



EDGE IMPULSE

How to **rapidly** build robust,
data-driven embedded ML
applications



Goals for this session

1. Introduce Edge Impulse Studio
2. Walk through some key features
3. Empower you to build embedded ML apps

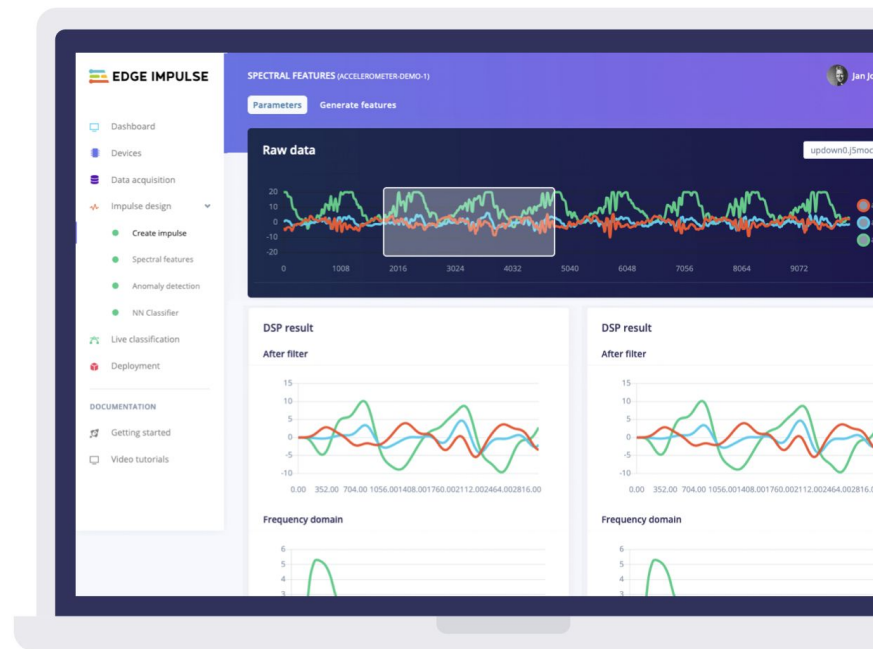
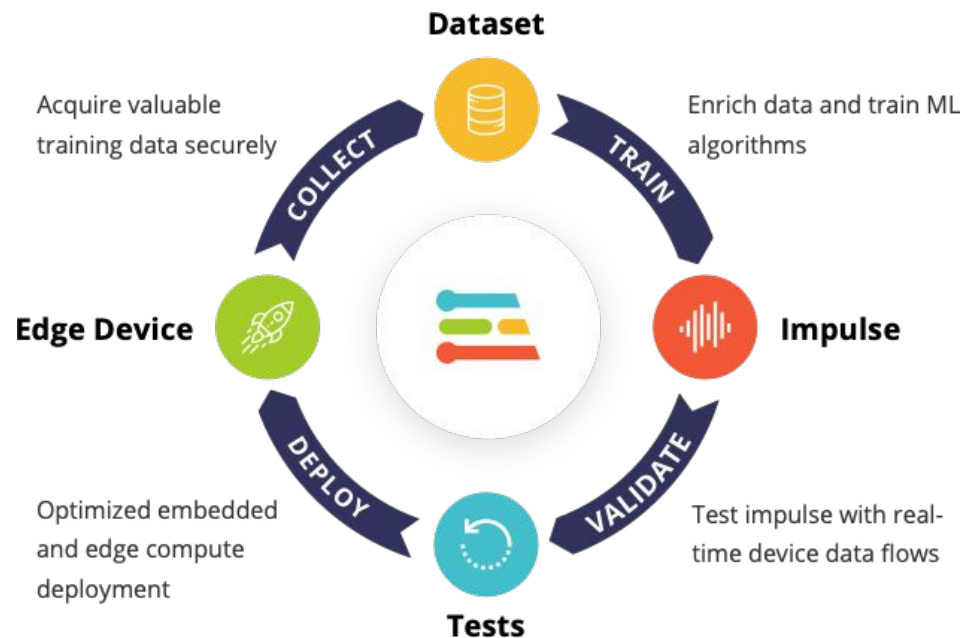


