THE ARTIFICIAL INTELLIGENCE ACTIVITY BOOK

CONTENTS

06 **Topic 1: What Is AI?**

12 **Topic 2: How Does AI Work?**

17 **Topic 3: AI Is Present In Our Everyday Lives**

24 **Topic 4: Debunking Myths Of AI**

29 **Topic 5: AI And Your Data**

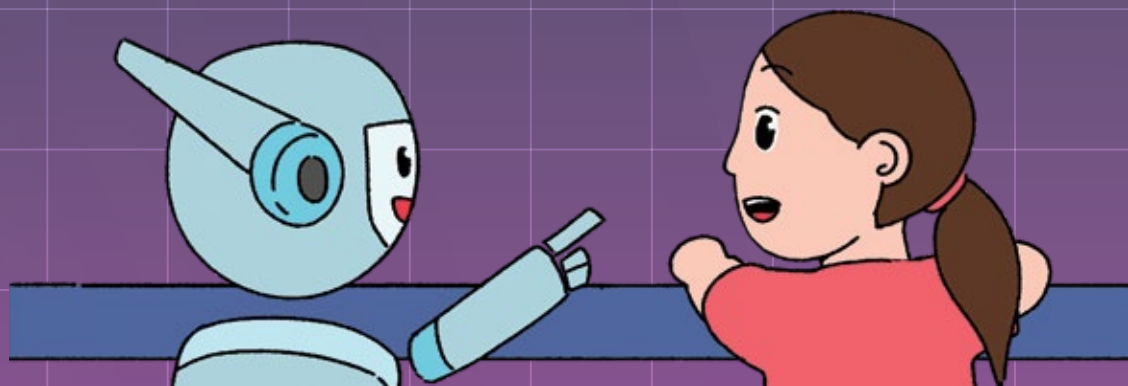
35 **Topic 6: The Future Of AI**

41 **Let's Try A Quiz!**

42 **Learn More About AI**

This interactive activity book encourages young learners like you to understand what is Artificial Intelligence (AI), and see how it can help you in your everyday life. We hope you will have fun learning about AI with Rolly and friends through the entertaining comics and fun activities.

Before you begin your intriguing journey, fill in a short survey to see how well you know about AI!



THE AI-OPENER

ROLLY

Enthusiastic and passionate about AI, Rolly is a robot prototype from Mum's workplace. He helps Mavie on her journey to learn about AI.

MAVIE

New to the world of AI, Mavie is enlightened with Rolly's help. As their journey progresses, Mavie learns about AI, and understands how it works.

NATHAN

Classmate and close friend of Mavie, Nathan is a reserved individual. Meeting Rolly, he is able to learn more about what AI has to offer.

MUM

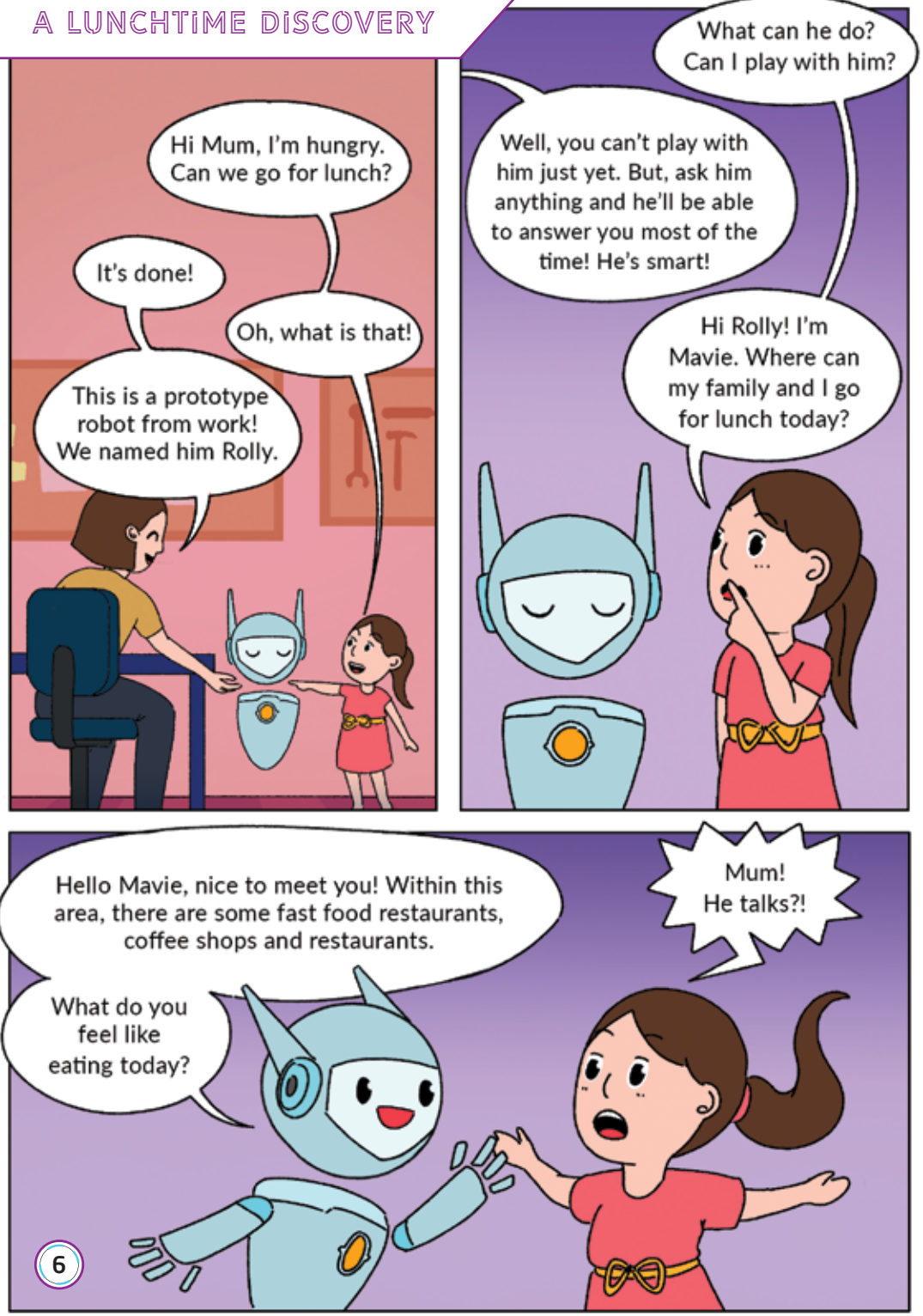
Her work revolves around AI and robotics, and explore how they can be used to make the world a better place. Together with Rolly, they teach Mavie and Nathan about AI.

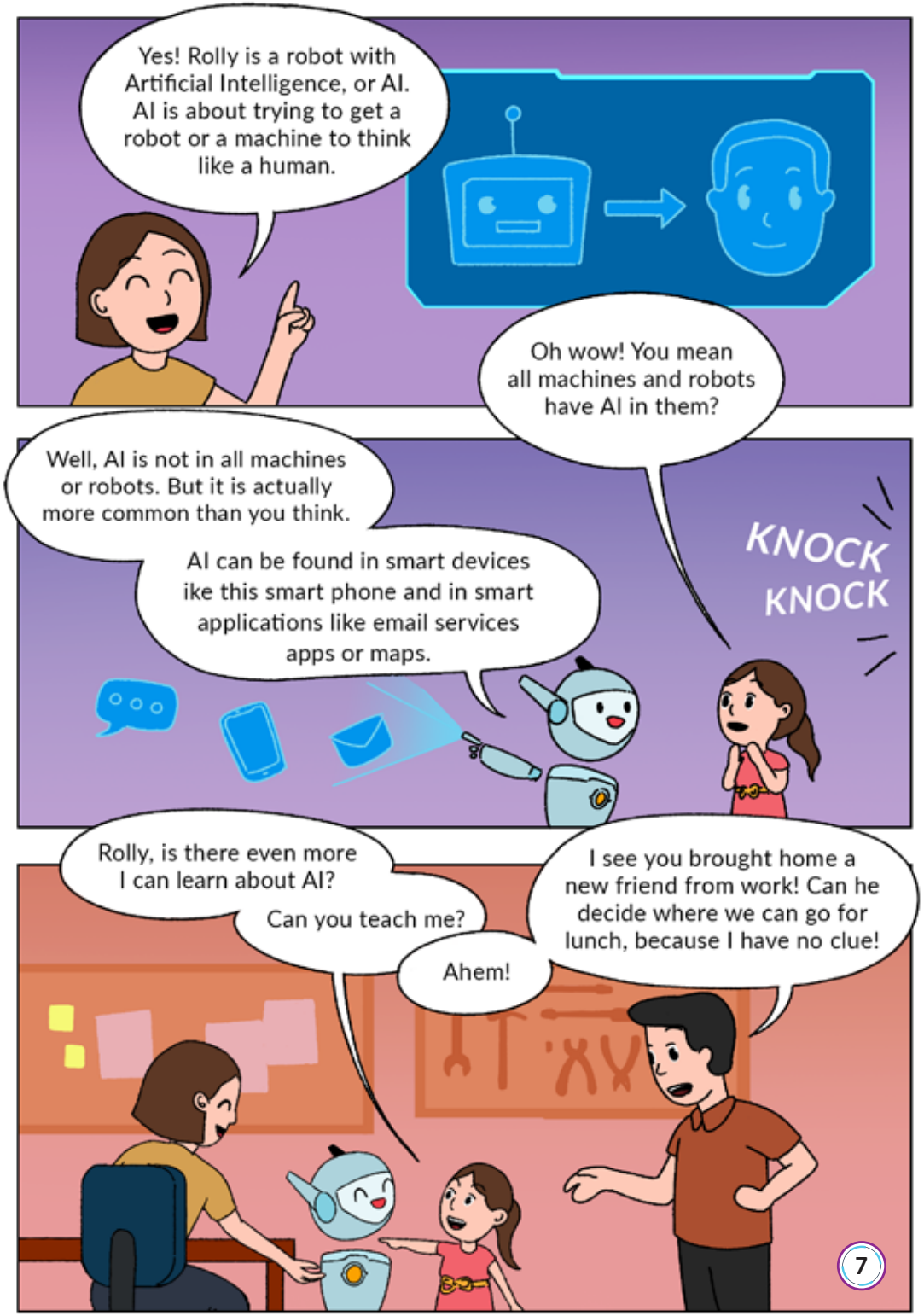
DAD

He balances the energy within the household, and uses AI to help him in his daily lives.

MS NORA

A teacher who promotes learning about AI through fun and interactive ways.


Hi Mum, I'm hungry. Can we go for lunch?
It's done!
Oh, what is that!
This is a prototype robot from work! We named him Rolly.
What can he do? Can I play with him?
Well, you can't play with him just yet. But, ask him anything and he'll be able to answer you most of the time! He's smart!
Hi Rolly! I'm Mavie. Where can my family and I go for lunch today?
Hello Mavie, nice to meet you! Within this area, there are some fast food restaurants, coffee shops and restaurants.
What do you feel like eating today?
Mum! He talks?!


Yes! Rolly is a robot with Artificial Intelligence, or AI. AI is about trying to get a robot or a machine to think like a human.
Oh wow! You mean all machines and robots have AI in them?
Well, AI is not in all machines or robots. But it is actually more common than you think.
AI can be found in smart devices ike this smart phone and in smart applications like email services apps or maps.
KNOCK KNOCK
Rolly, is there even more I can learn about AI?
Can you teach me?
Ahem!
I see you brought home a new friend from work! Can he decide where we can go for lunch, because I have no clue!

