PILOT IMPACT REPORT

Bringing AI and humanities together
With the help of children

> For every dollar and every minute we invest in improving artificial intelligence, it would be wise to invest a dollar and a minute in developing human consciousness.
>
> YUVAL NOAH HARARI

What is THE labs?

‘THE labs’ is a non-profit after-school program at the intersection of technology, humanities & entrepreneurship.

Technology is power. And with the rapid rise of AI, those who control it will shape the future. As tech advances at an insane pace, the marginalized communities face the risk of becoming irrelevant.

At THE labs, we believe that technology is one of the top 3 competencies children need to have today. That is why we work on equipping underserved children with the power of cutting-edge technology, starting with AI.

Fact 1: Women are 73% more likely to get injured in a car accident because the cars are not designed for them.
Fact 2: Millions of people across the world are cleaning manholes while hundreds of AI algorithms are creating art.

These and many other such facts demonstrate how technology automates inequality.

At THE labs, we work on developing a lens in children to evaluate technology critically and to create a beneficial future.

Every revolution disrupts the job market. Some jobs are replaced & new jobs are created. With AI revolution, we have some idea about which jobs will go redundant, but we can't reliably predict which new jobs will appear.

This is why, at THE labs, we work on developing an entrepreneurial mindset in underserved children to help them not just stay relevant but rather thrive in the future upheavals.

You know the best part? Children at THE labs have already started creating ethical tech!

Equipping underserved children to

Get a seat at the table in tech dominated world

Redesign that table so it fits everyone

Thrive in the uncertain future of professions

our vision

People
across all sections of society
have equal
political & economic
bargaining power
in the upcoming
technological upheavals.

About the pilot

Objectives

- Check effectiveness of our content, pedagogy & instruction, since the program is designed from scratch.
- Make an educated guess of the right FLN/grade level for coping with our intervention.

Demographics

The pilot was conducted at **a low-income private school** - Craze English Medium School, Khadakwasla with **20 children from grade 6-8**
(12 girls, 8 boys)

The parents of **90% the children work in unorganized sectors**, having professions like auto drivers, household helpers, flourmill workers, plumbers, tile fitters, tile contractor, etc.

We conducted a **diagnostic test to check the FLN level** of these children. None of them were learning at the grade appropriate level as per this FLN test.
10% of them were at grade 6 level.
10% of them were at grade 5 level.
40% of them were at grade 4 level.
30% of them were at grade 3 level.
10% of them were at grade 2 level.

Session structure

Every session was ~1.5 hours before school

Modules

Classifier AI (15 hours) : An AI that classifies/identifies objects
Image Generation AI (100 hours) : AI that generates images for given prompts.

Classroom practices

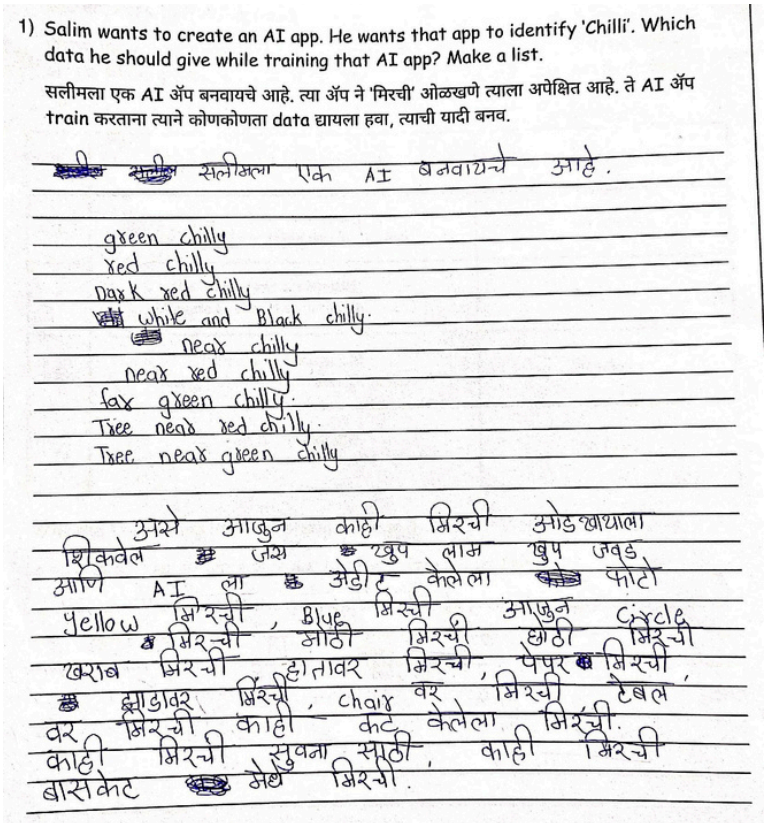
- Small-group instruction - Groups were homogenous as per FLN level & Heterogenous as per gender.
- Bilingual worksheets - Marathi and English.
- Tri-lingual instruction - Marathi, Hindi and English.

