**Committee**: United Nations Environment Programme (UNEP)

**Issue**: AI in the service of creating a healthy environment and preventing future disease outbreaks

**Student Officer**: Andreas Bermingham

**Position**: Deputy President

## PERSONAL INTRODUCTION

Dear delegates,

My name is Andreas Bermingham, I am 17 years old, and I am a student at Arsakeio Tositseio School in Ekali. It is my pleasure to be serving as a deputy president in the United Nations Environmental Programme in this year's ATSMUN, as it is my first-time chairing.

Firstly, I would like to welcome all of you to the 9th ATSMUN and to the UNEP committee. I believe that the topics chosen for our committee are very interesting, challenging and have a lot of room for discussion. I am eagerly waiting to hear all of your opinions and beliefs about the topics. I hope we will be able to have a fruitful and interesting debate.

Regarding the study guide and talking from experience based on my previous participation as a delegate, I strongly recommend using it as a source of information. The guide provides a general summary as well as in-depth information on the subject at hand. Having said that, it is equally if not more important for each delegate to conduct their own research, as it will provide a unique and complete understanding of the topic. Please note that the sources I used for the guide are listed in the bibliography and are open for all of you to access and use for your research. As always, I am open to any questions you may have, and I'll be more than happy to assist you with any issues that you might be facing.

Best wishes,

Andreas Bermingham

andreasberm@gmail.com

## INTRODUCTION

The past couple of years have been filled with worldwide disasters and scares, revolving around the environmental and health sectors, such as wildfires across multiple countries, most notable of which are Australia, the US and Greece, record breaking temperatures in July of 2023 and of course the historic pandemic of Covid19 starting in 2020[1]. Because of all these events, countries around the world are researching ways to help solve the climate crisis and prevent future pandemics. The ever-progressing technological sector proposes a tool that could prove to be the solution to these issues. That tool is none other than Artificial Intelligence.

Artificial Intelligence (AI) has very quickly taken the industry by storm. AI has shown promising signs in providing substantial assistance and solutions to the world's most challenging problems. Because of that the European Union (EU) has started investigating the possibility that, with the aid of AI, we could slow down and even prevent future disease outbreaks whilst also creating a safe and clean environment by providing solutions to the present environmental concerns such as global warming and pollution. AI has already made its way into multiple other sectors such as the financial sector, the energy sector, transportation and the manufacturing field, so it could prove very useful in both the environmental and health sectors.

While such a concept may be enticing, it still has a long way to go until it can be implemented, as it faces many obstacles, the most prominent of which is the fact that AI technology is still fairly new. Even though the idea of AI has been around for centuries, the official "birth" of AI happened in 1956, whilst "the big AI boom"

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[1] "What Is the History of Artificial Intelligence (AI)?" Tableau, www.tableau.com/data-insights/ai/history#:~:text=Most%20of%20the%201980s%20showed,funding%20to%20support%20the%20researchers.

occurred in the 1980s. As such, this technology has not been thoroughly researched and tested, so we are not sure about its full range of capabilities yet. Even though we are still in the beginning of using AI in solving such serious issues, the EU is hopeful that in a few years we will be able to utilize its amazing abilities to help the health industry and the planet.

## Where industries will put practical AI to work

Ranking of AI impact by its potential to free up time, enhance quality, and enhance personalization

| Ranking | Industry | High-potential use cases |
|---|---|---|
| 1 | Healthcare | • Supporting diagnosis by detecting variations in patient data<br>• Early identification of potential pandemics<br>• Imaging diagnostics |
| 1 | Automotive | • Autonomous fleets for ride sharing<br>• Semi-autonomous features such as driver assist<br>• Engine monitoring and predictive, autonomous maintenance |
| 3 | Financial services | • Personalized financial planning<br>• Fraud detection and anti-money laundering<br>• Automation of customer operations |
| 4 | Transportation and logistics | • Autonomous trucking and delivery<br>• Traffic control and reduced congestion<br>• Enhanced security |
| 5 | Technology, media, and telecommunications | • Media archiving, search, and recommendations<br>• Customized content creation<br>• Personalized marketing and advertising |
| 6 | Retail and consumer | • Personalized design and production<br>• Anticipating customer demand<br>• Inventory and delivery management |
| 7 | Energy | • Smart metering<br>• More efficient grid operation and storage<br>• Predictive infrastructure maintenance |
| 8 | Manufacturing | • Enhanced monitoring and auto-correction of processes<br>• Supply chain and production optimization<br>• On-demand production |

**Figure 1:** The impact of AI on different industries[2]

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[2] "Practical-Use-of-Ai-in-Business-Omnidigit." *OmniDigit*, 16 May 2018, omnidigit.com/artificial-intelligence-affects-digital-marketing/practical-use-of-ai-in-business-omnidigit/.