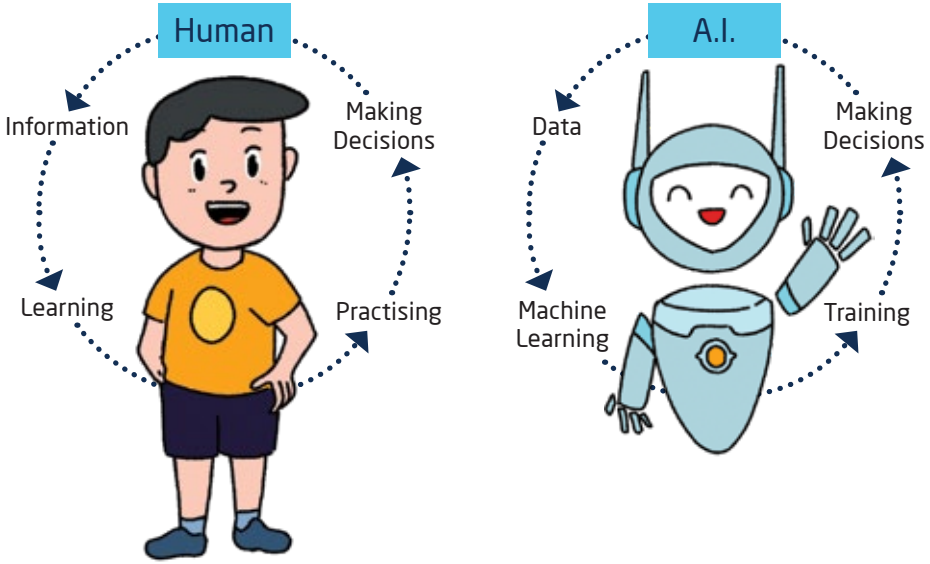
TOPIC 1

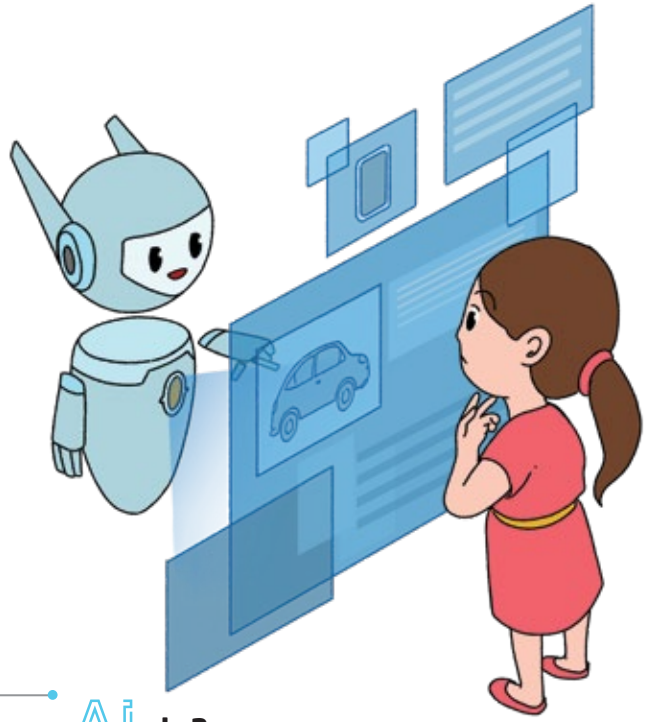
WHAT IS AI?

Artificial Intelligence (AI) is about trying to teach machines and computers to be smart.

Like a human brain, AI learns from information, also known as data. With training and learning, AI makes machines and computers smart and can make recommendations or decisions to help humans.

A.I. IN A NUTSHELL





What does AI do?

AI helps humans search for information more efficiently, brings convenience into our daily lives and increases our productivity levels by helping us do simple tasks.

TRY IT OUT!

Discover how AI can help us by trying these commands on your smart phone. Remember to enable the function in your phone before you try!

If you are using an iOS phone
Say "Hey Siri", followed by:

- "Set an alarm for 7am on weekdays"
- "What's the weather today?"
- "Send a message to mum saying I'll be late for dinner."

If you are using an Android phone
Say "Okay google", followed by:

- "Take a selfie"
- "Remind me to do my math homework at 3pm"
- "Set a timer for 5 minutes"

AI is in SMART DEVICES

AI can be found in smart devices like Digital Personal Assistants such as Google Home, Alexa and in smart phones.

AI is also in self-driving vehicles to predict dangers and ensures that passengers and pedestrians remain safe on the road. AI helps these vehicles to:

- Recognise the roads and drive only on them
- Navigate from point A to B
- Identify the speed limits of roads
- Tell people and animals apart

AI is also in SMART APPLICATIONS OR SERVICES

Video platforms like YouTube never fail to recommend something you will love to watch! They use AI to understand what you may like, based on your viewing history such as the videos you have watched.

With AI, repetitive tasks such as replying emails will be more efficient, as AI predicts and provides suggestions so users can write messages with less words. AI also helps with identifying and filtering of spam emails, so your email account will almost always be spam-free.

LET'S PLUG IN!

EXERCISE #1

1. AI is about trying to get a human to think like a robot. — True / False
2. AI is like a human brain, which processes information as data. — True / False
3. AI helps humans do repetitive tasks, and it could be more accurate and efficient as compared to humans. — True / False
4. AI is found in all vehicles. — True / False
5. AI is found in Apps such as Gmail and YouTube. — True / False

Answers:
1. (False) - AI is about teaching machines and robots to be smart.
2. (True) - AI processes information and makes decisions based on what it has learnt.
3. (True) - The purpose of AI is to bring convenience into our lives so we can be more efficient in what we do.
4. (False) - AI is found in self-driving vehicles to ensure that both the passengers and pedestrians are safe.
5. (True) - AI is found in commonly used apps such as YouTube and Gmail and even social media platforms too.

I haven't even finished drawing the guitar yet and it can already guess what it is! How does it do that?

Oh i know, It's a guitar!

It's AI again Mavie! It recognised your drawing by looking at its data of millions of drawings done by others.

I don't understand.

AI is made through coding. Codes are instructions for machines and robots like me.

When you go to school, your teacher prepares lessons for you so that you can learn something new.

Oh i know, It's a guitar!

For us robots and machines, the codes are our lessons and we have to be taught as well! We learn by being fed large amounts of data, just like how humans learn from past experiences.

By drawing a guitar, you are adding to a growing set of guitar drawings contributed by many other people. From these drawings, machines discover patterns about what makes up a guitar, and learn what a guitar looks like!

Oh i know, It's a guitar!

Oh, so does that mean I've contributed data to you and helped you learn?

Yes! Exactly!

But we don't always get it right on the first try. We have to learn by practicing many times. Through experience, we'll be able to guess your drawing right! This process is called machine learning.

How long does it take for you to learn from the data, Rolly?

Machine learning is similar to growing up! As you grow up and perform a task repeatedly, your experience in performing that task grows too. Each time we take a task, execute it and process the data, we're able to better process the data.

Oh, so does that mean if I keep doing my homework even though I don't like it, it'll get easier?

Practice makes perfect!

Okay then I will do just that. It's homework time!

HOW DOES AI WORK?

AI is created through the process of writing codes; which are the instructions for machines or robots. Codes are also known as programming languages.

To "teach" the machines or robots, we provide large amount of data to them. Based on the instructions, the machines or robots will then learn to respond to the data.

FUN FACTS about AI

There are about **700** different codes or programming languages in the world!

ALPHA ZERO, the game-playing AI created by DeepMind, has beaten the world's best chess player.

LET'S PLUG IN!

EXERCISE #2

Learn more about AI through these fun activities!

Programming Language: WIN A GAME OF TIC TAC TOE

Play a game of Tic Tac Toe with a piece of intelligent paper. Did you realise that the intelligent paper won half of the games and scored a draw for the other half? It did show intelligence after all!

This is an example of a computer program where instructions are to be followed blindly to make computers work. The instructions for the computer program is called programming language.

ACTIVITY
Play a game of Tic Tac Toe

Dataset Classification: CLASSIFYING CATS AND CUPS

A dataset is a collection of data such as images or specific words that is grouped in a certain way; either by humans or AI.

ACTIVITY
Classifying Cats and Cups

Growing a Dataset: DOODLE AWAY WITH QUICKDRAW

AI manages to guess what you are doodling by referring to its dataset of millions of drawings done by other people. It gets more accurate as more people contribute to this dataset. Congratulations! You have just contributed your drawings to its dataset.

ACTIVITY
Doodle Away with Quickdraw

Machine Learning: WINNING THE FLAPPY BIRD GAME

AI learns by practicing many times. It could get it wrong at first. Eventually, it will learn from its experience and get it right. This process is called machine learning.

Watch how AI learns to play Flappy Bird. Notice how it did not know how to play in the beginning, but it managed to ace the game after many rounds of learning and adjusting.

ACTIVITY
Watch the Flappy Bird video

Computer Vision: SEEING THE WORLD THROUGH THE MACHINE'S "EYES"

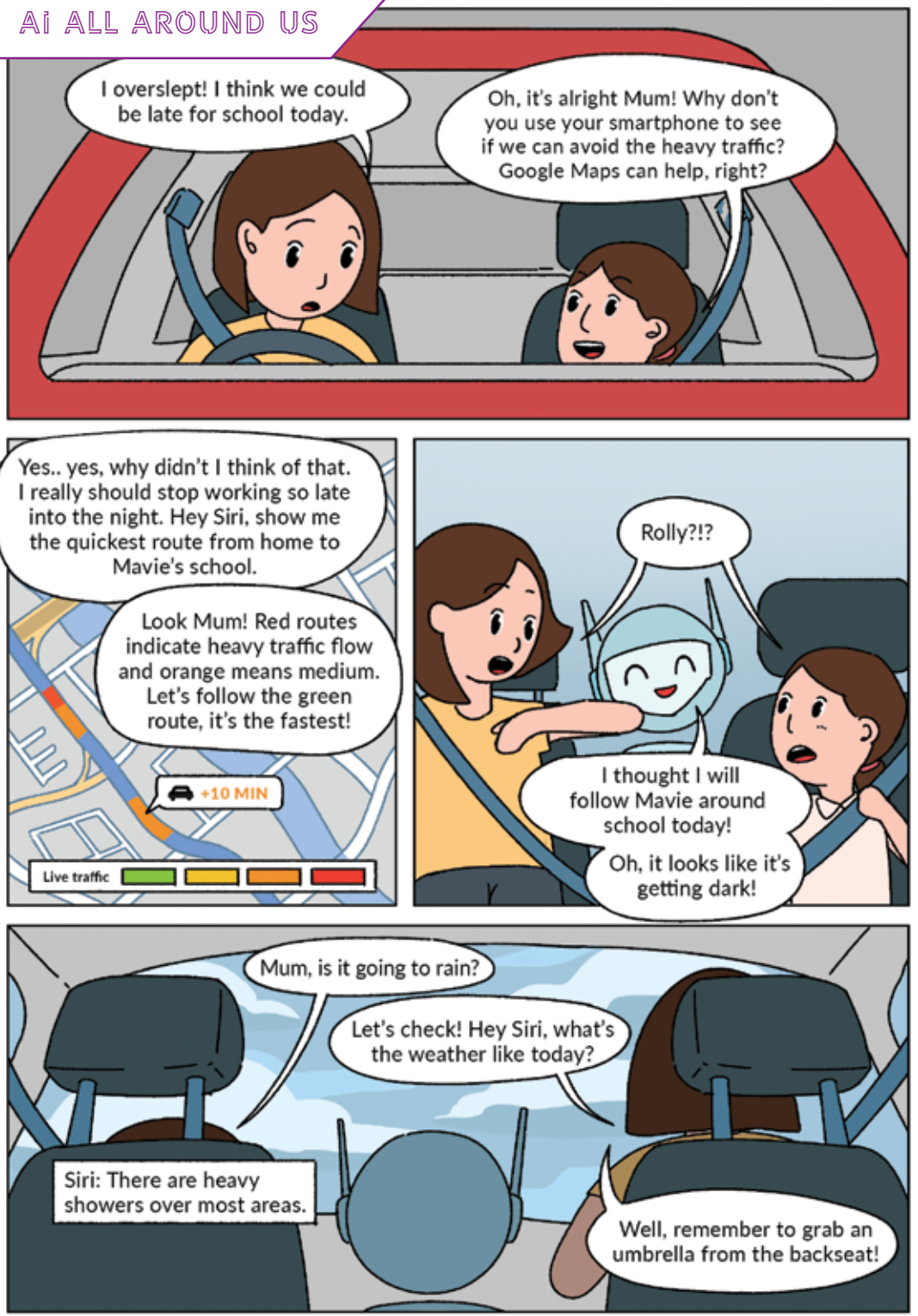
Computers and smart phones use a technology called Computer Vision to recognise and understand the world. Computer Vision identifies objects by comparing its database of images and making an intelligent guess on the object.

