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AI4STEM CONSORTIUM

Introducing the 5 Big Ideas in Artificial Intelligence using Internet of Things in STEM education

Co-funded by the European Union

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About the project

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The AI4STEM project is an Erasmus+ Co-funded by the European Union. The partnership consists of 6 organizations from 5 different countries (i.e., France, the Netherlands, Greece, Cyprus, and Portugal).

The project is coordinated by
ECAM EPMI (FR)

and is supported by
ATERMON BV(NL),
ASSERTED KNOWLEDGE (GR),
EDUMOTIVA(GR),
Emphasys Centre (CY) and
Scholé (PT)

About the project

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The AI4STEM project aims to introduce artificial intelligence to students aged 8-16 through modules and hands-on projects that blend AI and IoT principles, programming, and STEM learning outcomes.

The project presents the 5 big ideas in AI (as they are defined by AI4K12 initiative) to develop an educational framework for educators helping them to introduce their students to AI through IoT projects.

Furthermore, the project raises awareness about the use of AI and its positive impact on our daily lives.

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Target Groups

The main target groups for this project are:

-Educators in primary/ upper primary and secondary education
-Students aged between 8 and 16 years old.

The five big ideas of AI

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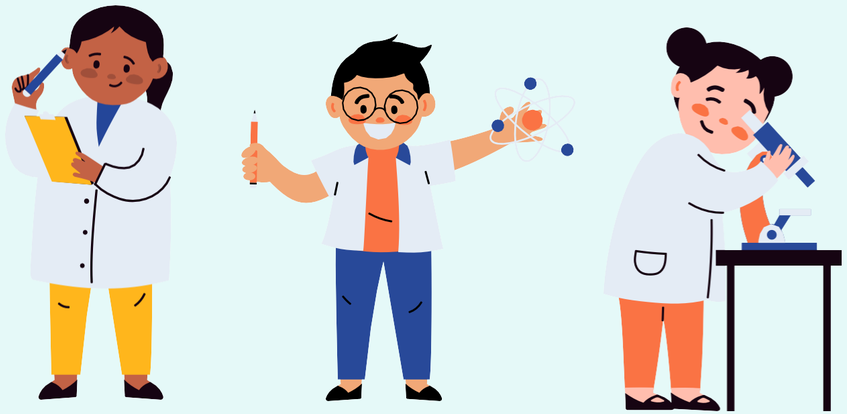
1. **Perception**
2. **Representation & Reasoning**
3. **Learning**
4. **Natural Interaction**
5. **Societal impact**



The five big ideas of AI

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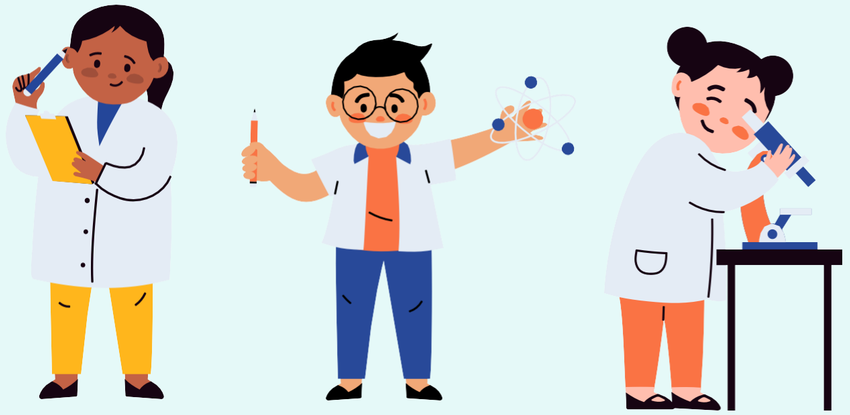
1 **Perception:** the process by which computers can understand their environment.

How do computers and other intelligent agents perceive the world?

Through various sensors and input devices.

These sensors and devices collect data from the physical world and convert it into a digital form that a computer can process and understand.



