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

Marco Zennaro,
mzennaro@ictp.it

Thanks!

Marco Zennaro
ICTP

Brian Plancher
Barnard College, Columbia University

Vijay Janapa Reddi
Harvard University

Marcelo Rovai
UNIFEI
Brazil

Jeremy Ellis
School District 75
Mission
Canada

Organizers

15 Great Speakers!

Thanks!

Harvard John A. Paulson
School of Engineering
and Applied Sciences

Opportunities

1) Join the TinyML Academic Network: edu@tinyml.org
2) Join the Edge Impulse University program:

   https://edgeimpulse.com/university

3) Participate in the AI for Good Challenge:

   https://aiforgood.itu.int

Networking

Please use the “**ictp-workshop**” Discord channel!

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

We will post **news, opportunities, workshops** only on Discord.

Learning and Teaching

If you want to learn more about TinyML:

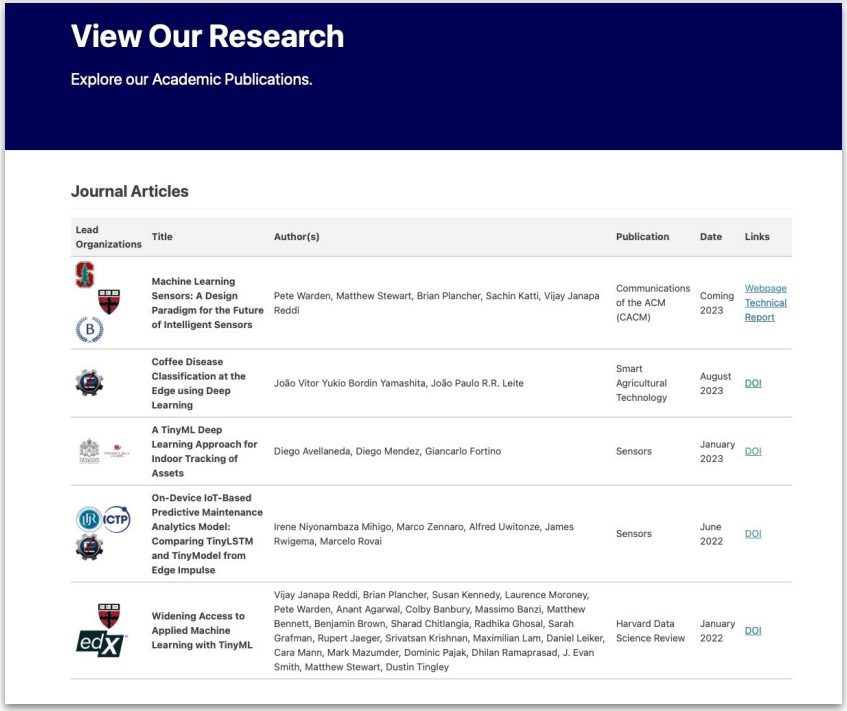
https://tinyMLedu.org/learn

If you want to teach a course on TinyML:

https://tinyMLedu.org/teach

edX tinyML Specialization	Launched 2020-2022	Everyone	English	English	Course 1-3 Website Course 4 Website All Materials All Colabs Arduino Library
UNIFEI IESTI01 TinyML - Machine Learning for Embedding Devices	Jan 2021 - Present	Undergraduate Students	Portuguese	English	2022.1 Website and Materials 2021.2 Website and Materials 2021.1 Website and Materials

Research



View Our Research

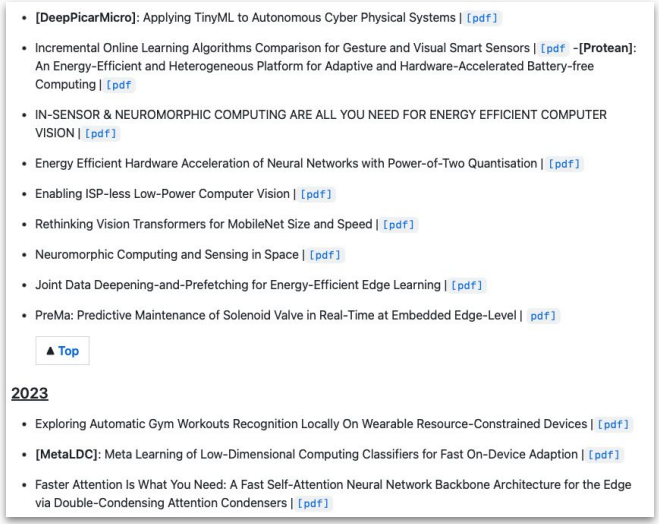
Explore our Academic Publications.

