

## Workshop on Widening Access to TinyML Network by Establishing Best Practices in Education



3 - 7 July 2023  
An ICTP Meeting  
Trieste, Italy

Further information:  
<http://indico.ictp.it/event/10185/>  
smr3851@ictp.it

# Launching TinyML edX and Long Term Support



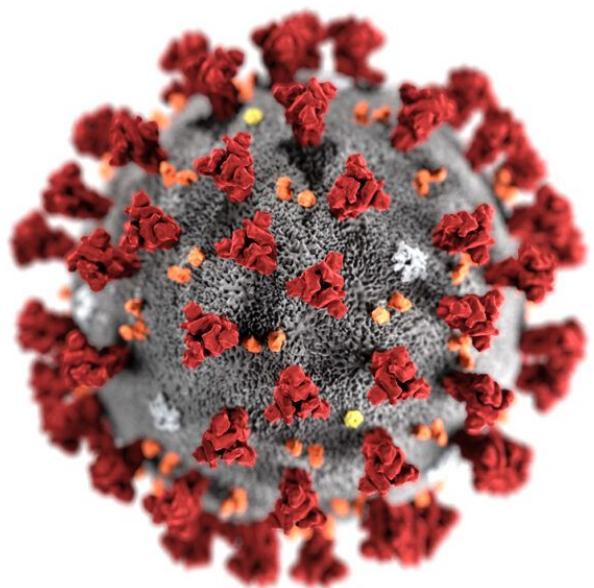
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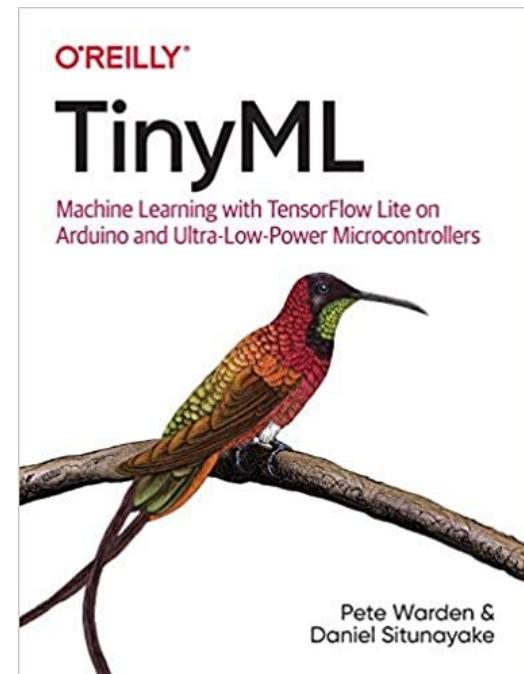
1. Why TinyML on edX?
2. The Development Process and Lessons Learned
3. Long Term Support Successes and Challenges

# Why TinyML on edX?

# Setting the Context



Late  
Spring  
2020



# Setting the Context



Let's Teach a Course on TinyML

The screenshot shows a dark-themed website for a machine learning course. At the top, there is a navigation bar with links for Home, Lectures, Final Projects, Assignments, HarvardX, and FAQ. A magnifying glass icon indicates a search function. Below the navigation bar, the course title "CS249r: Tiny Machine Learning" is displayed in large white text. Underneath the title, a subtitle reads "Applied Machine Learning for Embedded IoT Devices". On the left side of the main content area, there is a small image of the man from the previous photo, wearing a red and black plaid scarf and sitting at a desk with a laptop.

TinyML

Home Lectures Final Projects Assignments HarvardX FAQ

CS249r: Tiny Machine Learning

Applied Machine Learning for Embedded IoT Devices

# Setting the Context

Can we broaden access to our course?



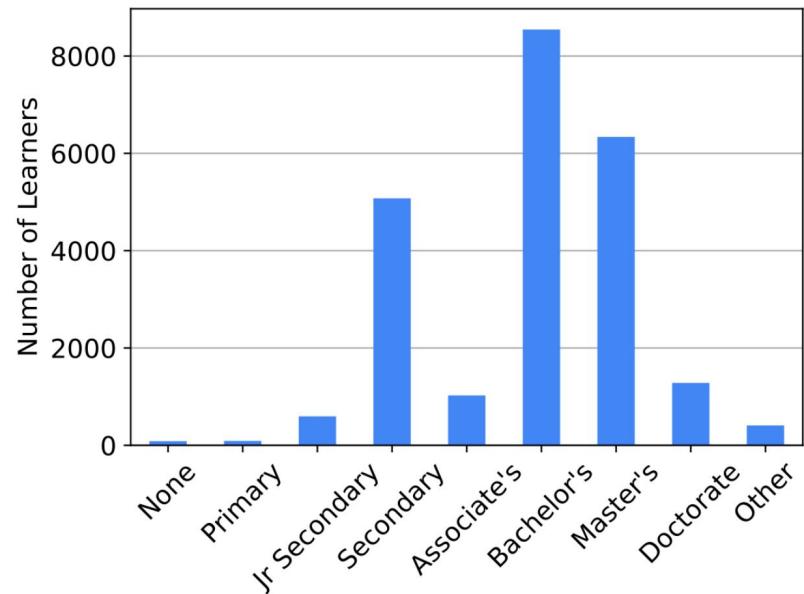
Why not work  
with us?



# The Development Process and Lessons Learned

# Why is an edX Course Different?

1. Students are both **More and Less** Experienced
2. Increased Challenge of **“Chunking”** to Preserve Learner Attention
3. **Inability to Directly Support** all Learners Especially with IT



# The Development Process

1

Course  
Design

Domain Expert  
Interviews

Module Topic  
Outlines

Pedagogical  
Overlay and  
“Chunking”

2

Content  
Development

Distributed  
Development

Content  
Smoothing

Formatting and  
Slide Development

3

Production

Copyright  
Analysis

Video Recordings

Content Uploads

Creative Team  
Post-Processing

Final  
Reviews

# Key Lessons Learned

**Simplify the Barriers to Entry** to Attract Students (Colab + Low-Cost Kit)

**Real-World Hands-On** Applications Retain Learners

**Large Teams of Diverse Experts** are Needed for Fast Timelines (Content + Formatting + Platform)

**Industry Collaborations** are Vital (Google, ARM, Arduino)

**Process Matters – Collocation Does Not**

**Less is More**

**Hardware is Hard**

# Long Term Support Successes and Challenges

# Long Term Support Successes and Challenges

1. Videos Can't be Changed (Easily)
2. Future Proofing by Design
3. Prepare for Surprises
4. Plan for Who Does the Support

- Videos as Background and **Fundamentals**.
- Code and Hands-On pegged to **Specific Versions** of OSS but prepare for the version to **No Longer Work!**
- 2 Year Support can be You – 5+ years needs a **Transition Plan!**

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ICTP arm ML

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