

# AIR4Children: Artificial Intelligence and Robotics for Children

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R. Montenegro, E. Corona, D. Badillo-Pérez, A. Mandujano, L. Vázquez, D. Cruz, **Miguel Xochicale**  
Workshop on Child-Robot Interaction & Child's Fundamental Rights at **#HRI2021**  
March 08, 2021

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## 1. Introduction

1.1. Education, Investment and Publications in AI and Robotics (AIR)

1.2. Open source software and hardware in AIR

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2.1. Prototyping and Piloting Open Source Robots

2.2. Adopting Montessori Education and Spiral Learning

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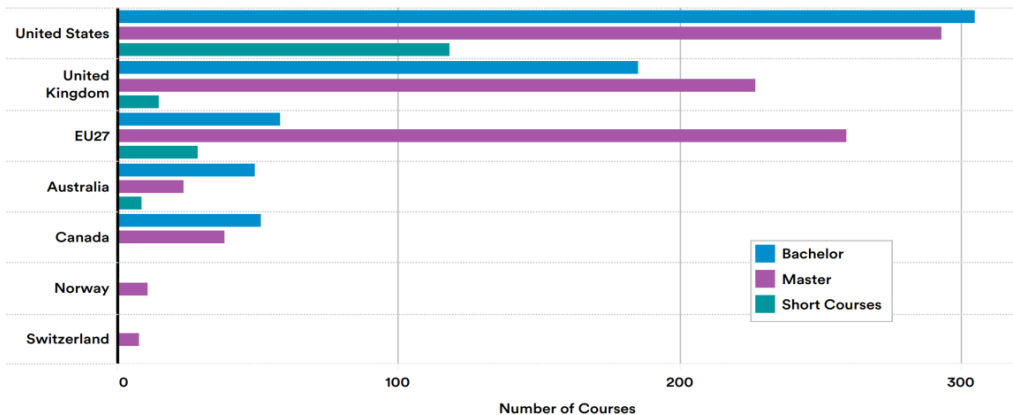
# Introduction

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# The progress of AI and Robotics in USA, China and EU

## NUMBER of SPECIALIZED AI PROGRAMS by GEOGRAPHIC AREA and LEVEL, 2019-20

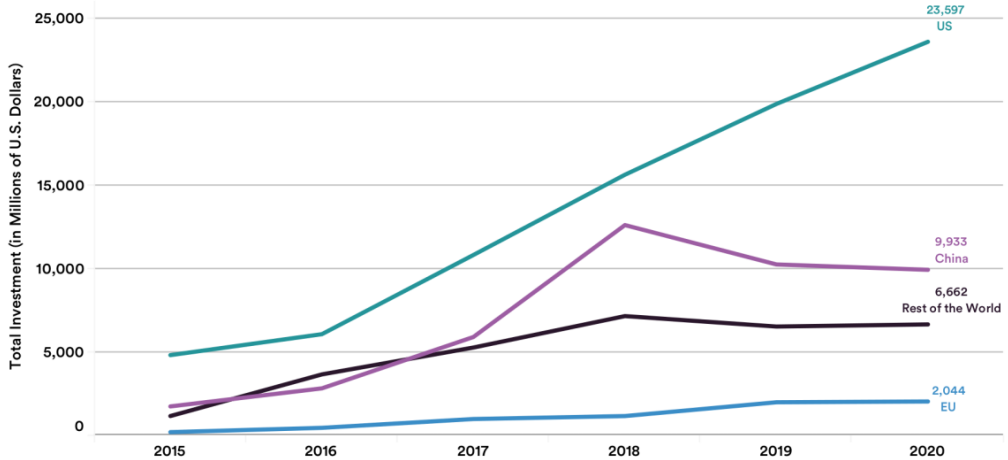
Source: Joint Research Centre, European Commission, 2020 | Chart: 2021 AI Index Report