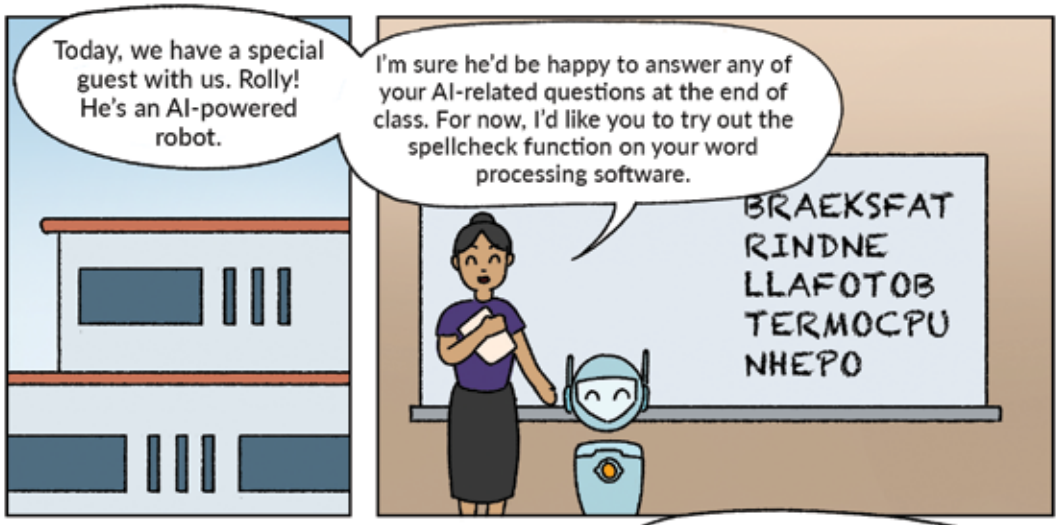
ACTIVITY
Identifying everyday things with Thing Translator

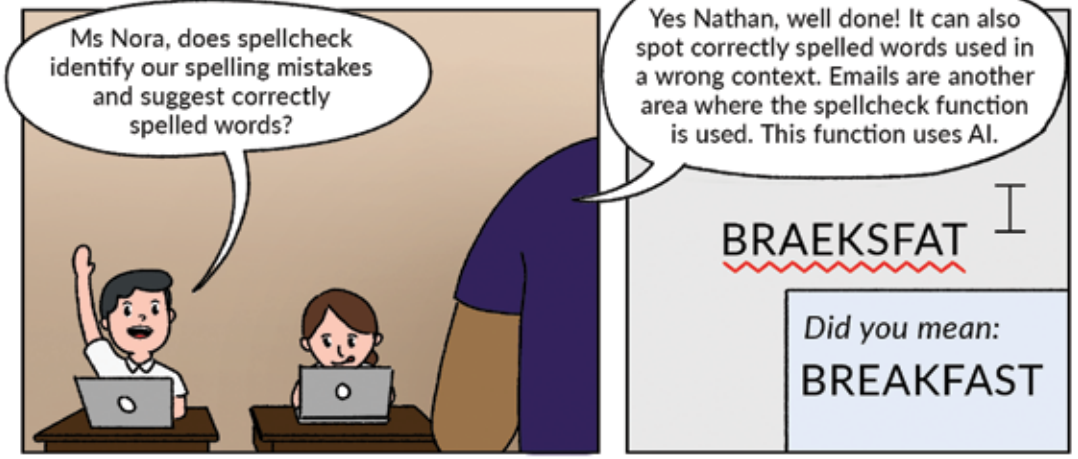
Natural Language Processing: THE MEANING OF WORDS

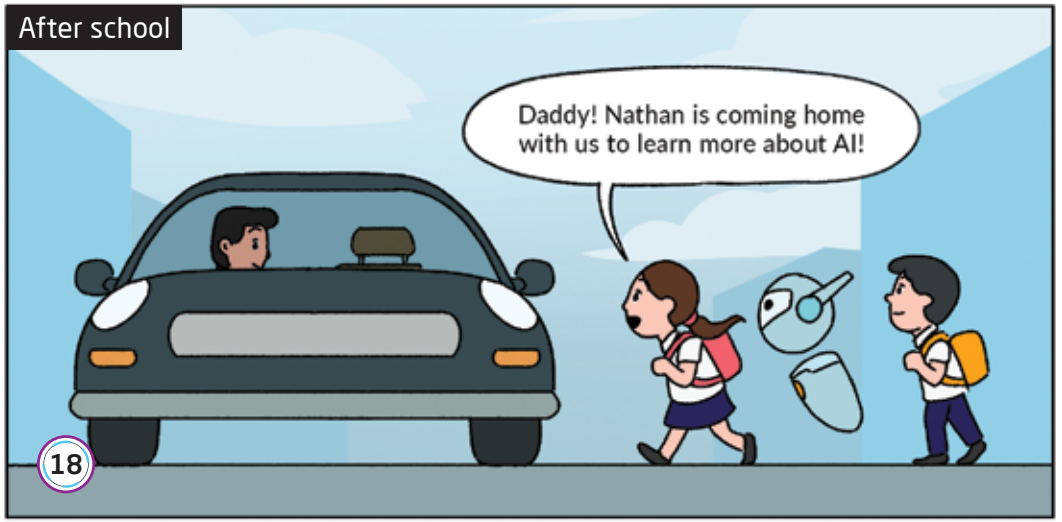
Natural Language Processing helps computers to understand the context and accents of words when they are spoken to the computer. This makes it possible for computers to read text, hear speeches, interpret text and even measure sentiment.

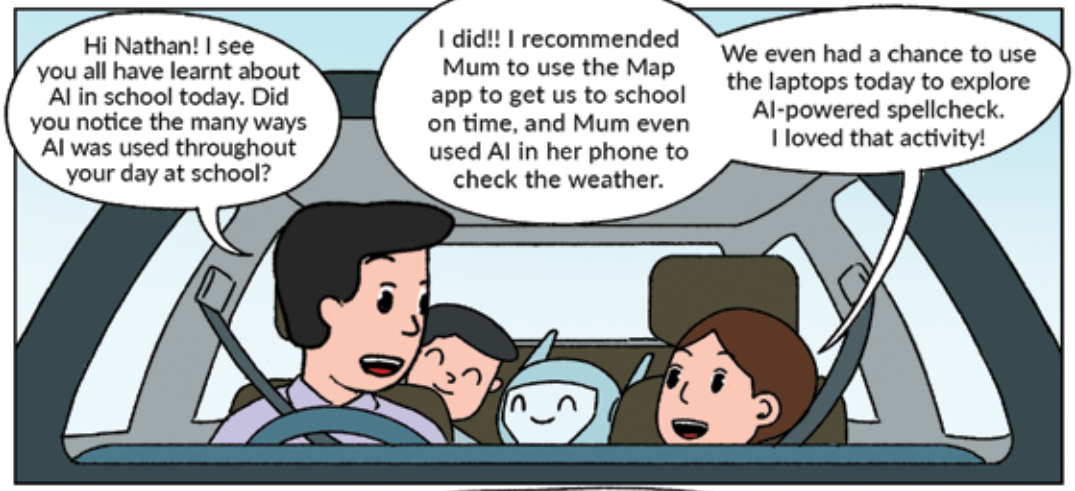
ACTIVITY
Translate your speech with Google Translate

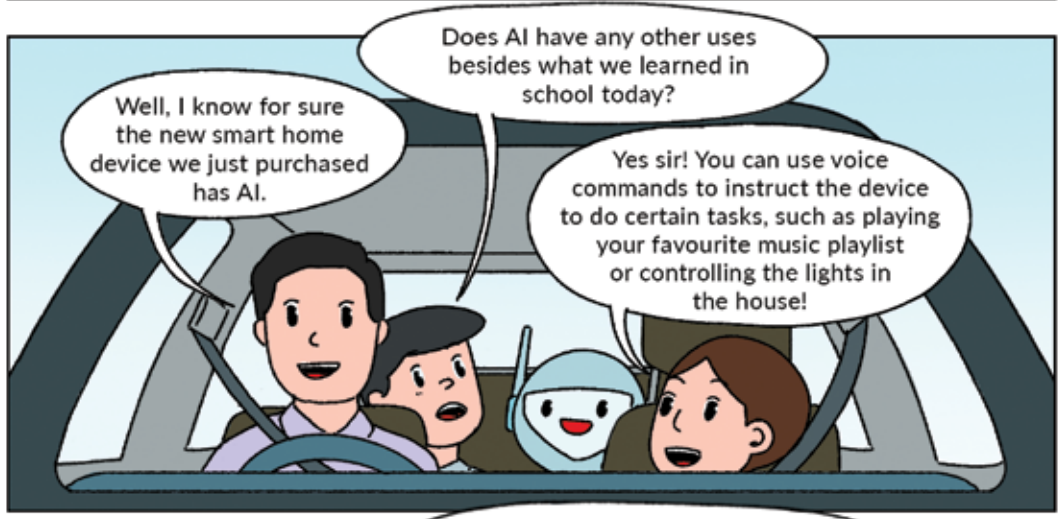


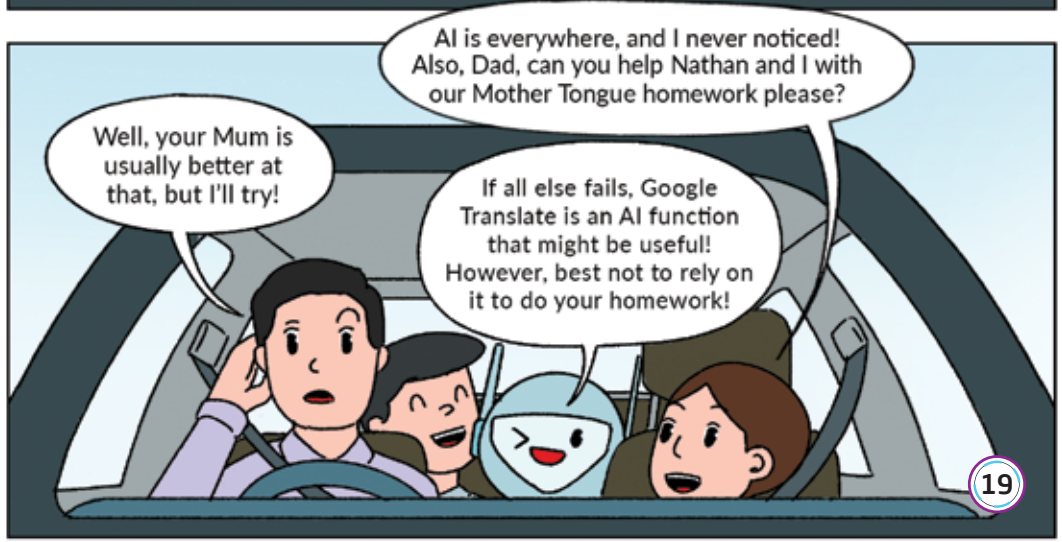

Today, we have a special guest with us. Rolly! He's an AI-powered robot.
I'm sure he'd be happy to answer any of your AI-related questions at the end of class. For now, I'd like you to try out the spellcheck function on your word processing software.
BRAEKSFAT
RINDNE
LLAFOTOB
TERMOCPU
NHEPO


Ms Nora, does spellcheck identify our spelling mistakes and suggest correctly spelled words?
Yes Nathan, well done! It can also spot correctly spelled words used in a wrong context. Emails are another area where the spellcheck function is used. This function uses AI.
BRAEKSFAT
Did you mean:
BREAKFAST

