The future of IoT education

Global startup riding the IoT revolution
Outline

- Wyliodrin story
- Empowering engineers
- Tools for IoT education
  - from hosted solution to Open Source
The problem

Imagine driving in San Francisco with a stick shift car
(hard work all the time - 80% useless, 20% excellent)

80% of the time IoT development tools are overhead for your project
The solution
The solution
The vision

- **Goal:**
  - Engaging students
  - Bringing the *maker culture* into the school
  - Building the *confidence* to be part of IoT projects

Create, modify, tweak, customize current solutions to your needs and use cases
The technology: Hardware

- Before 2012
  - expensive embedded devices
  - few devices running Linux
- Raspberry Pi changed the game

Currently experiencing rapid growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of connected devices (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>4,000</td>
</tr>
<tr>
<td>2015</td>
<td>6,000</td>
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<tr>
<td>2016</td>
<td>7,000</td>
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Internet of Things

- A system where the Internet is connected to the physical world via ubiquitous sensors

Scalable  Real time  Security and privacy  Intelligent and dynamic  Distributed and decentralized
The IoT stack

The problem

- Arduino does well on the sensor level
- Raspberry Pi follows the full stack, but lacks the benefits of Arduino
IP Workshop Summer School

- IoT practical projects
- ~100 participants / event
Why

- Arduino preferred to Raspberry Pi
- The fault
  - teaching strategy
  - development tools

Projects were not IoT projects, they fell into electronics or programming
How

- Transfer the accessibility typical of Arduino to Raspberry Pi

Ease to use  Direct access  High productivity  Use from anywhere
Teaching IoT the right way: How to actually do it?

- Programming
  - basic programming skills
  - high level languages
- Web technologies rather than electronics
  - connecting devices
- The right tools
  - easy access
  - quick prototyping
  - simple IDE for IoT (e.g., Arduino IDE)
It’s about programming rather than electronics

- less electronics
- programming of well established kits
It’s about web technologies

- IoT is about connectivity
- IoT includes the Web
The new problem

- Focus on the data
- It’s all about interconnection
It’s about the right tools

- controlling the peripherals is puzzling
- platform dependent
- knowhow of the platform

Solution:
- new level of abstraction
- open source Arduino like environment
It’s about the right tools

- anywhere, anytime
- fast access to embedded boards
- accessible to non-experts
- increases productivity for experts
- fast prototyping of ideas
- no software pre-requisites
It’s about the right tools

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Since 2013…

- We have worked with:

- Notable users:

  "I really like how the environment works and it is really slick with how you connect to the boards. It has changed how I view the Galileo and added a lot of value to the board."

  Derek Runberg,
  Educational Technologist,
  Sparkfun Electronics Inc.

  "It has to be said that Wyliodrin is fantastic effort to bring real-world interactive coding using the Raspberry Pi."

  Simon Walters,
  Scratch GPIO
All over the world

- Wyliodrin has been used at hackathons in:
  - United States
  - European Union
  - Singapore
  - South Korea
Wyliodrin: Web IDE

- Manage your projects
- Store the projects in the Cloud
- Deploy applications on your boards
Visual Programming

- Great traction with beginners
- No formal programming knowhow required
Debug using graphs

- Debug IDE
- Real-time monitoring
- Intuitive showcase of sensor measurement evolution
Board communication

- Intuitive communication platform
- High abstraction for easy use
- Open and secure standard protocol
Write in Python / Javascript

▪ The ultimate goal
Wyliodrin STUDIO: Open Source

- Open Source
- Available for
  - UDOO Neo
  - Raspberry Pi
  - BeagleBone Black
  - Arduino Yun
- Works locally
Wylidorin STUDIO: future steps

- Enlarge the community
- Lessons
- Hardware simulation
- Projects sharing
Who is Wyliodrin

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Head of R&D, Teaching Assistant

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- Jutta Jerlich (TU Wien)
- Raluca Oltean (Intel)
The takeaway

- IoT is not just electronics or microcontrollers
The takeaway

- IoT is not just electronics or microcontrollers
  … so we need to:
  - build a simple way to interact with the new intelligence around us
  - bridge the Arduino community with the Linux enthusiasts
  - harvest the power of Python & Javascript for IoT projects
Thank you!

/wyliodrin