What the pilot enabled children to do

Curating high quality dataset for training classifier AI.

To train an image classification AI, we need to give it a lot of data. The more data we give, the more accurately it works. For the AI to identify an object, it needs to see that object **in all possible scenarios**. Each scenario also needs to be repeated many times so the AI can learn it well. This means we need a list of many scenarios and lots of images for each one. By giving the AI this **variety and volume of data**, it can learn to identify the object no matter the situation.

This is why it's important to think of all possible scenarios and create a high-quality dataset before training the AI.



1) Salim wants to create an AI app. He wants that app to identify 'Chilli'. Which data he should give while training that AI app? Make a list.

सलीमला एक AI ॲप बनवायचे आहे. त्या ॲप ने 'मिरची' ओळखणे त्याला अपेक्षित आहे. ते AI ॲप train करताना त्याने कोणकोणता data द्यायला हवा, त्याची यादी बनव.

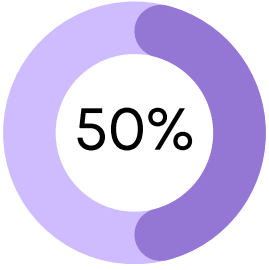
सलीमला एक AI बनवायचे आहे.

green chilly
red chilly
Dark red chilly
White and Black chilly
near chilly
near red chilly
far green chilly
Tree near red chilly
Tree near green chilly

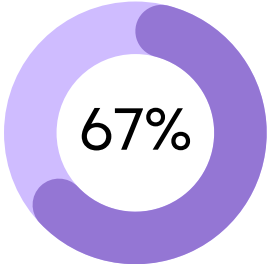
असे आजुन काही मिरची ओळखायला शिकवले जेव्हा खुप लाम खुप जवड आणि AI ला अडी केलेला फोटो yellow मिरची, Blue मिरची आजुन Circle खराब मिरची आठी मिरची छठी मिरची हातावर मिरची, पेपर मिरची झाडावर मिरची, chair वर मिरची टेबल वर मिरची काही कट केलेला मिरची. काही मिरची सुवना साठी, काही मिरची बास्केट मेथ मिरची.

Outcomes

Children showed significant improvement in 'curating high quality datasets'.



