

Final goal is to provide

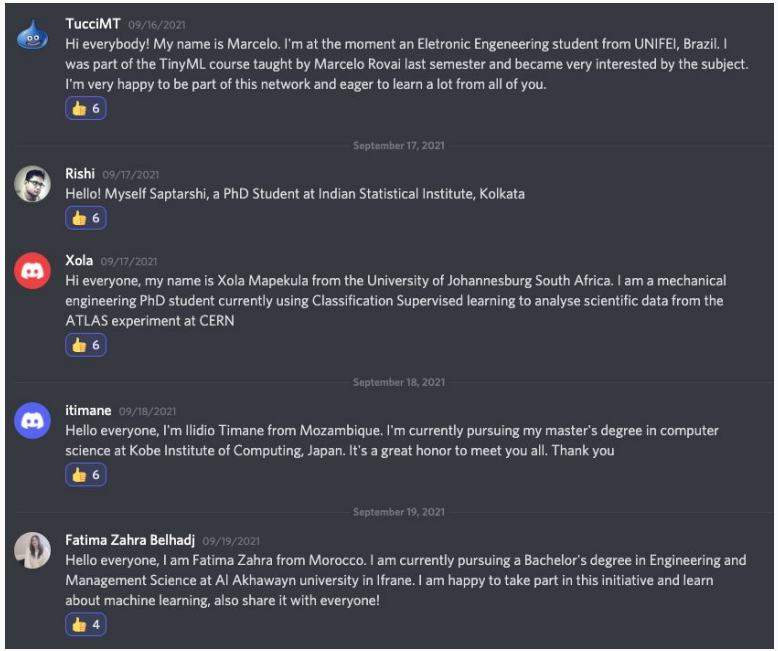
Open Educational Resources

TinyML academic network

https://discord.gg/zKWgwhSAEY

#ictp-workshop

+1000 members on Discord!



TinyML academic network

Standard kit in each University

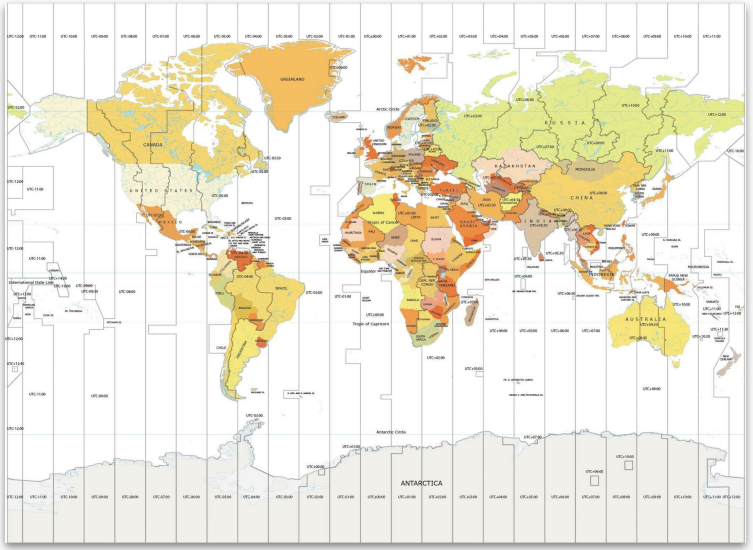
=

Exchange of code / tutorials / projects

Workshop Logistics

Three hours per day

GMT: 1pm to 4pm
(https://time.is/GMT)



Workshop Logistics

Attendance certificate only if you follow at least 80% of the lectures (according to Zoom's log file).

Contact the workshop secretariat for info/clarifications.

The Abdus Salam International Centre for Theoretical Physics

This is to certify that

Imad EZ-ZAZI

participated in and completed online the

African regional workshop on SciTinyML: Scientific Use of Machine Learning on Low-Power Devices

25 - 29 April 2022

Directors:
Gregg Barrett (AI Africa Consortium, South Africa)
Vijay Janapa Reddi (Harvard University, USA)

Local Organiser:
Marco Zennaro

Atish Dabholkar, Director

Workshop Agenda

Day 1	Monday	**Introduction to (tiny)ML** *3:00 PM* Workshop Opening and Schedule *3:30 PM* Opening Keynote *4:15 PM* Introduction to Machine Learning *5:15 PM* Introduction to Embedded ML *5:55 PM* Day Closing	Marco Zennaro of ICTP Daniel Situnayake and Jenny Plunkett of Edge Impulse Diego Mendez Chaves of Pontificia Universidad Javeriana Robert Thas John of Versus

