Teaching TinyML and supervising capstone projects

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Workshop on Widening Access to TinyML Network by Establishing Best Practices in Education
Prof. Ronald Criollo

- Lecturer at Faculty of Electrical and Computer Engineering, ESPOL.
  - Computer Science (Undergraduate)
    - Coordinator of Computer Science Capstone Course
  - Master in Telecommunications (Graduate)
    - Internet of Things
- Researcher at Center for Industrial Digital Transformation, CTD-ESPOL.
- Coordinator of track “IoT Machine Learning”, Workshop for Latin America and the Caribbean, Foundation EsLaRed.
- Tutor of an open source community ”KOKOA”, ESPOL.
- Instructor at Cisco Networking Academy.
How to motivate undergraduate/graduate students to learn TinyML?
Methodology

• Undergraduate (Computer Science Program)
Teaching TinyML

• Tutor of open source community ”KOKOA”
Teaching TinyML (open source community)

**Challenges**
- Motivate students of first semesters
- Variety of the students backgrounds

**Opportunities**
- Increase members of the student club
- Recruit future students to develop capstone projects using TinyML

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

- Undergraduate (Computer Science Program)

Motivate and involve students in learning TinyML workshops, webinars

As tutor of open source community

Select candidates to develop CS capstone projects using TinyML

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Methodology

• Undergraduate (Computer Science Program)

  Motivate and involve students in learning TinyML workshops, webinars  
  As tutor of open source community

  Select candidates to develop CS capstone projects using TinyML
  As tutor of capstone projects

  Propose a capstone project to solve real problems with a real client using TinyML

Workshop on Widening Access to TinyML Network by Establishing Best Practices in Education
**Methodology CS Capstone Course**

Desing Thinking + TinyML Edu resources

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<th>Target Audience</th>
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<td>tinyML Specialization by Harvard University</td>
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Supervising Capstone Projects

- Audio processing to prevent possible femicides

Xiao BLE Sense

Workshop on Widening Access to TinyML Network by Establishing Best Practices in Education
Supervising Capstone Projects

• Audio processing to detect possible speaking problems in children
Supervising Capstone Projects

• Audio processing to send instantaneous notification for safety issues
Methodology

• Undergraduate (Computer Science Program)

- Motivate and involve students in learning TinyML workshops, webinars
- As tutor of open source community

- Select candidates to develop CS capstone projects using TinyML

- Propose a capstone project to solve real problems with a real client using TinyML
- As tutor of capstone projects

- Graduated students

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

- Undergraduate (Computer Science Program)

  Motivate and involve students in learning TinyML workshops, webinars as tutor of open source community.

  Select candidates to develop CS capstone projects using TinyML as trainer.

  Propose a capstone project to solve real problems with a real client using TinyML as trainer.

  Graduated students.

  Motivate engineers to improve their projects for a possible publication as researcher.

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

• Graduate (Master in Telecommunications)

- Teaching introduction unit of TinyML into IoT course
- Integration IoT + AI
- Propose Capstone Projects

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

• Master in Telecommunications
Future Research

Counting microorganisms in petri dish

Portable radar speed camera

Low cost analyzer of mango quality
Conclusions

• The experience using resources like TinyML Edu empower the students in the rapid prototyping of proof of concepts.

• It is absolutely possible to involve students in the early stages of their careers developing proof of concepts using TinyML.

• The participation of students into open source communities or academic clubs during early stages of their careers could give them an overview of their future profession.
Thanks

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