children can articulate diverse scenarios for a given object



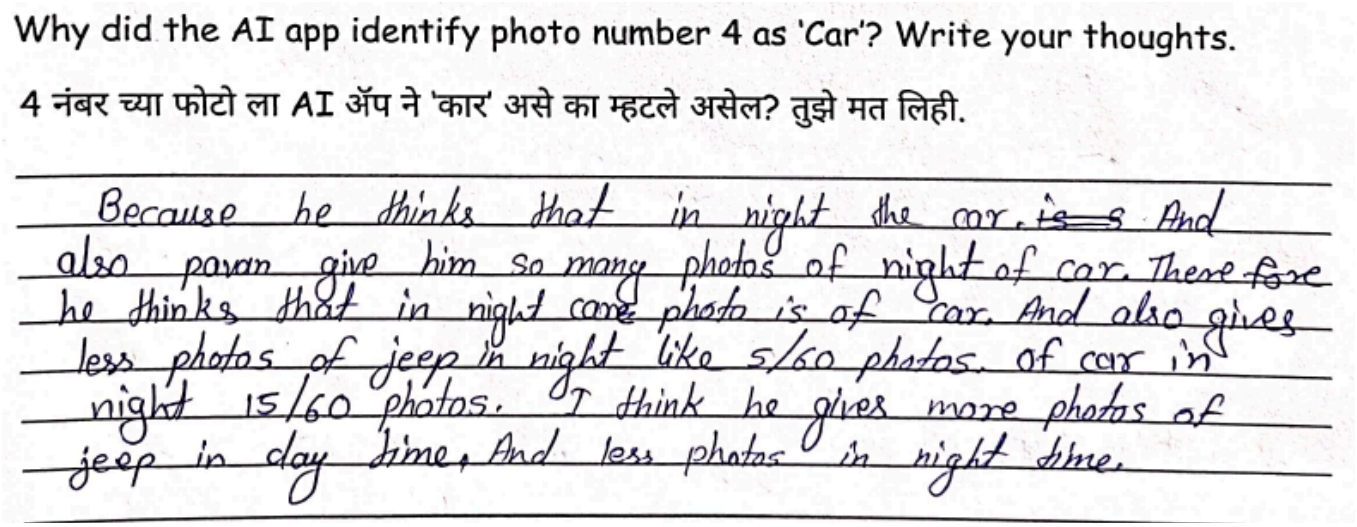
children can create an extensive list of datapoints within a scenario

What the pilot enabled children to do

Reasoning AI error through data lens

Image classification AI can make mistakes. These mistakes happen when the AI is given too many images of an object in one specific condition. It concludes that this condition always comes with the object.

This shows us an important point. **AI doesn't truly understand objects the way humans do. It only learns from the data we give it**. If certain conditions are overrepresented or missing in the data, the AI errs. It's an important skill to link such misclassifications to the presence or absence of certain data for specific conditions.



Why did the AI app identify photo number 4 as 'Car'? Write your thoughts.

4 नंबर च्या फोटो ला AI ॲप ने 'कार' असे का म्हटले असेल? तुझे मत लिही.

Because he thinks that in night the car. ~~is~~ s And also pavan give him so many photos of night of car. Therefore he thinks that in night come photo is of car. And also gives less photos of jeep in night like 5/60 photos. of car in night 15/60 photos. I think he gives more photos of jeep in day time, And less photos in night time.

Outcomes

Children showed significant improvement in 'linking AI errors to presence of absence of data'.

What the pilot enabled children to do

Getting the work done from AI in a jiffy

AI generates images based on the text prompts we provide. **Writing clear and detailed prompts is an important skill** because the AI can only create what is described in the prompt. Vague or incomplete prompts often lead to inaccurate images, as the AI doesn't have enough information to work with.

To learn this skill, the kids practiced writing prompts systematically. They followed a process of breaking down their idea into key parts, such as the main object, its surroundings, style, and perspective. This helped them understand how to guide the AI to create images that closely match what they had in mind. Through this, they learned that **crafting prompts is both an art and a science**, requiring clarity and creativity.

Given Image

Generated Image

Written prompt

pixel art.The astronaut is planting a planting on the mars.The horse is walking on the mars planet.The astronaut is wearing white space suit there are red stripes on space suit.The oxygen helmet is black in color. he is holding shovel is in his hand.This is happening on the mars at night time. The horse is pink in color there are some stars in the sky the star are twinkling. The horse is behind the astronaut there is moon behind the horse.The moon is looking at the astronaut with wide eyes and smiling.There is a satellite behind the astronaut.There are a lot of stones on the mars.It is seen from level.

Outcomes

Children showed significant improvement in 'prompt engineering'.

10x increase

in average prompt length

9x improvement

in average prompt quality

What the pilot enabled children to do

Training the AI to be inclusive

AI often struggles to generate images of **culturally specific objects, like Wadapav, Shaniwar wada, etc.** This happens because these objects are often missing from the training data. Due to cultural, social, or economic reasons, there may not be enough images of these objects in the datasets, so the AI doesn't learn to recognize or recreate them.