The five big ideas of AI

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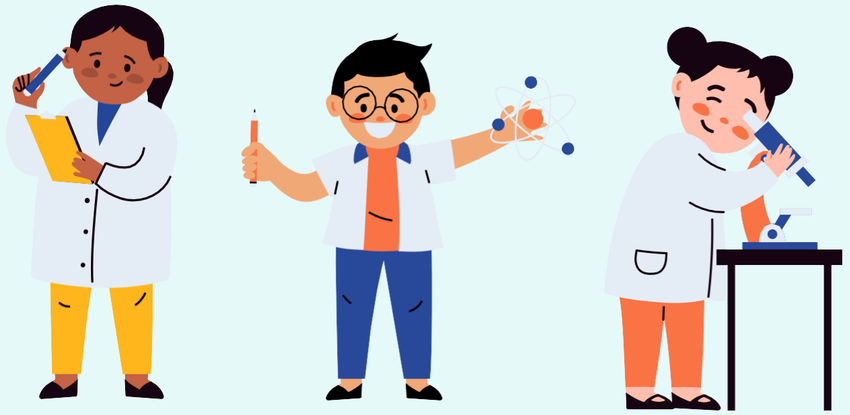
2 **Representation & Reasoning […]**: refer to the ways in which AI can process and manipulate information to solve problems and make decisions based on the constructed representations of the world, in the form of data.

3 **Learning:** How AI can learn from data and use this experience to improve accuracy in performing a task. This is done through Machine Learning algorithms that permit intelligent agents to create representations based on training data.



The five big ideas of AI

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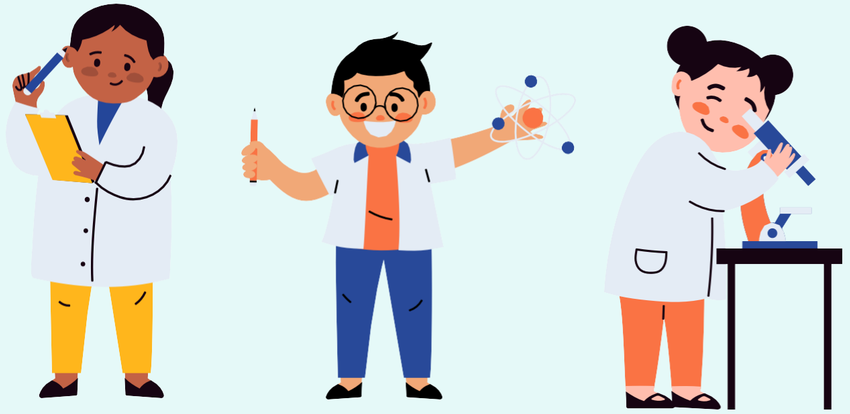
4 **Natural Interaction:** One of the goals of AI is to make interaction with computers more natural. If you have asked Siri or Alexa a question, you have a general idea of how this interaction works.

5 **Societal impact:** As AI becomes more widespread, there is a growing concern about the ethical implications of its use.
This includes the need for AI systems to be transparent and explainable so that their decisions can be understood and trusted.



Project objectives

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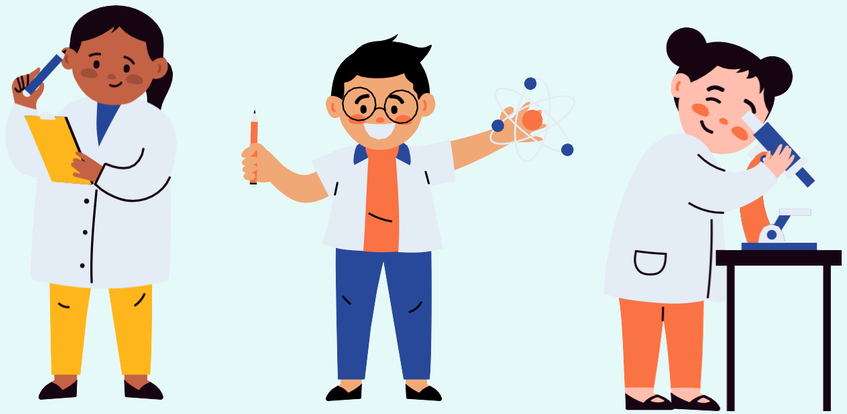
1. **Familiarise primary and secondary schools with AI under the 5 Big Ideas**
2. **Make AI easier to understand through hands-on lessons**
3. **Create IoT projects combined with AI**
4. **Get students involved in real-life applications**
5. **Make students and teachers experiment and find the technical solution to their project**