Edge Impulse helps developers build embedded ML apps



Edge Impulse

The ML development platform



Learn more at <http://edgeimpulse.com>



Four key parts

Iterative
development

Eng practices
(MLOps)

EON
technologies

Edge Impulse
SDK



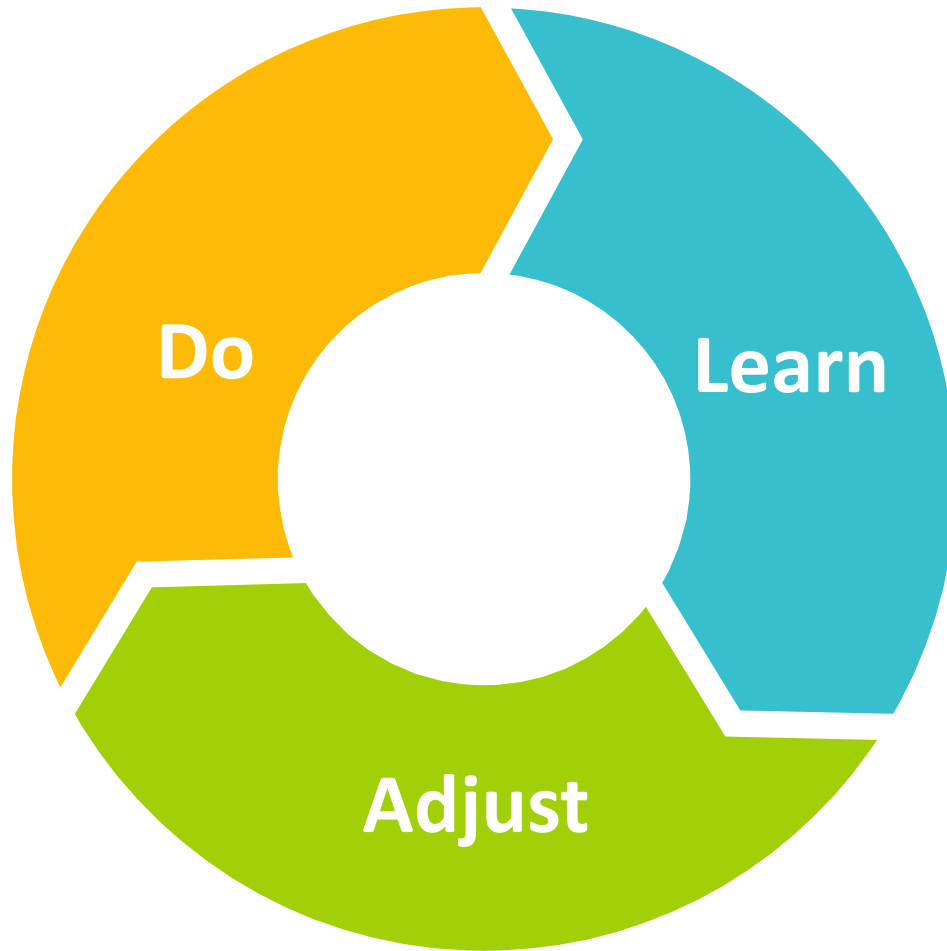
Part 1

Iterative development



Modern software development
is a feedback loop









Part 1: Iterative development

- Feedback loop key to ML workflow
- Collect data, train, evaluate, tweak, repeat
- Can't build robust applications without it
 - Give example of things that can go wrong, e.g. insufficient dataset

- Show how EI features help
 - Data ingestion
 - Phone and supported hardware
 - Very quick to create model and test
 - Automated testing & feature explorer