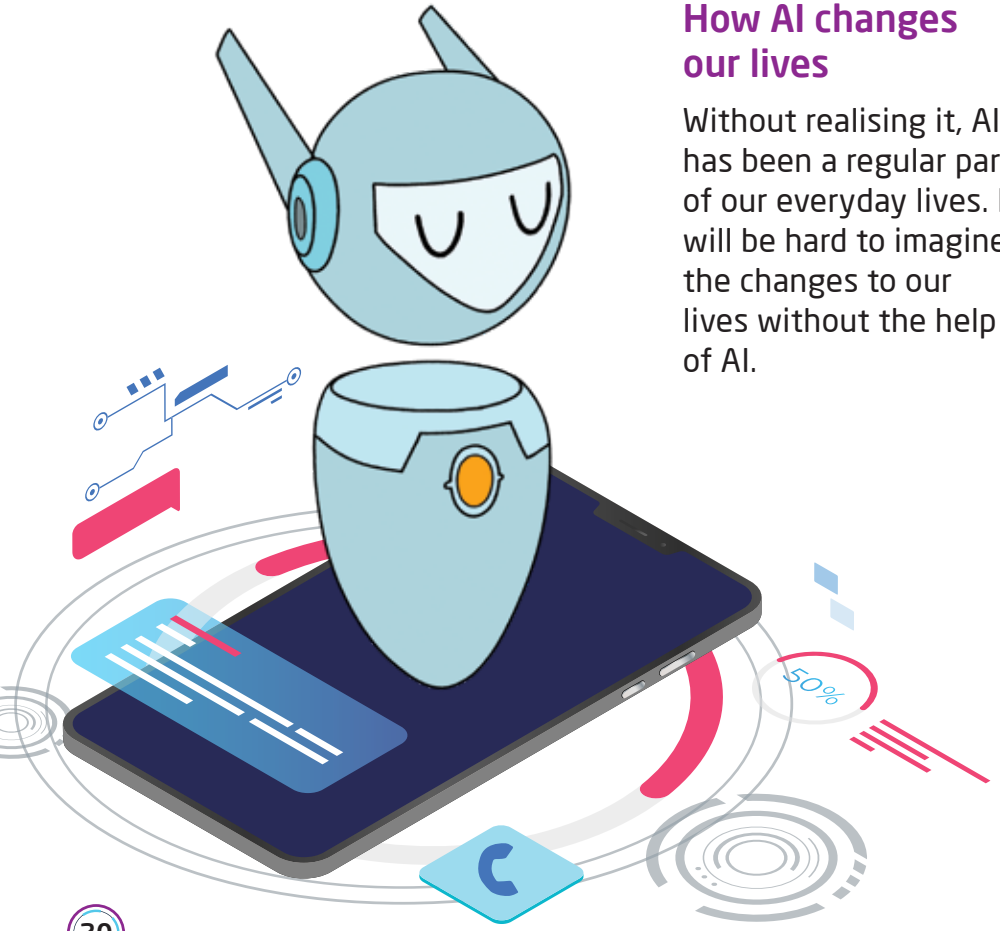

After school
Daddy! Nathan is coming home with us to learn more about AI!


Hi Nathan! I see you all have learnt about AI in school today. Did you notice the many ways AI was used throughout your day at school?
I did!! I recommended Mum to use the Map app to get us to school on time, and Mum even used AI in her phone to check the weather.
We even had a chance to use the laptops today to explore AI-powered spellcheck. I loved that activity!


Does AI have any other uses besides what we learned in school today?
Well, I know for sure the new smart home device we just purchased has AI.
Yes sir! You can use voice commands to instruct the device to do certain tasks, such as playing your favourite music playlist or controlling the lights in the house!


AI is everywhere, and I never noticed! Also, Dad, can you help Nathan and I with our Mother Tongue homework please?
Well, your Mum is usually better at that, but I'll try!
If all else fails, Google Translate is an AI function that might be useful! However, best not to rely on it to do your homework!

AI IS PRESENT IN OUR EVERYDAY LIVES



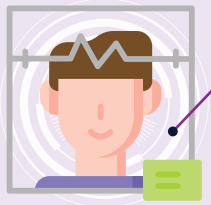
How AI changes our lives

Without realising it, AI has been a regular part of our everyday lives. It will be hard to imagine the changes to our lives without the help of AI.

AI IN COMMONLY USED DEVICES AND APPS

Check out these AI-powered devices and apps we commonly used in our daily lives.

AI protects our email accounts by blocking emails IDENTIFIED as spam, using a spam filter.



The FACIAL RECOGNITION feature in smart phones uses AI as a security measure to recognise faces and unlock phones.

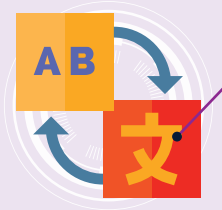
AI is in PREDICTIVE TEXTING that suggests replies you can use in your messages.

Spellcheck uses AI to help IDENTIFY spelling mistakes and suggests correctly spelled words.

Smart home devices such as Google Home or Alexa use **SPEECH RECOGNITION** to recognise the users' voice to activate various functions at home.

Map apps such as Google Maps uses AI to check the traffic conditions and **RECOMMENDS** the best route for you.

Digital Voice Assistants use **SPEECH RECOGNITION** to help our parents and grandparents learn about the current news affairs and the weather without the hassle of typing.



Google Translate uses **COMPUTER VISION** to translate road signs and restaurant menus by pointing your camera at the words you want to translate.

LET'S PLUG iN!

EXERCISE #3

Identify which item or service has AI and which one doesn't.

EMAIL

YES NO

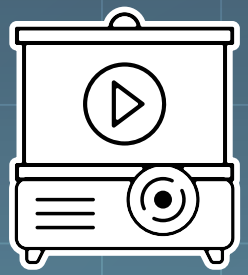
SMART TV

YES NO

BICYCLE

YES NO

VISUALISER



YES NO

COMPUTER MOUSE

YES NO

INSTAGRAM

YES NO

Answers:

Email: Yes - AI is widely used in emails. An example is the usage of Spam filters to detect unwanted emails, sending them to the Junk mail box directly.

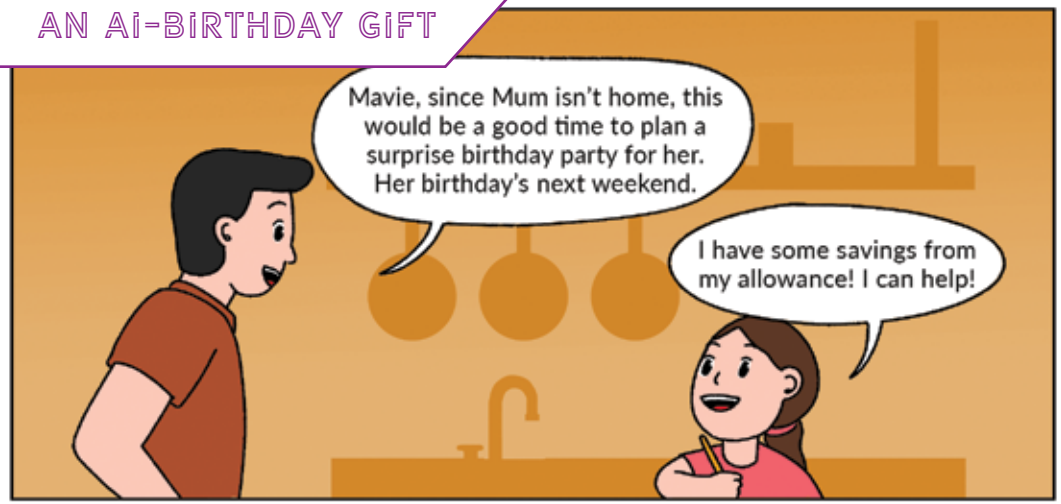
Smart TV: Yes - TVs are increasingly being built with voice recognition ability to recognise your voice and answer your request.

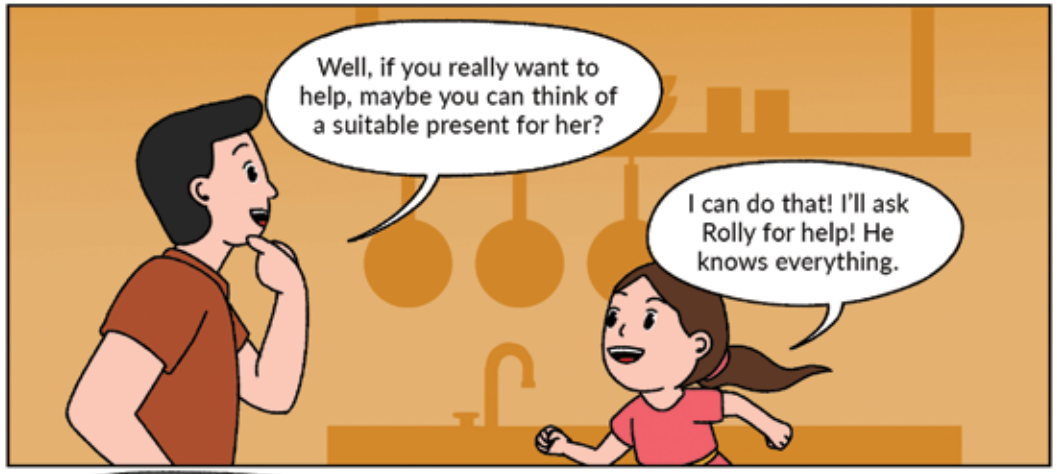
Bicycle: No - It requires humans to ride the bicycle.

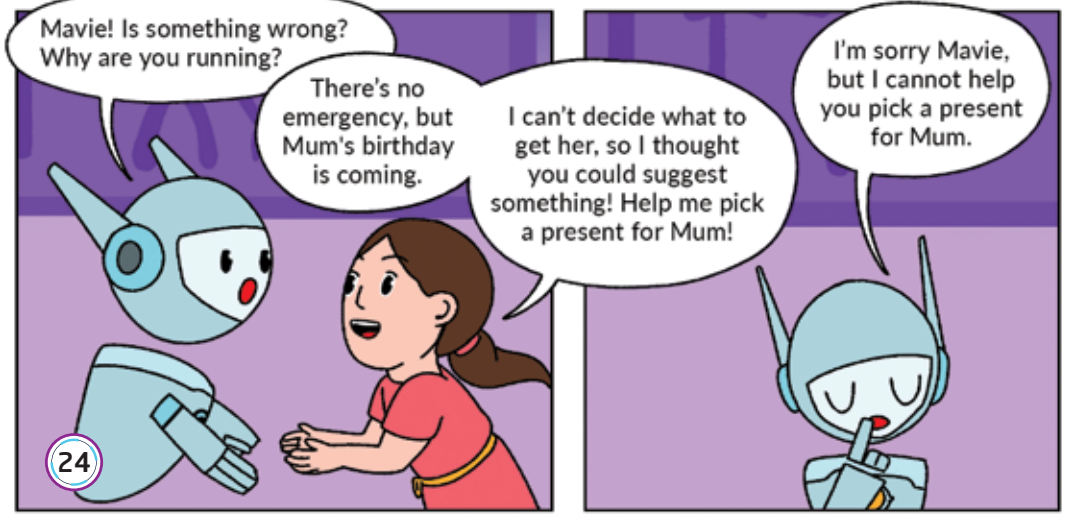
Visualiser: No - It only projects images.

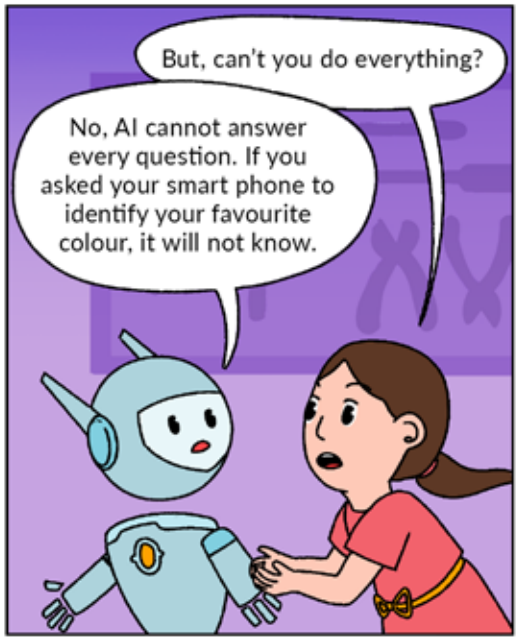
Computer Mouse: No - It helps us as a pointing device to move the pointer across the screen.

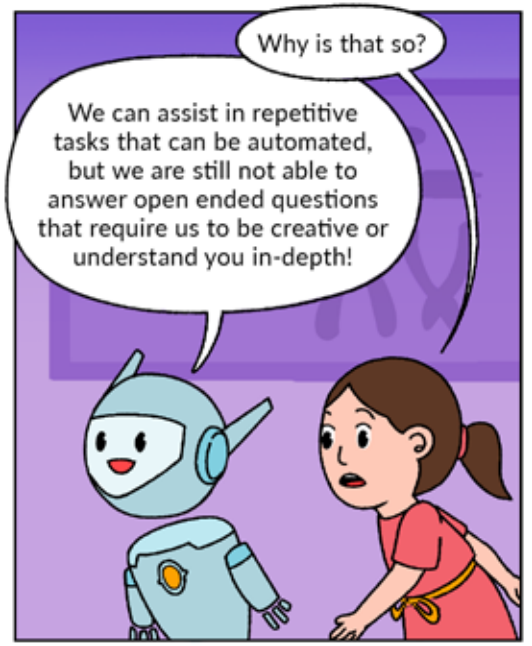
Instagram: Yes - Social Media platform such as instagram creates filters that use AI-powered facial recognition function to identify a human face and overlay effects on it.