Project Activities

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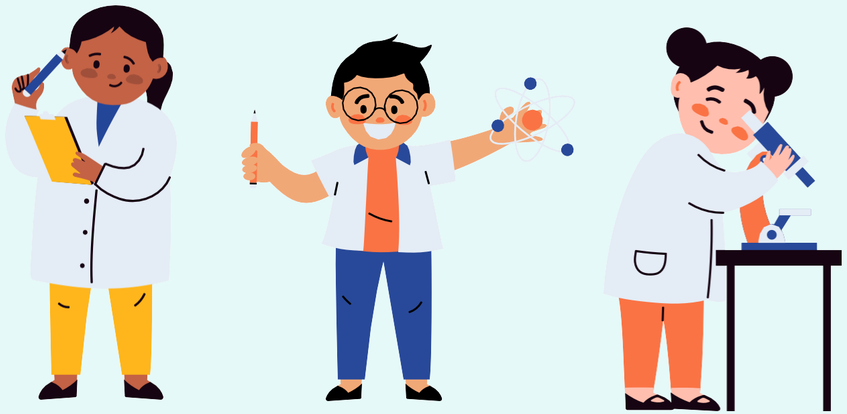
1. Provide educators with a curriculum to introduce students to AI, in the light of the Five Big Ideas
2. Give examples of different areas where AI is applied in everyday life such as robotics, vision, speech and games.
3. Develop an IoT kit containing the components needed to implement the IoT projects and an Educators' Manual with brief explanations of the included components and suggested software.



Project Activities

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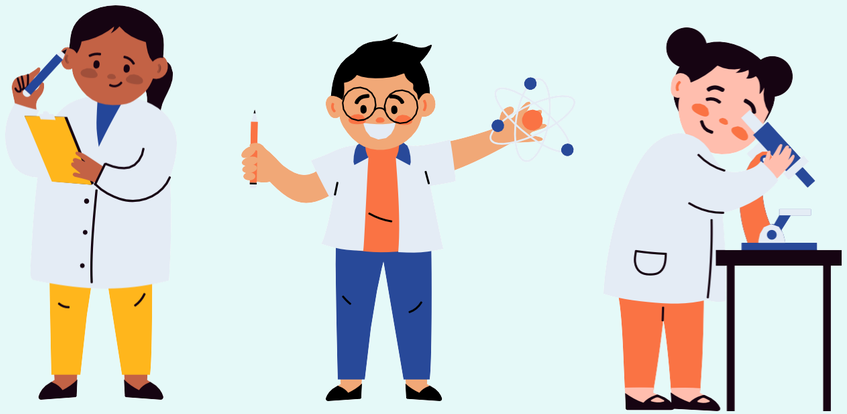
4 Create a community of practice for educators and learners through the AI4STEM online Academy, ensuring continuity and development of project outcomes, and encouraging collaboration and constructive discussion.

5 Pilot activities in upper-primary classes and secondary schools of the kit, the IoT projects, the Virtual Academy and the Educator's Manual. Evaluation and update of the created materials.



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Project results

AI4STEM Educational Framework

A framework for teachers to guide learners in exploring the 5 Big Ideas in AI

AI4STEM IoT Kit

The Kit is based on BBC micro:bit includes sensors and electronic components for the students to develop their IoT projects.