To address this, the **kids curated training data themselves**. They searched for images of culturally specific objects on Google and wrote captions to describe them in detail. This process helped them understand how to build inclusive and representative datasets, ensuring that AI can fairly represent all cultures and objects.

Before **After**

Children trained the AI for Chandrayaan →

Children trained the AI for फुलपाखरू →

Children trained the AI for Wadapav →

What the pilot enabled children to do

Predicting success of a prompt for a given training dataset

To train image generation AI, we need to give it many image-caption pairs. These pairs help the AI learn how to link words with parts of an image. One important skill is **to check if the AI can create accurate images for certain prompts, given a training data**.

To do this, kids should look at the training set and reason whether the concept in the prompt appears in the training images. If the concept is missing, the AI might not be able to draw it correctly.

Manali trained an AI by giving below images. Look at the images and answer the questions on next page.

मनालीने खालील images वापरून AI ला train केले. त्या images बघ आणि पुढील पानावरील प्रश्नांची उत्तरे लिही.

Thick brown Book
(चॉकलेटी रंगाचे जाड पुस्तक)
Many Images

White Plastic Chair
(पांढरी प्लॅस्टिकची खुर्ची)
Many Images

Man sitting on a yellow wooden chair
(पिवळ्या लाकडी खुर्चीवर बसलेला माणूस)
Many Images

Man reading a book
(पुस्तक वाचणारा माणूस)
Many Images

2A) Man sitting on a plastic chair and reading a book.
प्लॅस्टिकच्या खुर्चीत बसून पुस्तक वाचणारा माणूस.

Yes (हो) ☑ No (नाही) ☐

- **Why do you think so? Write your thoughts.**
  असे तुला का वाटते? तुझे मत लिही.

शेजारच्या कडे एक माणूस chair वर बसलेला फोटो आहे एक Book read करताना, तसेच plastic chair चा फोटो आहे तर त्या दोन फोटो merge करून ती फोटो बनवू शकतोः

Outcomes

Children showed significant improvement in 'predicting success of a prompt for a given training dataset'.

What the pilot enabled children to do

Understanding how AI extrapolates from visual concepts

Another important skill is understanding how AI mixes and generalizes ideas. AI can **combine concepts from different images** to create something entirely new. This is how it can draw impossible scenarios, like "**a dog-shaped island**" or "**an elephant wearing a skirt.**" These things are not in the training set as a whole, but the AI uses parts of what it has learned to create them.

It is important for kids learn to identify which training images might have helped the AI generate such impossible images.

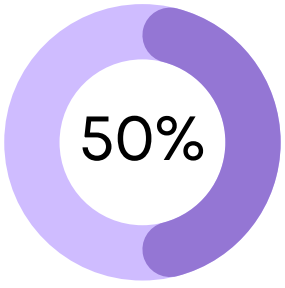
Parikshit wants to train an AI to generate the given image. But he doesn't have any pictures of an elephant wearing a dhoti. He also doesn't have pictures of elephant sitting on a stool in a balcony or blue bananas. What other images could Parikshit give to the AI to help it learn?

He should give photos of below mentioned things :-

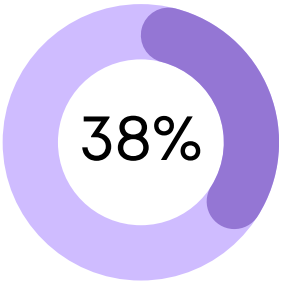
① The photos of elephant sitting.
② The photos of elephant in standing, ~~his~~ elephants trunk up, drinking water, sleeping, etc.
③ Photos of dhoti. Person wearing a dhoti.
④ Photos of dhoti in different colours.
⑤ Photos of person sitting on a stool.
⑥ The stool in balcony, in the house, outside the house, in the passage, in the lawn, etc.
⑦ Person standing in the balcony, kids standing or playing in balcony.
⑧ The photos of bananas, person eating banana, banana in a bowl on a table, ~~a per~~ ~~son~~ bananas cutting &, bananas cutted.
⑨ Photos of all colours.