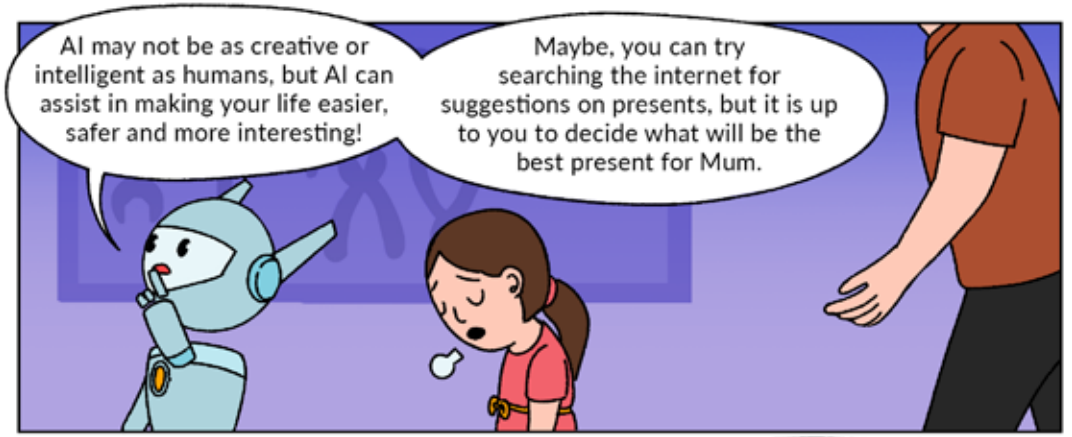

Mavie, since Mum isn't home, this would be a good time to plan a surprise birthday party for her. Her birthday's next weekend.
I have some savings from my allowance! I can help!


Well, if you really want to help, maybe you can think of a suitable present for her?
I can do that! I'll ask Rolly for help! He knows everything.


Mavie! Is something wrong? Why are you running?
There's no emergency, but Mum's birthday is coming.
I can't decide what to get her, so I thought you could suggest something! Help me pick a present for Mum!
I'm sorry Mavie, but I cannot help you pick a present for Mum.


But, can't you do everything?
No, AI cannot answer every question. If you asked your smart phone to identify your favourite colour, it will not know.


Why is that so?
We can assist in repetitive tasks that can be automated, but we are still not able to answer open ended questions that require us to be creative or understand you in-depth!


AI may not be as creative or intelligent as humans, but AI can assist in making your life easier, safer and more interesting!
Maybe, you can try searching the internet for suggestions on presents, but it is up to you to decide what will be the best present for Mum.

Dad.
I just realized AI can't help me find Mum a present.
It's okay. AI might not be able to know everything about Mum, but you do! How about listing some of her favourite hobbies and narrow down some gifts? A good book, maybe some roses...?

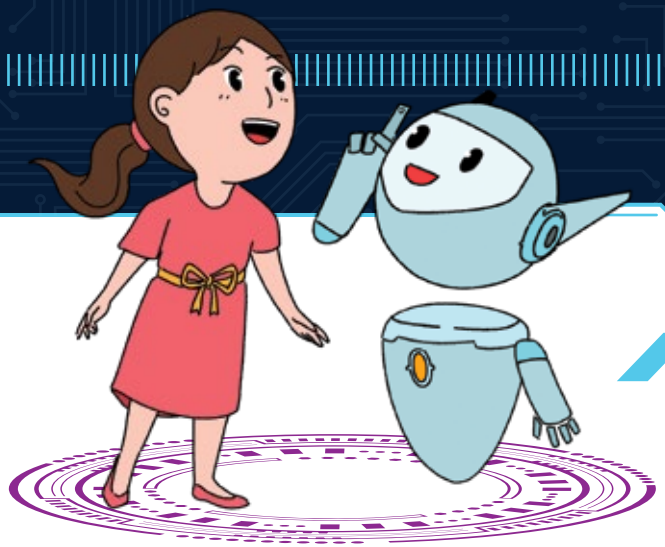
TOPIC 4

DEBUNKING MYTHS OF AI

AI has opened doors to endless possibilities, providing us with ease in our daily lives. However, there are certain areas in which AI is used as an aid, rather than a solution.

Myth: AI CAN DO EVERYTHING

Fact: AI is only able to assist in repetitive tasks that can be automated. While AI is getting better at understanding human emotions, there are still many limitations as it cannot engage in critical thinking, being creative or having emotional intelligence like humans. Hence, it may not be able to answer open-ended questions that requires in-depth understanding.



Myth

AI is smarter than humans.

Fact

AI can only perform tasks that it is programmed to do. While AI can help us to process information quicker and provide recommendations, there are still many decisions that only humans can make.

Myth

AI will replace our jobs in the future.

Fact

With AI's assistance in repetitive tasks, we are able to do more meaningful tasks. Jobs in certain industries such as complex and strategic jobs, creative jobs and empathetic jobs will not be replaced by AI.

Myth

AI will take over the world.

Fact

AI supports us by making our lives easier, safer and more fun. It is up to us to make sure that AI helps to make everyone's lives better.

LET'S PLUG IN!

EXERCISE #4

SEE WHAT AI CAN DO

ACTIVITY:

The Infinite Drum Machine

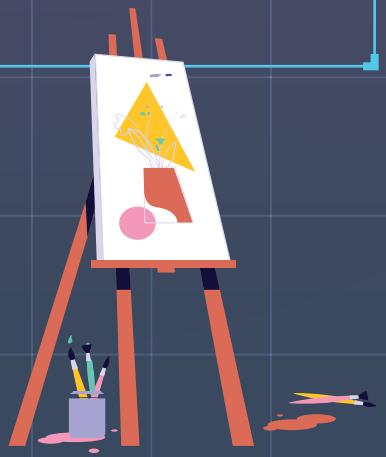
While AI is unable to create original content, they can assist us in creating content by following a set of instructions.

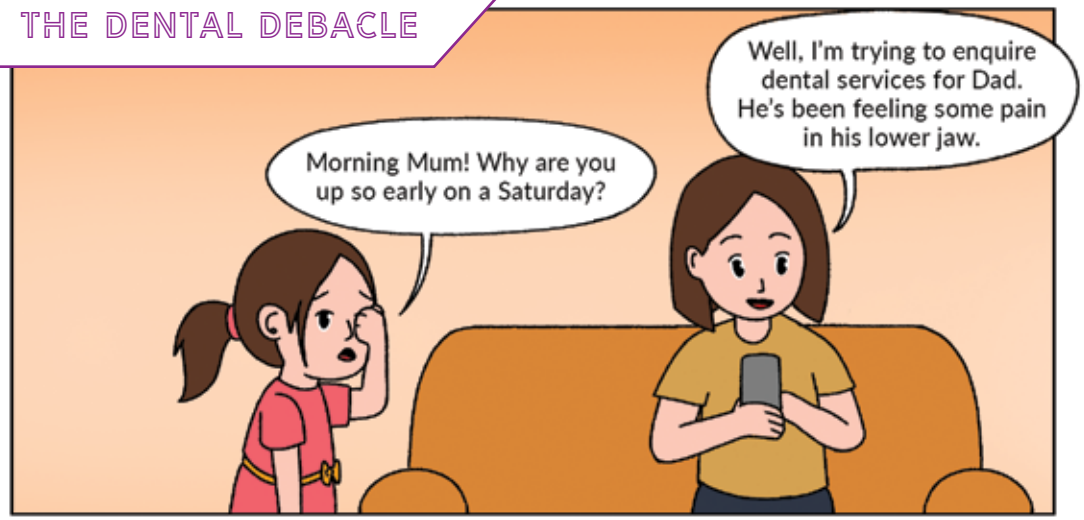
AI can group different types of sounds together without any description. Explore groups of similar sounds and make beats using the drum sequencer.

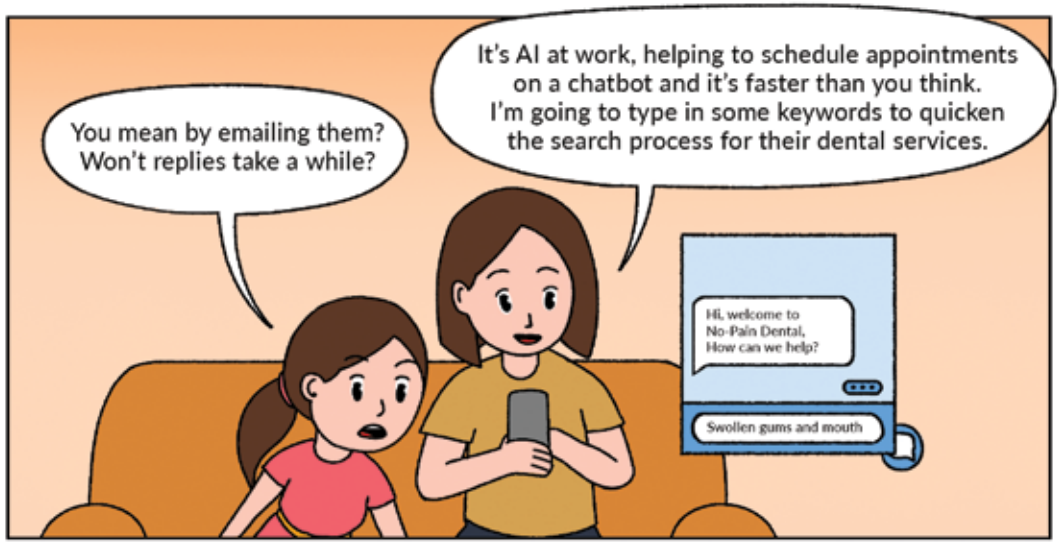
ACTIVITY:

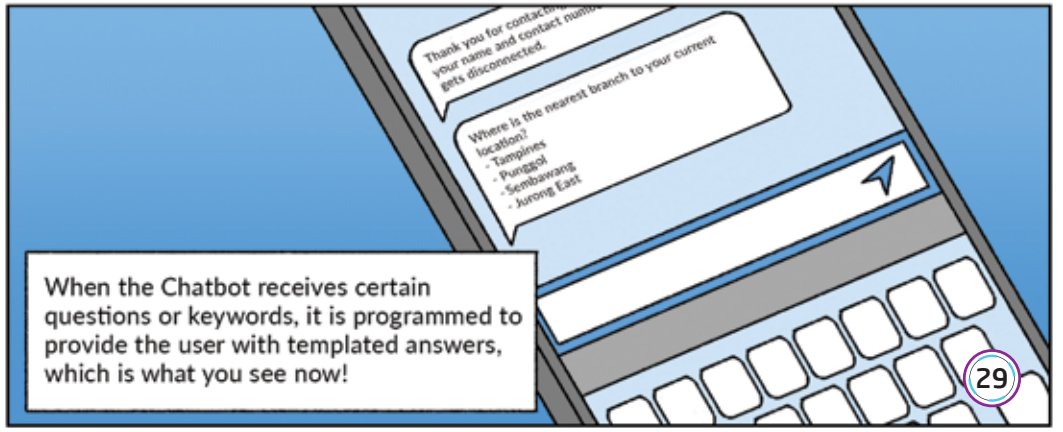
GoART - AI photo effects

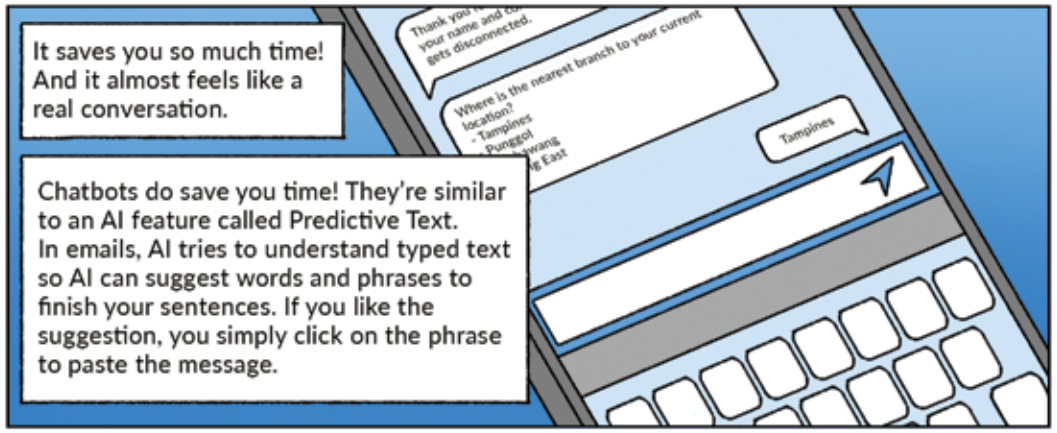
AI can help us turn any photo into an artwork, based on the style of famous artists. Check it out!