AI4STEM Educator's manual

This manual aims to assist educators in using the educational resources and hardware provided by the project

AI4STEM Academy

An Online Platform that connects educators, students, and hosts all the educational materials needed.

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AI4STEM Educational Framework

The framework consists of 6 Modules introducing the 5 Big ideas in AI

The topics incorporated are:
AI in Everyday Life
AI Applications
AI in Robotics
AI in Vision
AI in Speech
AI in Games and Puzzles

The documents are destined for educators and consist of:
- Glossary
- Theory
- Assessment

You can access it here:
https://ai4stem.erasmusplus.website/educational-framework

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AI4STEM IoT Kit

The AI4STEM IoT Kit consists of the BBC micro:bit and electronic components, peripherals, sensors. The Kit is meant to be used by students to run the projects created for experimenting. The Kit is accompanied by the Inventory list and the User Manual.

Projects developed:

- ❖ Smart Intruder Alarm
- ❖ IoT Robotic Car
- ❖ AI& Computer Vision Technology
- ❖ Voice-Controlled Home Lighting
- ❖ AI-Powered Puzzles

You can access it here:
https://ai4stem.erasmusplus.website/iot-kit

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AI4STEM Educator's manual

The AI4STEM Educators Manual is a guide for educators with information and indications on how to fully exploit the project results.

Instructions on:

- AI4STEM IoT Kit
- AI4STEM Educational Framework
- AI4STEM Academy
- AI4STEM Lessons and assessment framework

You can access it here:
https://ai4stem.erasmusplus.website/educator-s-manual

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AI4STEM Academy

The AI4STEM Academy is an online tool that hosts all the above-mentioned resources. The Academy is available in 5 languages, namely English, French, Portuguese, Greek and Dutch.

Furthermore, the Educational framework is provided as an online course where skills retention is validated through Open Badges.

You can access it here:
https://academy-ai4stem.erasmusplus.website/

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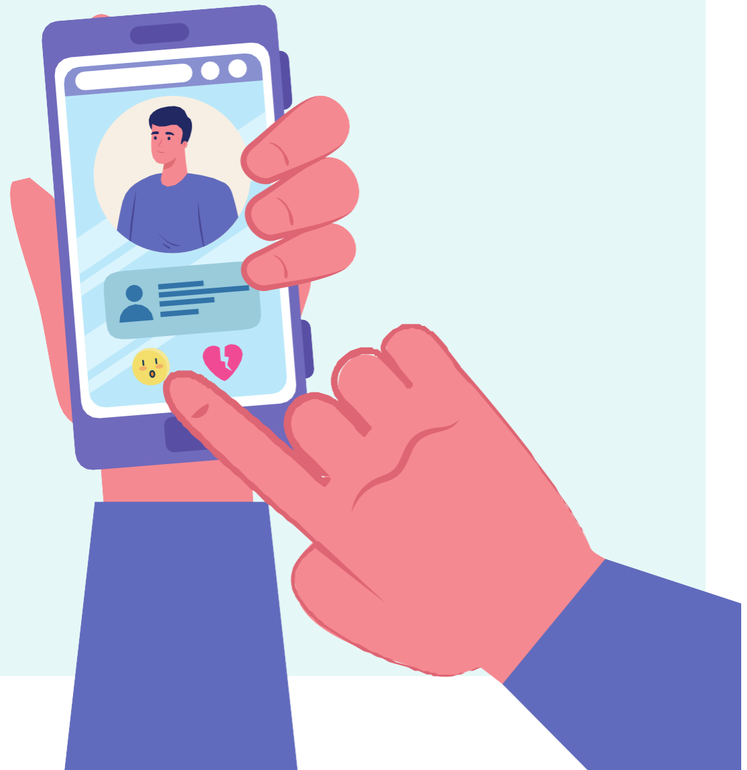

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