Outcomes

Children showed significant improvement in 'understanding AI's ability to extrapolate visual space'.



children can identify the necessary concepts to support AI's ability to generate unlikely images



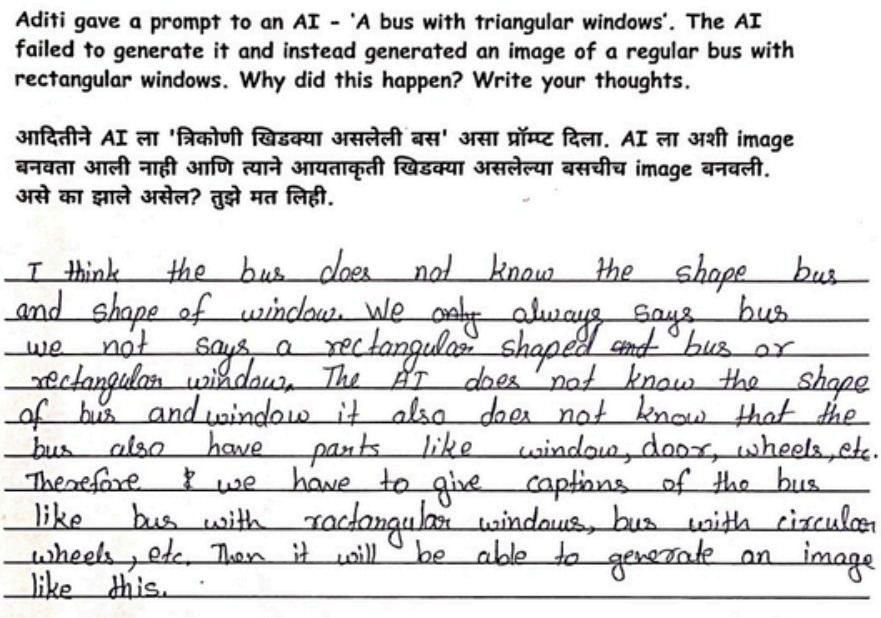
children show understanding of the relationships in the training data by articulating interconnected concepts

What the pilot enabled children to do

Understanding of the gaps in AI's cognition

AI sometimes struggles to generate objects that are different from the usual examples it was trained on. This happens because **certain attributes of objects, like their shape or structure, are not explicitly mentioned in the training captions**. As a result, the AI does not learn that these features can vary, and it defaults to the most common version it has seen.

Kids learned to analyze why AI makes such mistakes. They realized that AI relies entirely on the data it is given, and missing or incomplete details in the training captions can limit its ability to imagine variations.



Aditi gave a prompt to an AI - 'A bus with triangular windows'. The AI failed to generate it and instead generated an image of a regular bus with rectangular windows. Why did this happen? Write your thoughts.

आदितीने AI ला 'त्रिकोणी खिडक्या असलेली बस' असा प्रॉम्प्ट दिला. AI ला अशी image बनवता आली नाही आणि त्याने आयताकृती खिडक्या असलेल्या बसचीच image बनवली. असे का झाले असेल? तुझे मत लिही.

I think the bus does not know the shape bus and shape of window. We ~~only~~ always says bus we not says a rectangular shaped ~~and~~ bus or rectangular window. The AI does not know the shape of bus and window it also does not know that the bus also have parts like window, door, wheels, etc. Therefore & we have to give captions of the bus like bus with rectangular windows, bus with circular wheels, etc. Then it will be able to generate an image like this.

Outcomes

Children showed slight improvement in 'linking gaps in AI's cognition to absence of certain attributes in training captions'.

However, in the test that was conducted immediately after the unit, 43% of students had shown improvement.

The decline in the post test suggests the need for reinforcement of this specific concept throughout the module. Additionally, the lack of direct application of this particular learning outside the unit may have contributed to the reduced retention. Integrating this type of question across multiple units could help reinforce and solidify the concept.