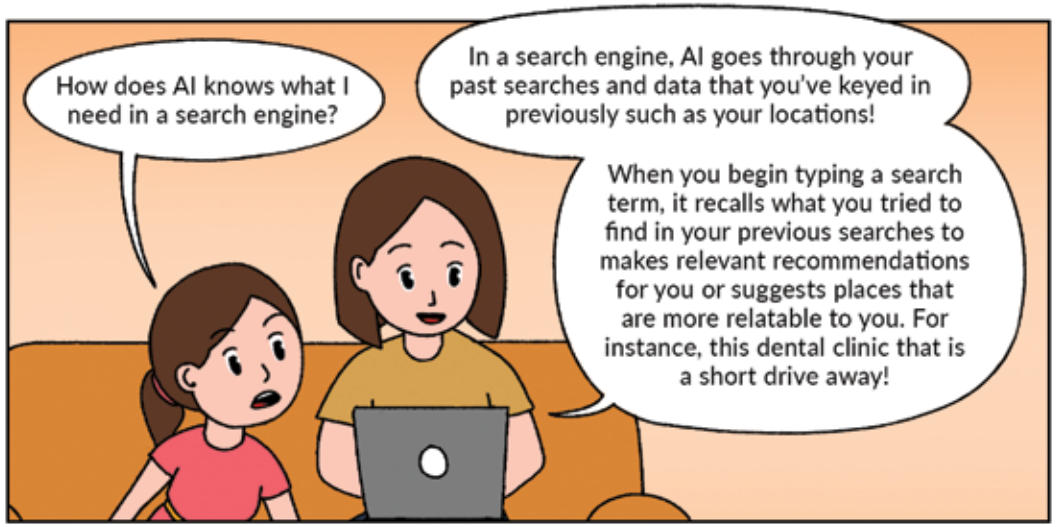


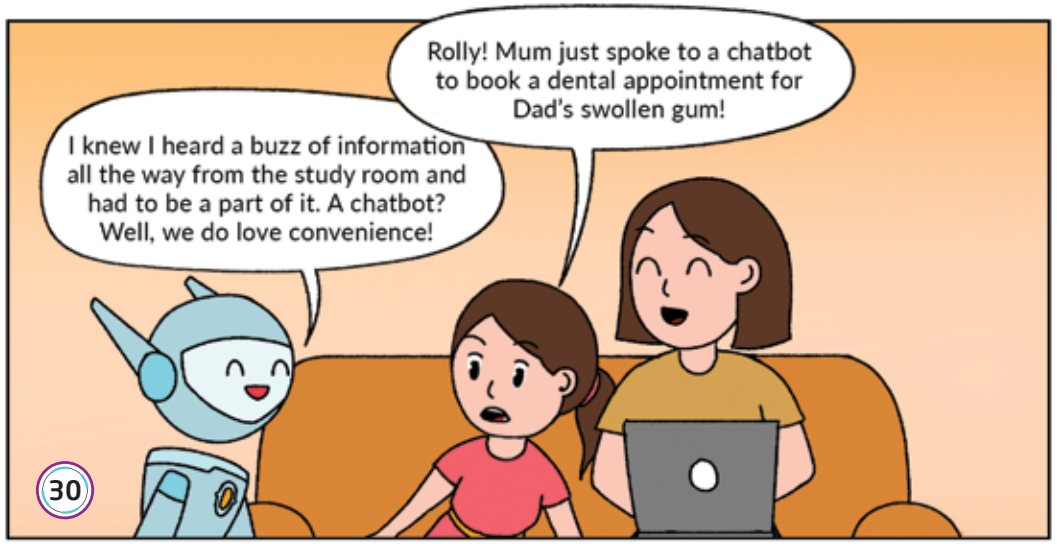


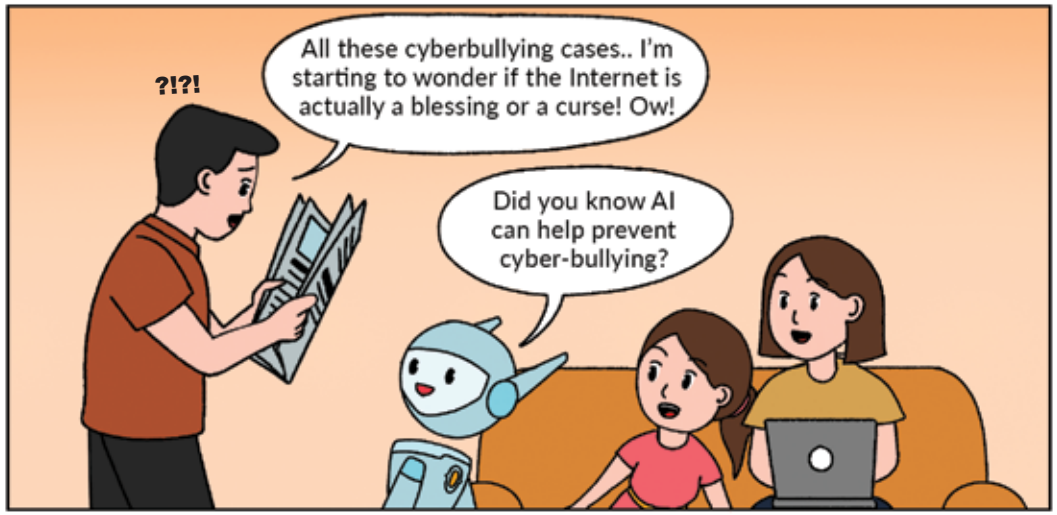


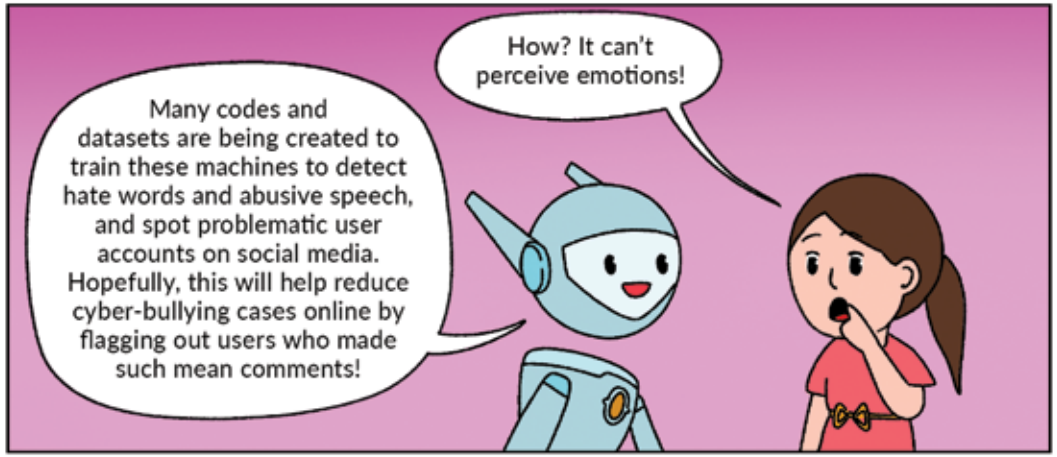


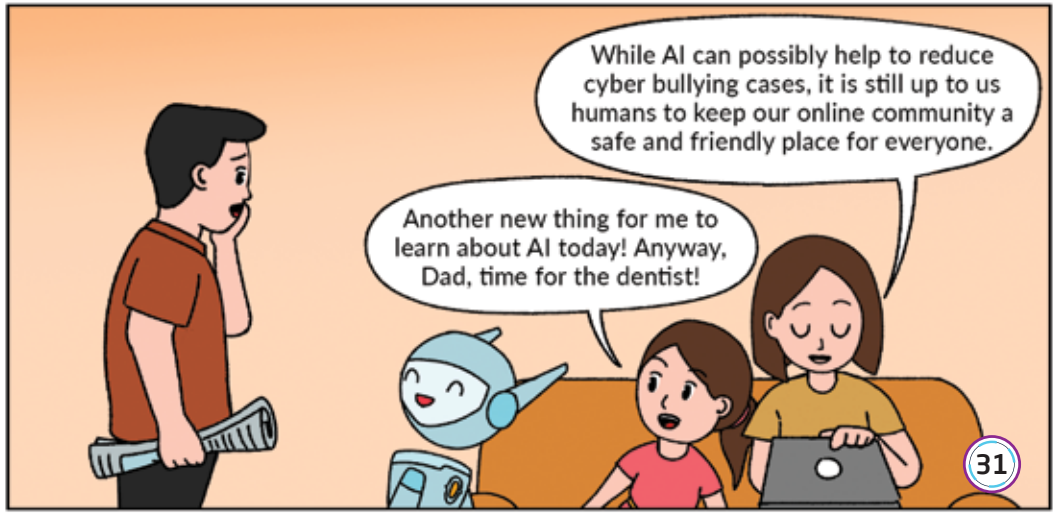

It saves you so much time! And it almost feels like a real conversation.
Chatbots do save you time! They're similar to an AI feature called Predictive Text. In emails, AI tries to understand typed text so AI can suggest words and phrases to finish your sentences. If you like the suggestion, you simply click on the phrase to paste the message.
Where is the nearest branch to your current location?
- Tampines
- Punggol
Tampines


How does AI knows what I need in a search engine?
In a search engine, AI goes through your past searches and data that you've keyed in previously such as your locations!
When you begin typing a search term, it recalls what you tried to find in your previous searches to makes relevant recommendations for you or suggests places that are more relatable to you. For instance, this dental clinic that is a short drive away!


Rolly! Mum just spoke to a chatbot to book a dental appointment for Dad's swollen gum!
I knew I heard a buzz of information all the way from the study room and had to be a part of it. A chatbot? Well, we do love convenience!


?!?!
All these cyberbullying cases.. I'm starting to wonder if the Internet is actually a blessing or a curse! Ow!
Did you know AI can help prevent cyber-bullying?


How? It can't perceive emotions!
Many codes and datasets are being created to train these machines to detect hate words and abusive speech, and spot problematic user accounts on social media. Hopefully, this will help reduce cyber-bullying cases online by flagging out users who made such mean comments!


While AI can possibly help to reduce cyber bullying cases, it is still up to us humans to keep our online community a safe and friendly place for everyone.
Another new thing for me to learn about AI today! Anyway, Dad, time for the dentist!