# The progress of AI and Robotics in USA, China and EU

## PRIVATE INVESTMENT in AI by GEOGRAPHIC AREA, 2015-20

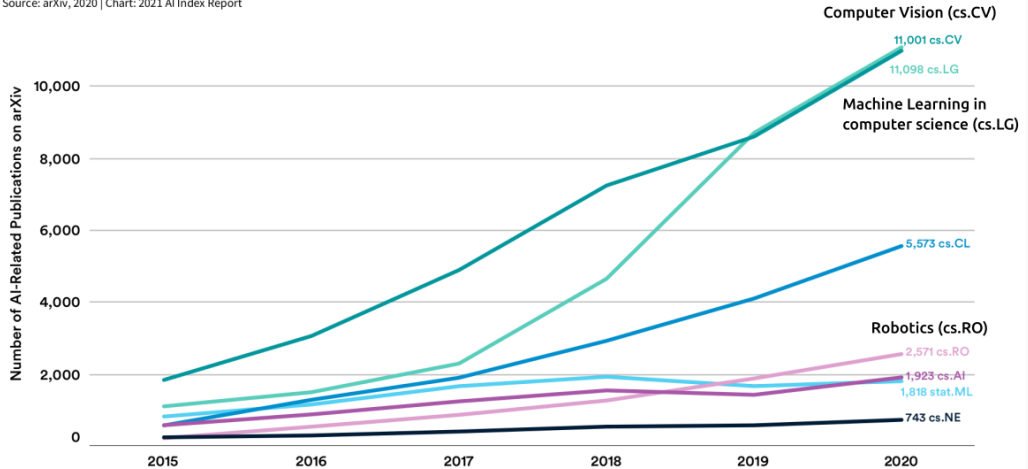
Source: CAPIQ, Crunchbase, and NetBase Quid, 2020 | Chart: 2021 AI Index Report



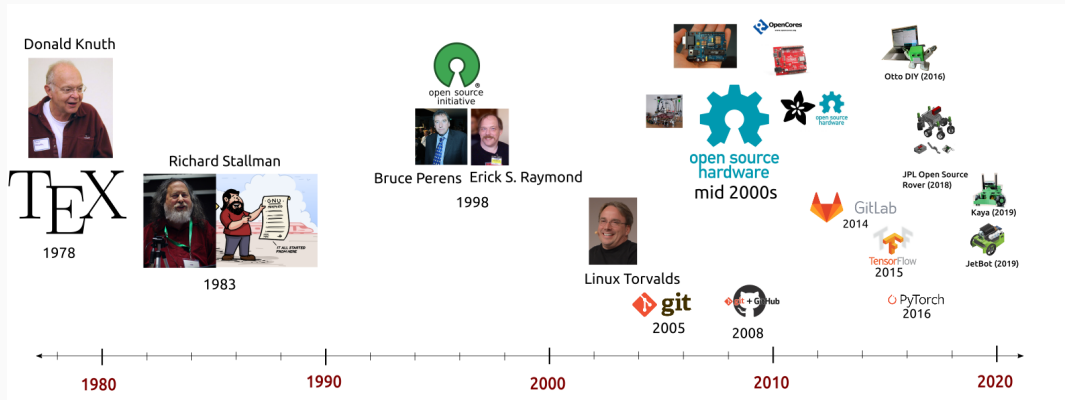
# The progress of AI and Robotics in USA, China and EU

NUMBER of AI-RELATED PUBLICATIONS on ARXIV by FIELD of STUDY 2015-20

Source: arXiv, 2020 | Chart: 2021 AI Index Report



# Open source software and hardware in AIR



AIR4Children

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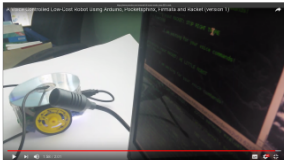