Workshop Agenda

Day 2	Tuesday	**Hands-on Introduction to TinyML** *3:00 PM* Day Opening *3:05 PM* Edge Impulse Overview and New Features *3:35 PM* Hands-on Motion Classification and Anomaly Detection *5:00 PM* Leveraging Other Microcontrollers and Sensors *5:55 PM* Day Closing	Marco Zennaro of ICTP Shawn Hymel of Edge Impulse José Antonio Bagur Nájera of Universidad del Valle de Guatemala Marcelo Rovai of Federal University of Itajuba - UNIFEI

Workshop Agenda

Day 3	Wednesday	**From Demos to Applications** *3:00 PM* Day Opening *3:05 PM* MLOps: Scaling Deployments *3:35 PM* To Personalize or Not To Personalize? Soft Personalization and the Ethics of ML for Health *4:25 PM* WebUSB and FOMO *4:55 PM* Industry 5.0 with Jetson Nano *5:25 PM* Adding IoT to a Project with Blues Wireless *5:55 PM* Day Closing	Marco Zennaro of ICTP Colby Banbury of Harvard University Viola Schiaffonati and Manuel Roveri of Politecnico di Milano Jeremy Ellis of School District 75 Mission Marcelo Pias of Federal University of Rio Grande - FURG Peter Ing of TFG (The Foschini Group)

Workshop Agenda

Day 4	Thursday	**TinyML Show and Tell** *3:00 PM* Day Opening *3:05 PM* Selected Show and Tell Talks *5:55 PM* Day Closing	Brian Plancher of Barnard College, Columbia University

10 presentations, 15 minutes each (10 min presentation + 5 min Q&A)

Please present at our monthly Show and Tell!

Workshop Agenda

Day 5	Friday	**Advanced Scientific TinyML** *3:00 PM* Day Opening *3:05 PM* TinyML and Robotics *3:35 PM* TinyML and Sustainability *4:05 PM* Scientific Applications of TinyML 1 *4:50 PM* Scientific Applications of TinyML 2 *5:35 PM* Workshop Closing and Future Events	Marco Zennaro of ICTP Bardienus Duisterhof of Carnegie Mellon University - CMU Matthew Stewart of Harvard University

Open Material

The material used in the workshop (slides, videos, code) will be **openly available** for you to use a teacher/student/practitioner.

TinyMLedu webpage: https://tinyml.seas.harvard.edu/SciTinyML-23/

(with videos, slides and code)

ICTP official webpage: https://indico.ictp.it/event/10166

Tell me and I forget,
teach me and I may
remember, involve me
and I learn.
– Benjamin Franklin

Tell me and I forget, teach me and I may remember, involve me and I learn.

– ~~Benjamin Franklin~~

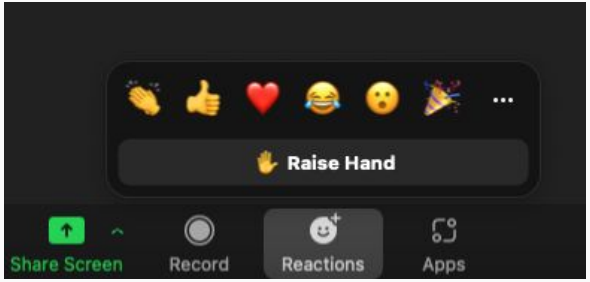
– Xun Kuang

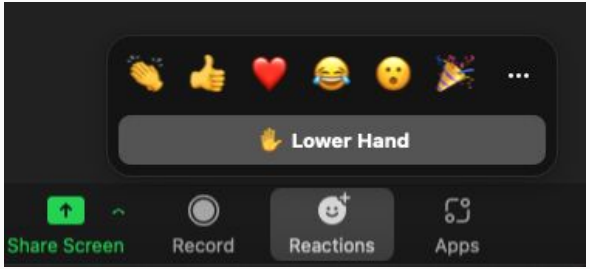
Interaction

You are more than welcome to ask questions!

Please raise your hand in Zoom to ask questions.

Unmute, turn on your camera and ask your question. Please lower your hand and mute yourself afterwards.





Interaction via Discord

If you have longer questions/ don’t want to talk, please use the “**#ictp-workshop**” Discord channel. Questions and answers in Discord will remain after the workshop (--> good reference!).

Please join Discord by following this link: https://discord.gg/zKWgwhSAEY if you haven’t already done so!

We will use **Zoom chat only for announcements**.

Thanks!

Harvard John A. Paulson
School of Engineering
and Applied Sciences