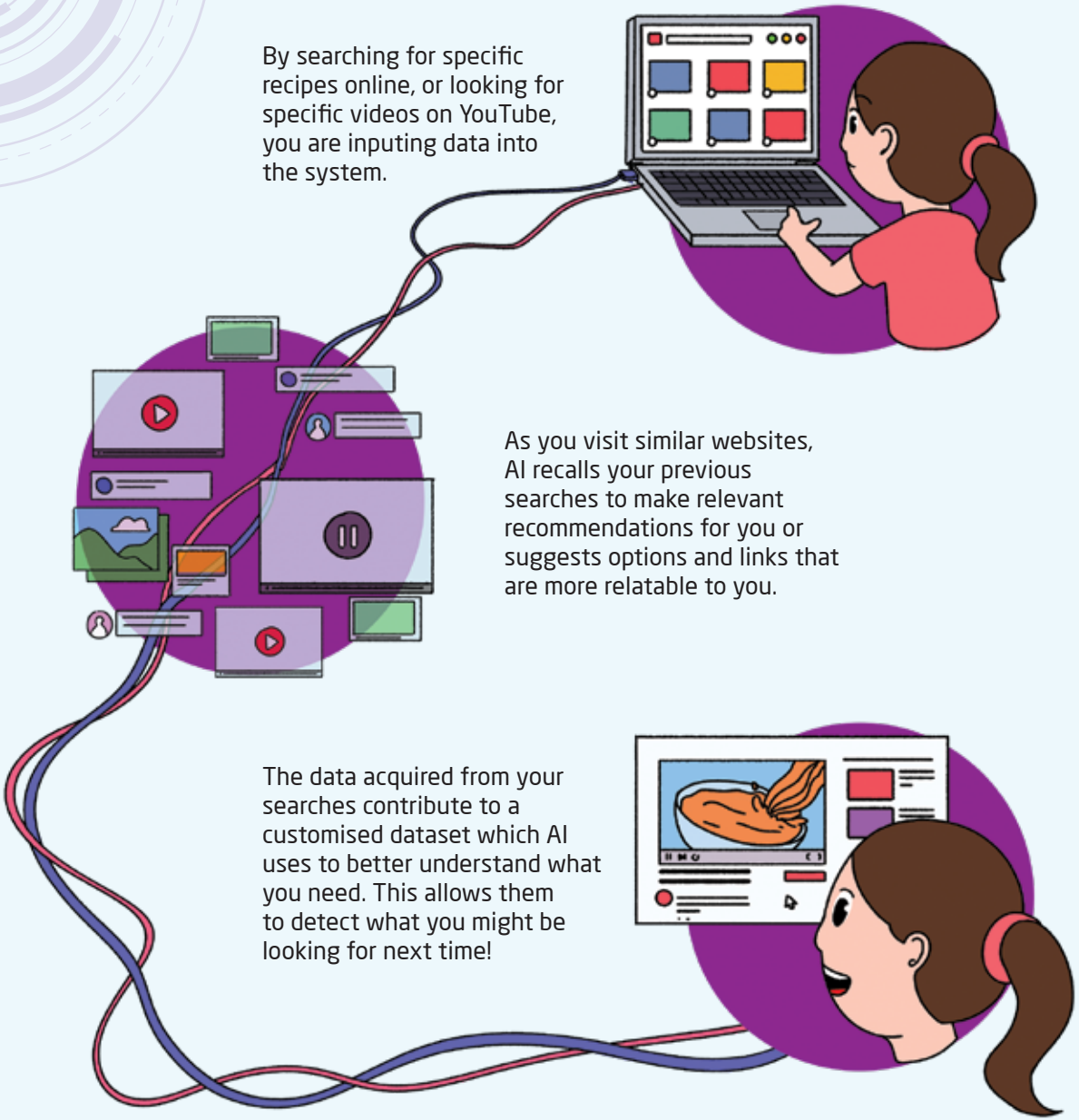
TOPIC 5

AI AND YOUR DATA

Does AI know what I want?

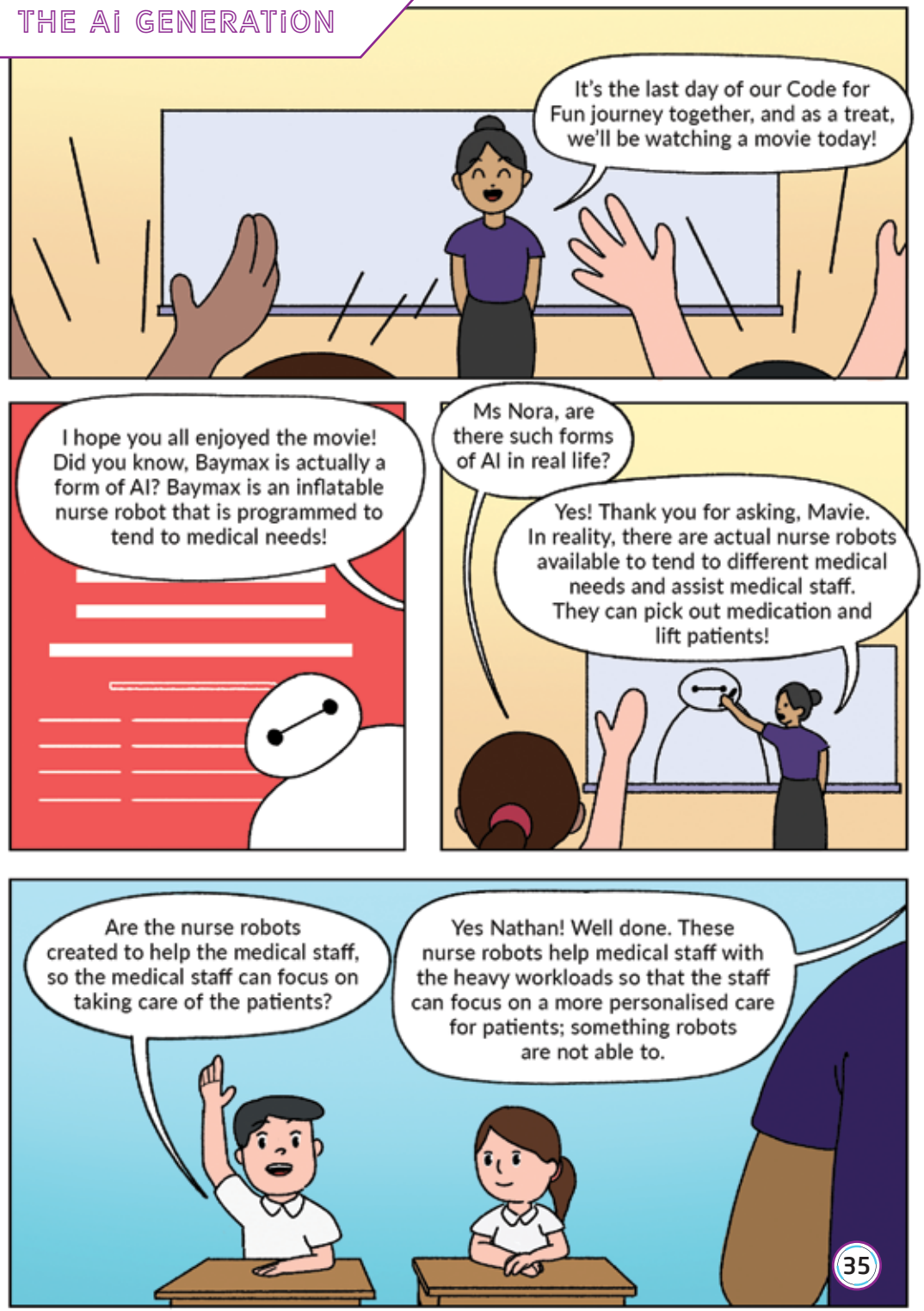
Your preferences can be captured as you click through different websites and applications or use AI-powered devices. This preference is then converted into data which is used to recommend similar videos to watch on YouTube or similar type of music to listen on Spotify. It can even remember your search history to help auto-complete your searches and remember your voice for voice-activated devices. This is how AI helps you make your life more convenient and efficient.

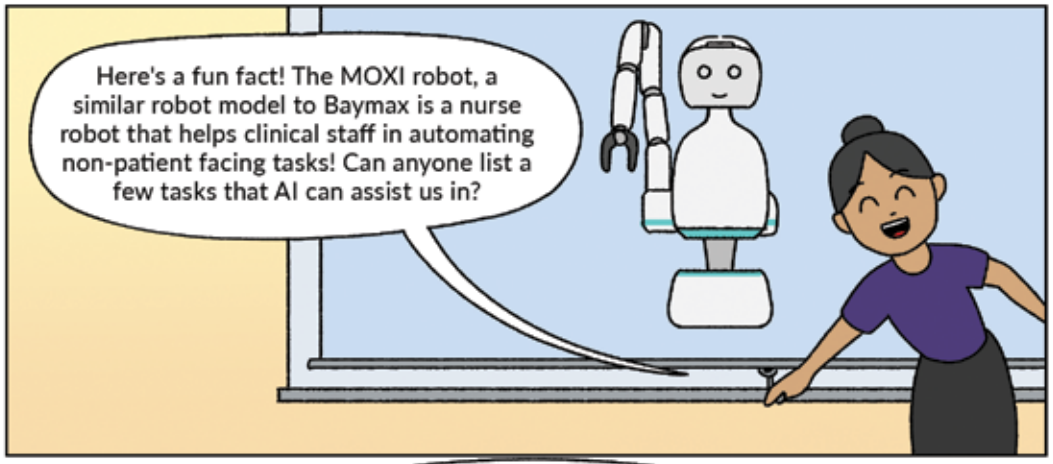
Know what you are sharing, and check if you need these services. You can opt to switch off this tracking function in the websites, applications or devices, if you do not need these services.

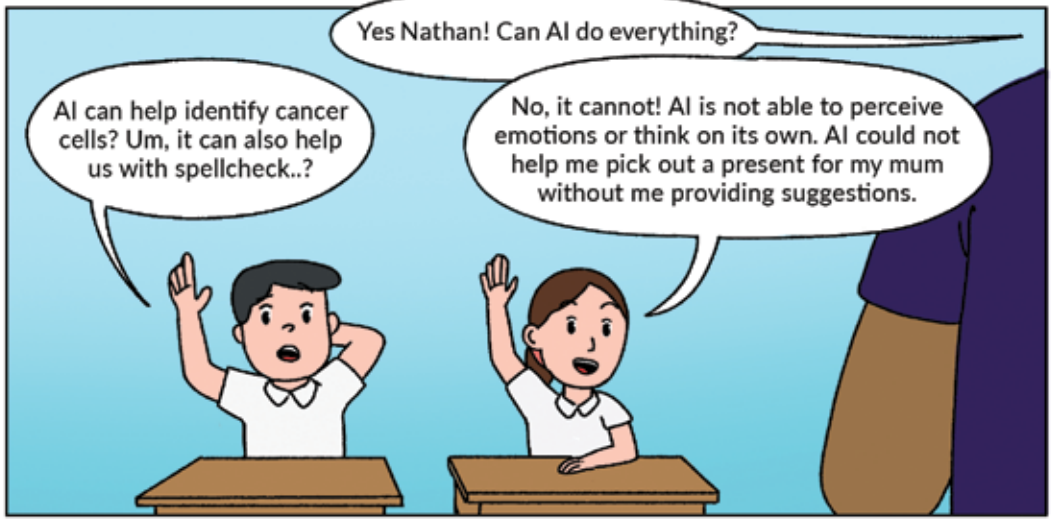


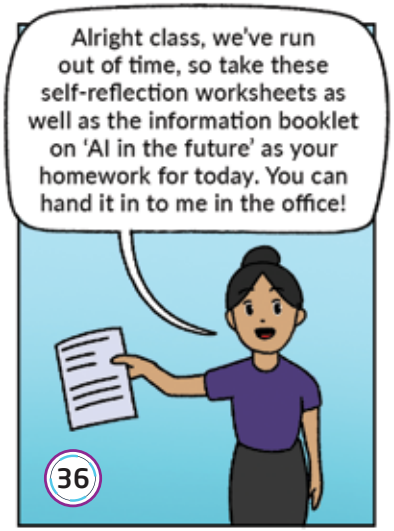
LET'S PLUG IN! #5

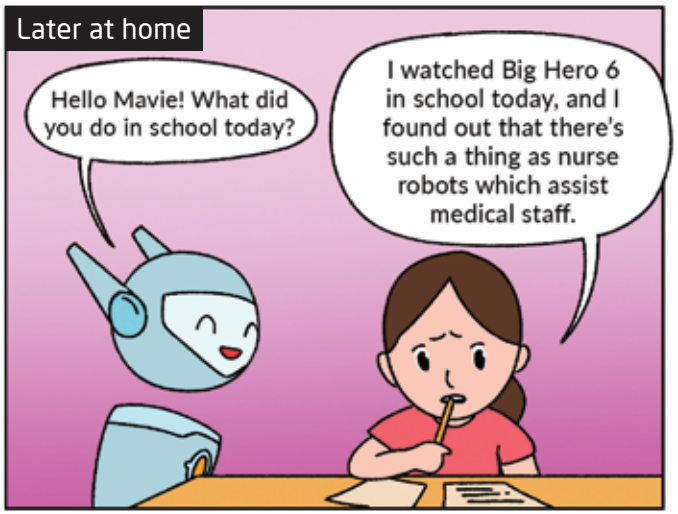
How else do you think AI can help us?