# Prototyping Open Source Robots

V00-MAY2014



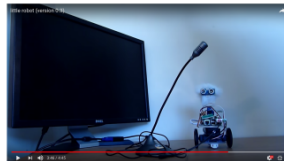
V01-JUNE2014



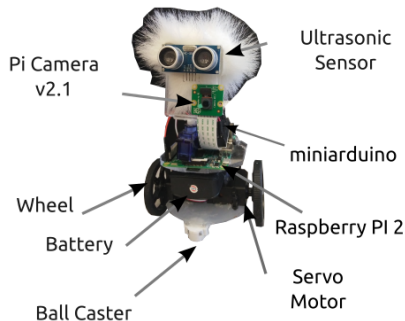
V02-JULY2014



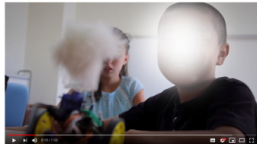
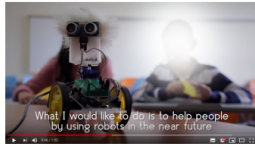
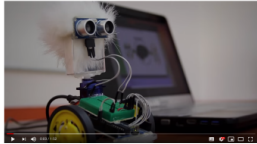
V03-APRIL2016



V04-DEC2017



# Piloting robot prototypes



June 2015



October to December 2020

# Adopting Montessori Education in the curriculum of AIR4Children

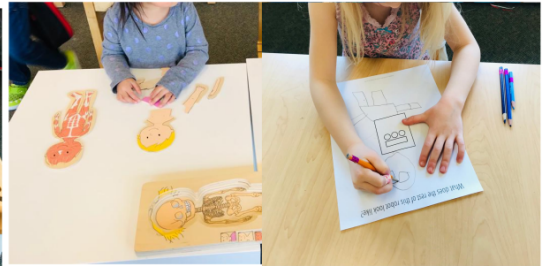
*"The hand is the instrument of the mind."* Dr. Maria Montessori (1970-1952).



Building  
Trinomial cube



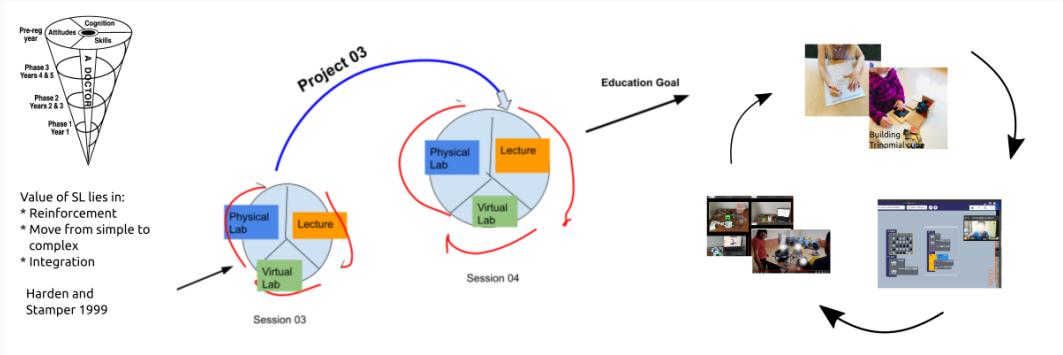
Using  
4 cylinder blocks



Relating human anatomy with AI/Robot anatomy

\* participate in creative explorations, develop fine motor skills, engage in collaborative and teamwork activities

# Adopting Spiral Learning Methods in the curriculum of AIR4Children



## Conclusions and Future work

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# Conclusions and future work

## Conclusions

We proposed AIR4children to create

- a more inclusive, affordable and fair participation of children in AI and Robotics,
- child-centred AI and Robotics based on Spiral Learning and Montessori Education, and
- Open source robots to be affordable and fun

## Future work

- Piloting AIR4Children in Xicohtzinco, México
- Evaluation of the impact of AIR to children, instructors and parents.



# Acknowledgements



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