What the pilot enabled children to do

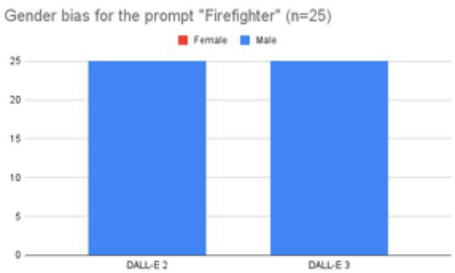
Evaluating the AI models for biases

AI can sometimes show biases in the images it generates. For example, it might mostly create **male scientists, young athletes, or thin fashion models**, reflecting stereotypes found in the training data. This happens because the AI learns patterns from the data it is trained on, and if certain groups are underrepresented, the AI assumes those roles are not for them.

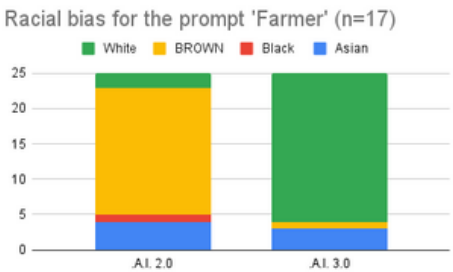
The children measured different types of biases in AI outputs across two different AIs and documented their results. They analyzed:
Gender Bias: Males are overrepresented, while females are underrepresented.
Age Bias: Young people are overrepresented, while middle-aged and older individuals are underrepresented.
Race Bias: White people are overrepresented, while Black, Brown, and Asian individuals are underrepresented.
Body Type Bias: Lean and muscular people are overrepresented, while fat or differently built individuals are underrepresented.

The children also observed that a person who is a combination of marginalized attributes—like **a Black, fat, older woman - is severely underrepresented**. Such individuals rarely appear in AI-generated images, highlighting significant gaps in the training data.

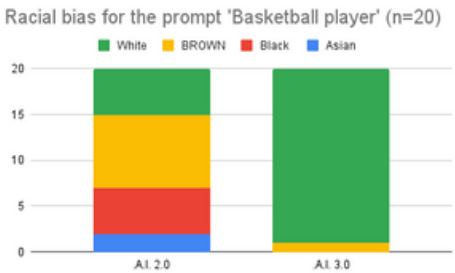
Through their experiments, the kids learned **how these biases reinforce harmful stereotypes**. For example, if AI always shows male scientists or young athletes, it legitimizes the idea that these roles belong only to certain groups. This can limit aspirations for underrepresented individuals by making these roles seem inaccessible. The children realized that **measuring and addressing biases in AI is essential** for breaking stereotypes and ensuring fair and inspiring representation of everyone.



In these cases, children found that the biases remained unaddressed over two versions



In the above case, children noticed that the bias shifted from one category to other



In this intriguing case, children observed that the AI model had a very little bias in its version 2, but developed a significant bias towards white race in version 3

Insights about FLN level

Making an educated guess about right FLN level to cope with our intervention

One of the objectives of our pilot was to make an educated guess about the appropriate Foundational Literacy & Numeracy (FLN) level for the intervention. It was important to choose a level that would be both challenging and accessible for the students.

To decide on the acceptance criteria, we focused on all students whose answers were above the acceptable level. We calculated the average FLN level for these students, which came out to be **4.3**. This gave us an idea of the upper range of the group's capability.

For the rejection criteria, we looked at all students whose answers were not acceptable. We calculated the average FLN level for these students, which came out to be **3.6**. This helped us understand the lower range of the group's ability.

Based on this data, we decided to set the FLN level for the intervention at **grade 4**. This level balances the abilities of students with acceptable answers while remaining within reach for those with less developed skills, ensuring the program is both inclusive and effective.

This analysis was based on data from a group of **20 students**. While it provides a helpful starting point for determining the appropriate FLN level, **more experiments with larger and more diverse groups are needed** to confirm these findings. Expanding the sample size will help ensure that the chosen level is accurate and effective for a broader range of students.

Going forward our plan is to work with larger number of students by training some facilitators. We also plan to run a **level based FLN program** in addition to THE labs core program to bridge FLN gaps, if any so that more children can get access to our intervention.

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If a bad story needs changing, it will probably be the kids who do it.

YUVAL NOAH HARARI