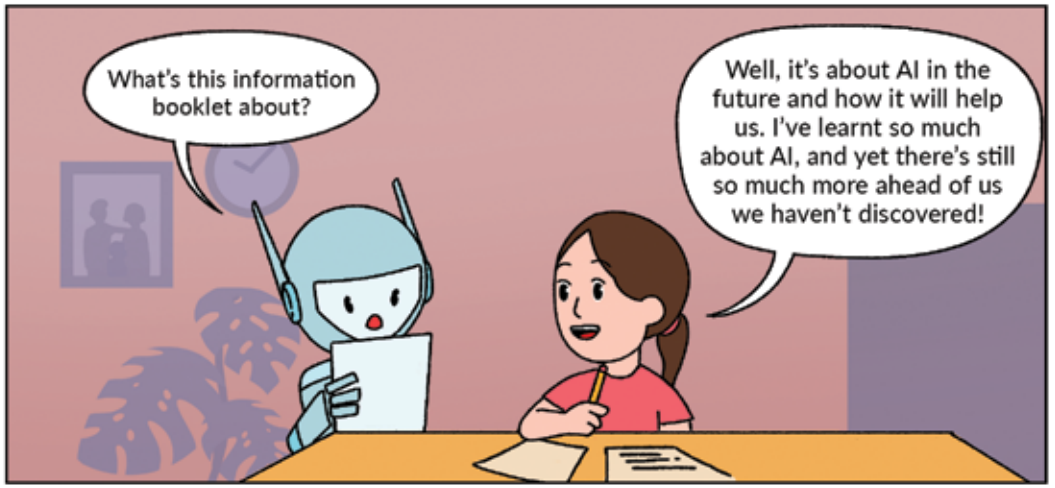


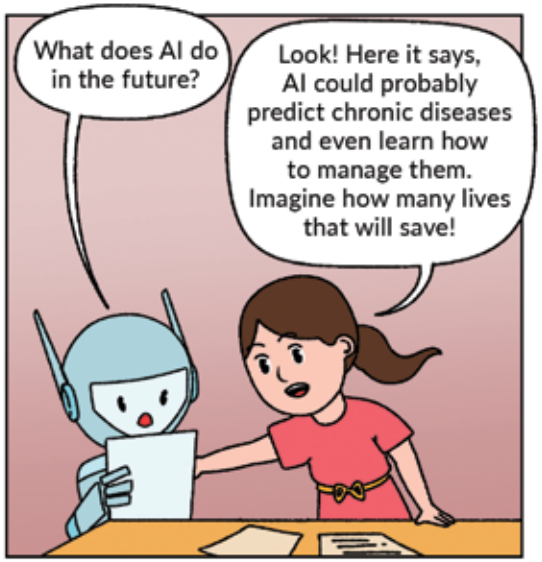

Here's a fun fact! The MOXI robot, a similar robot model to Baymax is a nurse robot that helps clinical staff in automating non-patient facing tasks! Can anyone list a few tasks that AI can assist us in?

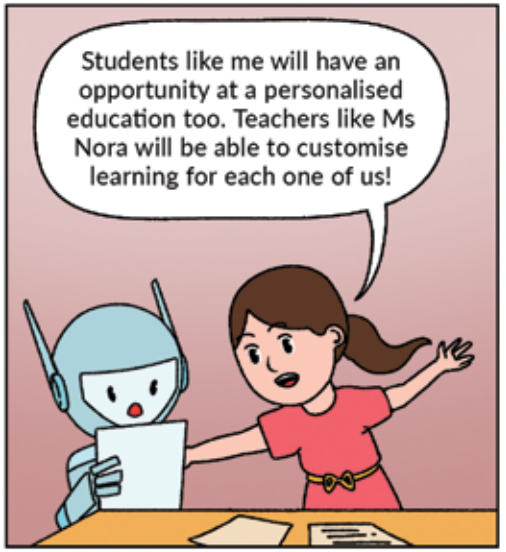

Yes Nathan! Can AI do everything?
AI can help identify cancer cells? Um, it can also help us with spellcheck..?
No, it cannot! AI is not able to perceive emotions or think on its own. AI could not help me pick out a present for my mum without me providing suggestions.

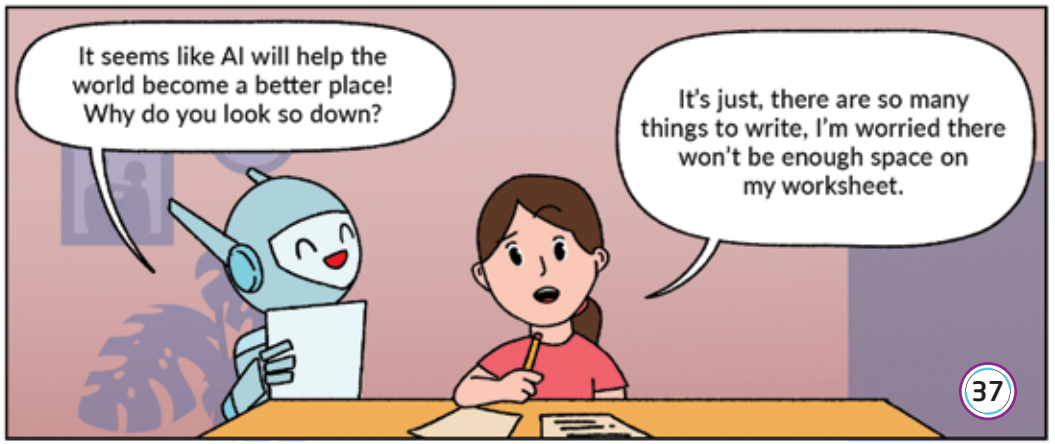

Alright class, we've run out of time, so take these self-reflection worksheets as well as the information booklet on 'AI in the future' as your homework for today. You can hand it in to me in the office!


Later at home
Hello Mavie! What did you do in school today?
I watched Big Hero 6 in school today, and I found out that there's such a thing as nurse robots which assist medical staff.


What's this information booklet about?
Well, it's about AI in the future and how it will help us. I've learnt so much about AI, and yet there's still so much more ahead of us we haven't discovered!


What does AI do in the future?
Look! Here it says, AI could probably predict chronic diseases and even learn how to manage them. Imagine how many lives that will save!


Students like me will have an opportunity at a personalised education too. Teachers like Ms Nora will be able to customise learning for each one of us!


It seems like AI will help the world become a better place! Why do you look so down?
It's just, there are so many things to write, I'm worried there won't be enough space on my worksheet.

TOPIC 6

THE FUTURE OF AI

National AI Strategy

In 2019, the Singapore Government published the National Artificial Inteligence (AI) Strategy, a plan sharing how AI can be used to bring greater convenience, safety and security to Singaporeans in their everyday lives.

Transport and logistics

Smart Cities and Estates

Healthcare

Education

Safety and security

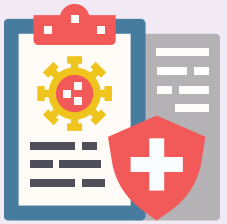
TRANSPORT AND LOGISTICS

AI can help to better plan transport routes and scheduling for drivers to increase productivity, and reduce waiting time in traffic or during deliveries.

SMART CITIES AND ESTATES

AI and sensors can be used in neighbourhood facilities, like lifts, to alert on would-be faults before they happen, reducing the inconvenience for residents.

It can also help better understand how residents use various facilities, so that the Government can plan and build better facilities that meet the residents' needs. With an AI-powered chatbot, queries from residents can also be addressed quicker.



HEALTHCARE

AI can help healthcare professionals in early detection of chronic disease so they can better help their patients, and help doctors to track a patient's recovery progress. With the help of AI, patients can also self-manage and monitor their health conditions.

EDUCATION

AI can be used to better understand students' response to learning materials and customise a learning pathway for students. An AI-enabled Automated Marking System can assist teachers in marking short answers and essays. Lastly, an AI Learning Companion can support students' development by motivating, engaging them and allowing them to reflect on their learning experiences.

SAFETY AND SECURITY

AI can help to enhance border security and reduce waiting time by turning immigration clearance into a fully automated system based on iris and facial biometrics, allowing travellers to enjoy a fuss-free experience without the need to present their passports.

What would the FUTURE with AI looks like? Check out these videos

Driverless car

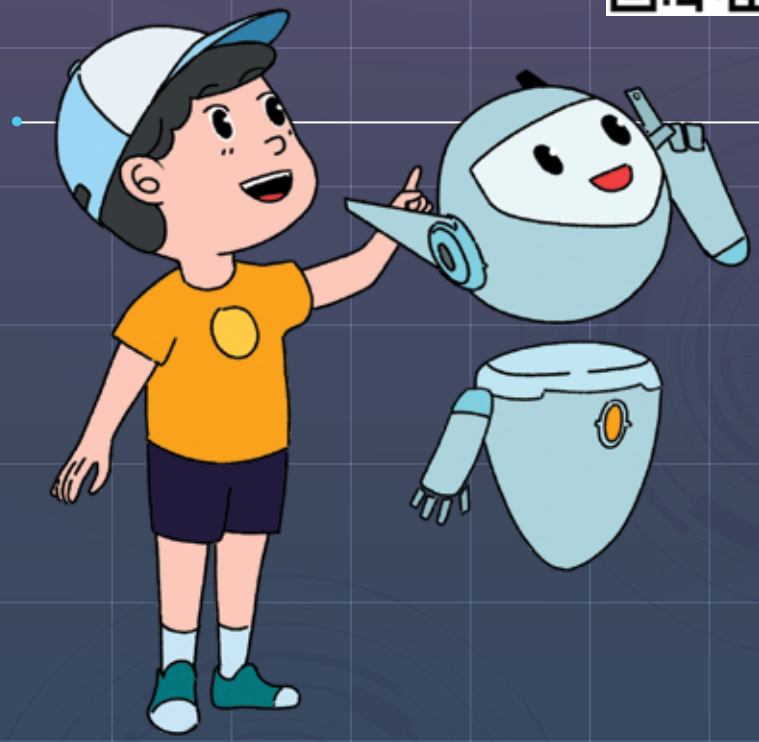
Google Duplex

Mark Zuckerberg's Jarvis

LET'S TRY A QUIZ!

It's all about what you've learnt so far. Let's put your new knowledge to the test!

Scan here:



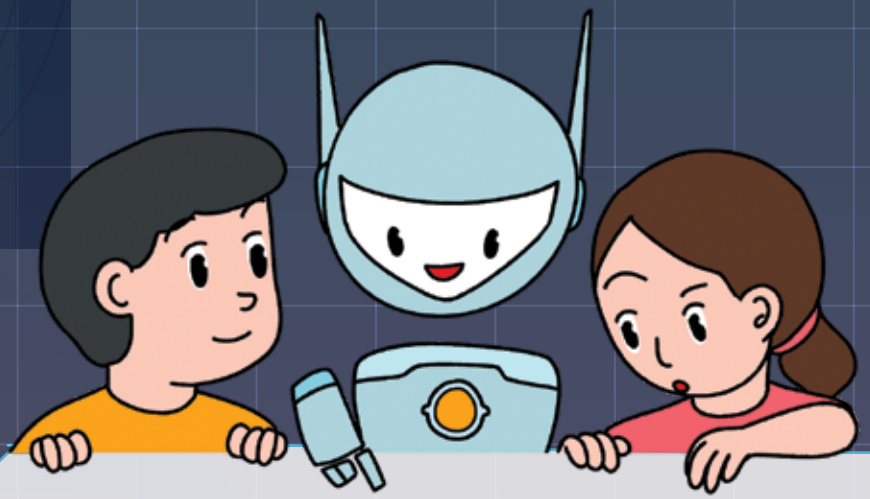
LEARN MORE ABOUT AI

Venture into the world of AI!
Here's some resources from other organisations:

Participate in AI4K programme by AI Singapore

Explore AI experiments with Google

Learn more about AI with Machine Learning for Kids



ONE STEP CLOSER TO AN AI-FUTURE

How was your AI-education?
Let us know by filling in a short survey!

SG:DIGITAL

INFOCOMM MEDIA DEVELOPMENT AUTHORITY

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