Journal Articles

Lead Organizations	Title	Author(s)	Publication	Date	Links
	Machine Learning Sensors: A Design Paradigm for the Future of Intelligent Sensors	Pete Warden, Matthew Stewart, Brian Plancher, Sachin Katti, Vijay Janapa Reddi	Communications of the ACM (CACM)	Coming 2023	Webpage Technical Report
	Coffee Disease Classification at the Edge using Deep Learning	João Vitor Yukio Bordin Yamashita, João Paulo R.R. Leite	Smart Agricultural Technology	August 2023	DOI
	A TinyML Deep Learning Approach for Indoor Tracking of Assets	Diego Avellaneda, Diego Mendez, Giancarlo Fortino	Sensors	January 2023	DOI
	On-Device IoT-Based Predictive Maintenance Analytics Model: Comparing TinyLSTM and TinyModel from Edge Impulse	Irene Niyonambaza Mihigo, Marco Zennaro, Alfred Uwitonze, James Rwigema, Marcelo Rovai	Sensors	June 2022	DOI
	Widening Access to Applied Machine Learning with TinyML	Vijay Janapa Reddi, Brian Plancher, Susan Kennedy, Laurence Moroney, Pete Warden, Anant Agarwal, Colby Banbury, Massimo Banzi, Matthew Bennett, Benjamin Brown, Sharad Chitlangia, Radhika Ghosal, Sarah Grafman, Rupert Jaeger, Srivatsan Krishnan, Maximilian Lam, Daniel Leiker, Cara Mann, Mark Mazumder, Dominic Pajak, Dhilan Ramaprasad, J. Evan Smith, Matthew Stewart, Dustin Tingley	Harvard Data Science Review	January 2022	DOI

https://tinyMLedu.org/research/

Research



- **[DeepPicarMicro]**: Applying TinyML to Autonomous Cyber Physical Systems | [pdf]
- Incremental Online Learning Algorithms Comparison for Gesture and Visual Smart Sensors | [pdf] -**[Protean]**: An Energy-Efficient and Heterogeneous Platform for Adaptive and Hardware-Accelerated Battery-free Computing | [pdf]
- IN-SENSOR & NEUROMORPHIC COMPUTING ARE ALL YOU NEED FOR ENERGY EFFICIENT COMPUTER VISION | [pdf]
- Energy Efficient Hardware Acceleration of Neural Networks with Power-of-Two Quantisation | [pdf]
- Enabling ISP-less Low-Power Computer Vision | [pdf]
- Rethinking Vision Transformers for MobileNet Size and Speed | [pdf]
- Neuromorphic Computing and Sensing in Space | [pdf]
- Joint Data Deepening-and-Prefetching for Energy-Efficient Edge Learning | [pdf]
- PreMa: Predictive Maintenance of Solenoid Valve in Real-Time at Embedded Edge-Level | pdf]