Part 2

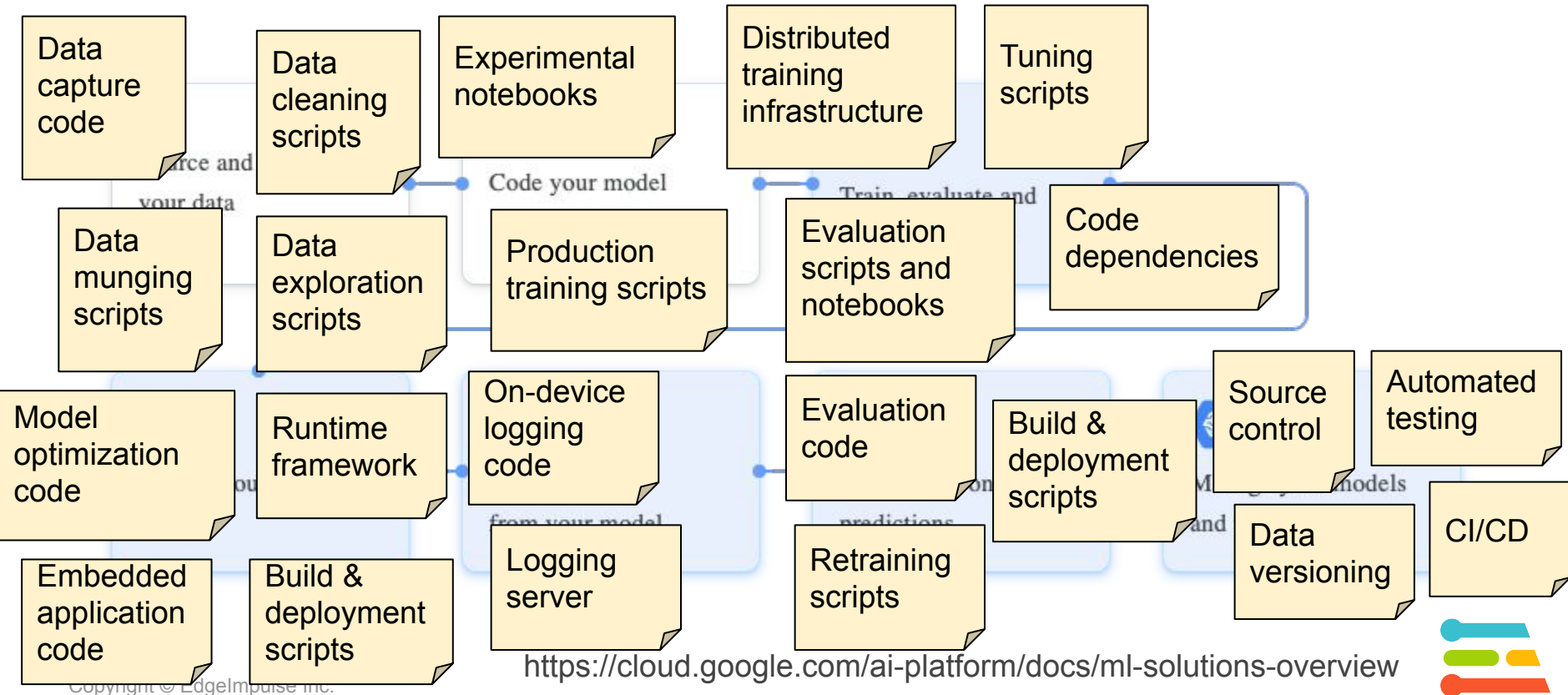
Engineering practices (MLOps)



Machine learning is a *workflow*
with a lot of moving parts



The ML workflow



<https://cloud.google.com/ai-platform/docs/ml-solutions-overview>





Part 2: MLOps

- Tons of things to keep track of
- <Show the slide from other deck>
- Need tooling to help track everything
 - Give example of why/things that can go wrong

- ML Ops: Keeping track of all the moving parts
 - End to end flow
 - Block and impulse versioning
 - Stuff from ML Ops talk
 - Organizational features, large datasets



Part 3

EON technologies

Edge Optimized Neural





Machine learning



Embedded devices have unique capabilities and constraints



EON
Compiler

Model
compression

Transfer
learning

Embedded
DSP



Research
community



Internal
R&D



Edge Impulse
Studio





Part 3: EON technologies

- Running models on embedded devices is different from running on servers
- Serious constraints—leading edge of ML research, new developments frequently
- EI makes these ready for production and available for all users