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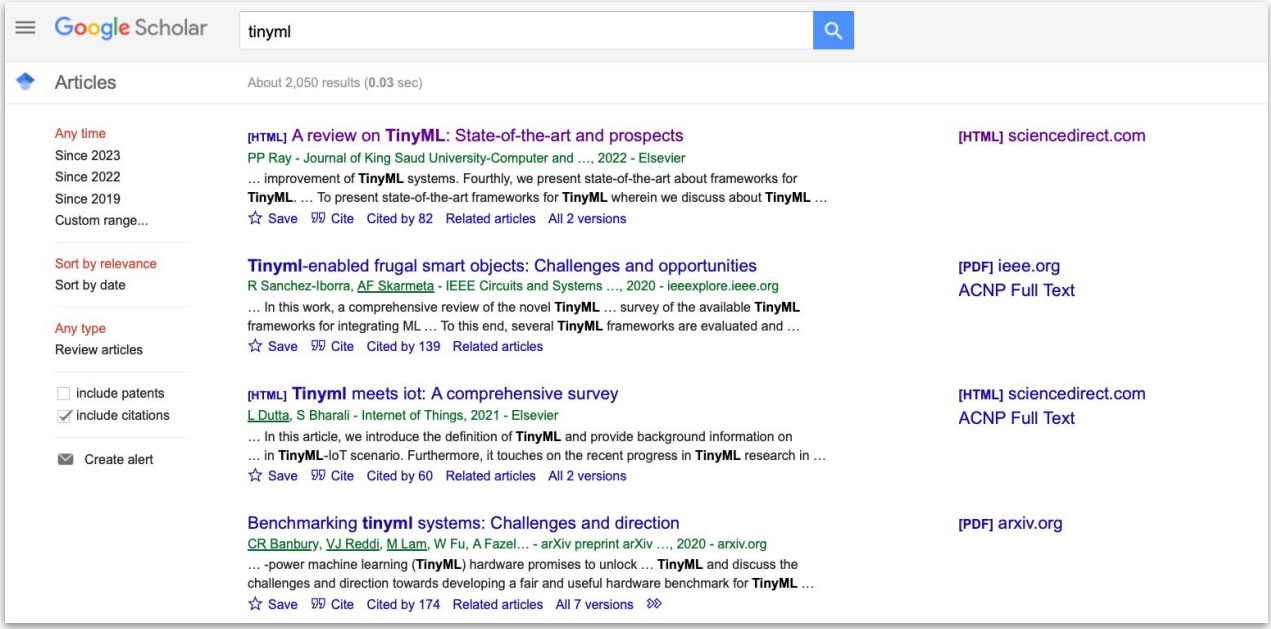
2023

- Exploring Automatic Gym Workouts Recognition Locally On Wearable Resource-Constrained Devices | [pdf]
- **[MetaLDC]**: Meta Learning of Low-Dimensional Computing Classifiers for Fast On-Device Adaption | [pdf]
- Faster Attention Is What You Need: A Fast Self-Attention Neural Network Backbone Architecture for the Edge via Double-Condensing Attention Condensers | [pdf]

https://github.com/gigwegbe/tinyml-papers-and-projects

Research


Google Scholar
tinyml
Articles
About 2,050 results (0.03 sec)
Any time
Since 2023
Since 2022
Since 2019
Custom range...
Sort by relevance
Sort by date
Any type
Review articles
include patents
include citations
Create alert
[HTML] A review on TinyML: State-of-the-art and prospects
PP Ray - Journal of King Saud University-Computer and ..., 2022 - Elsevier
... improvement of TinyML systems. Fourthly, we present state-of-the-art about frameworks for TinyML. ... To present state-of-the-art frameworks for TinyML wherein we discuss about TinyML ...
Save Cite Cited by 82 Related articles All 2 versions
[HTML] sciencedirect.com
Tinyml-enabled frugal smart objects: Challenges and opportunities
R Sanchez-Iborra, AF Skarmeta - IEEE Circuits and Systems ..., 2020 - ieeexplore.ieee.org
... In this work, a comprehensive review of the novel TinyML ... survey of the available TinyML frameworks for integrating ML ... To this end, several TinyML frameworks are evaluated and ...
Save Cite Cited by 139 Related articles
[PDF] ieee.org
ACNP Full Text
[HTML] Tinyml meets iot: A comprehensive survey
L Dutta, S Bharali - Internet of Things, 2021 - Elsevier
... In this article, we introduce the definition of TinyML and provide background information on ... in TinyML-IoT scenario. Furthermore, it touches on the recent progress in TinyML research in ...
Save Cite Cited by 60 Related articles All 2 versions
[HTML] sciencedirect.com
ACNP Full Text
Benchmarking tinyml systems: Challenges and direction
CR Banbury, VJ Reddi, M Lam, W Fu, A Fazel... - arXiv preprint arXiv ..., 2020 - arxiv.org
... -power machine learning (TinyML) hardware promises to unlock ... TinyML and discuss the challenges and direction towards developing a fair and useful hardware benchmark for TinyML ...
Save Cite Cited by 174 Related articles All 7 versions
[PDF] arxiv.org

Certificates

ICTP attendance certificates will be sent as soon as we analyze the Zoom logs.

Participants that have attended >80% of lectures according to Zoom logs.

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

Breakout rooms

Beginner TinyML and Edge Impulse questions

Jeremy and Diego

Teaching TinyML
Research in TinyML
Applications of TinyML

Brian and Marco