- EON technologies:
 - Test and compare optimizations during training
 - Data augmentation
 - Hand-tuned DSP code
 - EON compiler, run faster and with less memory than an interpreter



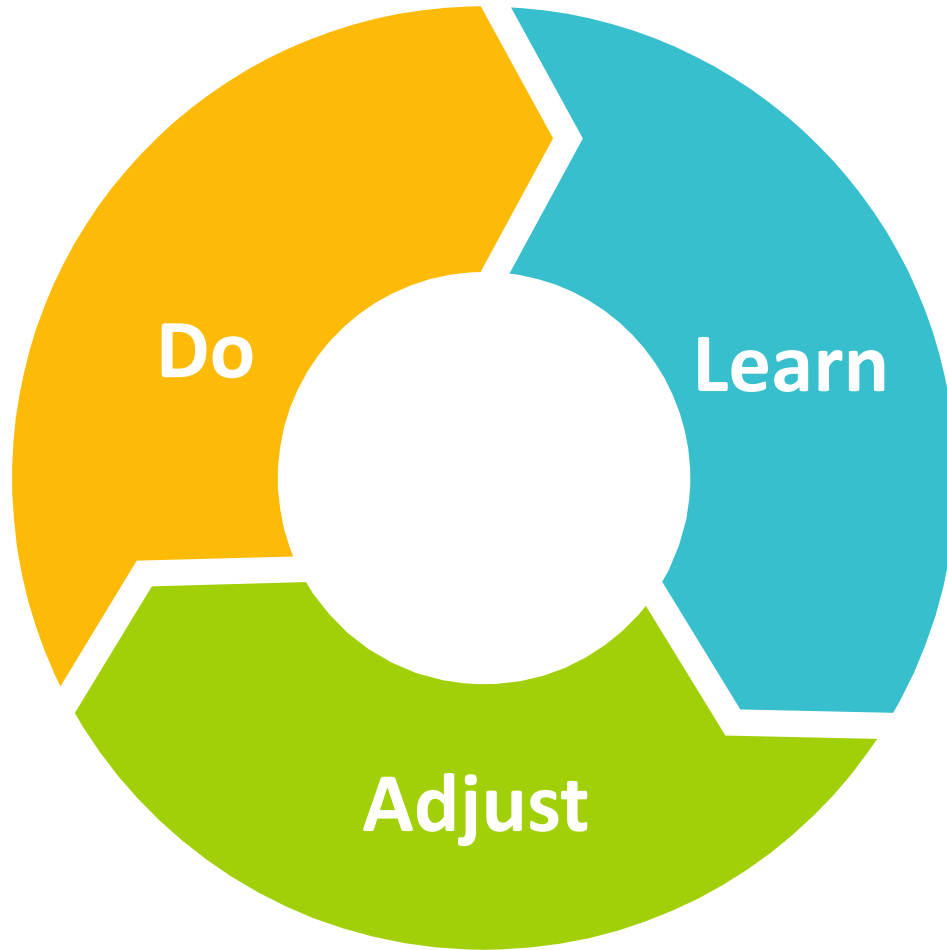
Part 4

Edge Impulse SDK



Integration and deployment
should be simple, easy, and fast







Part 4: Edge Impulse SDK

- Integration and deployment should be simple, easy, and fast
- Supports tight feedback loop
- Integrates with your existing tools and workflows

- Edge Impulse SDK: Portable, simple to build, simple API, examples
 - Available in lots of ways (C++, Arduino library, Cube.AI, etc)
 - Simple API
 - Pre-built firmware for rapid testing



Recap





How do I get started?



**Coursera
course**

coursera.org/learn/introduction-to-embedded-machine-learning

**Docs &
tutorials**

docs.edgeimpulse.com
www.youtube.com/EdgeImpulse

**Build a model
in 5 minutes**

www.edgeimpulse.com

@dansitu @zach_shelby



Empowering Product Creators to Harness Edge AI and Vision



The Edge AI and Vision Alliance (www.edge-ai-vision.com) is a partnership of ~100 leading edge AI and vision technology and services suppliers, and solutions providers

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The Alliance provides low-cost, high-quality technical educational resources for product developers

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