## DEFINITION OF KEY TERMS

### Artificial Intelligence

The capability of a machine to imitate intelligent human behavior.[3]

### Carbon dioxide emissions

Emissions stemming from the burning of fossil fuels and the manufacture of cement.[4]

### Carbon footprint

The amount of greenhouse gasses and specifically carbon dioxide emitted by something (such as a person's activities or a product's manufacture and transport) during a given period.[5]

### Climate change

A long-term change in the average weather patterns that have come to define Earth's local, regional and global climates. These changes have a broad range of observed effects that are synonymous with the term.[6]

### Connected Cars

A connected car is a car that can communicate bidirectionally with other systems outside of the car. This allows the car to share internet access, and hence data, with other devices both inside and outside the vehicle.[7]

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[3] "Artificial intelligence." Merriam-Webster.com Dictionary, Merriam-Webster, https://www.merriam-webster.com/dictionary/artificial%20intelligence.

[4] "Glossary:Carbon Dioxide Emissions." Glossary:Carbon Dioxide Emissions - Statistics Explained, Eurostat, 10 Aug. 2023, ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary%3ACarbon_dioxide_emissions.

[5] "Carbon footprint." Merriam-Webster.com Dictionary, Merriam-Webster, https://www.merriam-webster.com/dictionary/carbon%20footprint.

[6] "What Is Climate Change?" NASA, NASA, 9 Aug. 2023, climate.nasa.gov/what-is-climate-change/.

[7] "Connected Car." Wikipedia, Wikimedia Foundation, 15 Aug. 2023, en.wikipedia.org/wiki/Connected_car.

### Disease outbreak

The occurrence of disease cases in excess of normal expectancy.[8]

### e-waste

Waste consisting of discarded electronic products such as computers, televisions, and cell phones.[9]

### Epidemic

An outbreak of disease that spreads quickly and affects many individuals at the same time.[10]

### Greenhouse gasses

Gasses in the earth's atmosphere that trap heat.[11]

### Pandemic

An outbreak of a disease that occurs over a wide geographic area (such as multiple countries or continents) and typically affects a significant proportion of the population.[12]

### Pollution

Something (such as man-made waste) that makes an environment unsuitable or unsafe for use.[13]

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[8] "Disease Outbreaks." World Health Organization, World Health Organization, www.emro.who.int/health-topics/disease-outbreaks/index.html.

[9] "E-waste." Merriam-Webster.com Dictionary, Merriam-Webster, https://www.merriam-webster.com/dictionary/e-waste.

[10] "Epidemic." Merriam-Webster.com Dictionary, Merriam-Webster, https://www.merriam-webster.com/dictionary/epidemic .

[11] "What Are Greenhouse Gases?" GHGs Explained | National Grid Group, National Grid, www.nationalgrid.com/stories/energy-explained/what-are-greenhouse-gases.

[12] "Pandemic." Merriam-Webster.com Dictionary, Merriam-Webster, https://www.merriam-webster.com/dictionary/pandemic.

[13] "Pollution." Merriam-Webster.com Dictionary, Merriam-Webster, https://www.merriam-webster.com/dictionary/pollution.

## BACKGROUND INFORMATION

### Using AI's capabilities to help save the environment

In recent years, more and more often, the world faces a plethora of planetary crises such as climate change, pollution and general greenhouse gas emissions. When it comes to addressing and solving the issues at hand, humanity discovers many issues. A very promising solution for those challenges that humanity faces is AI technology, which provides multiple advantages when it comes to addressing the planetary crises.

Firstly, AI's ability to collect, analyze and manage climate data. Even though in today's day and age we have access to a large database of climate data, the analysis and categorization has proven to be a difficult and extremely long process. With the use of AI technology, however, a wide variety of complex data can be quickly analyzed, effortlessly and at a moment's notice.

Furthermore, AI technology can be used to tackle planetary challenges in a more direct way, through a variety of uses. From designing environmentally friendly vehicles and buildings, to monitoring the status of rainforests and endangered animal species around the globe. As stated by the coordinator of the United Nations Environment Program's (UNEP's) Digital Transformation sub-programme David Jensen "This can be on a large scale – such as satellite monitoring of global emissions, or a more granular scale – such as a smart house automatically turning off lights or heat after a certain time,"[14]. It is noteworthy that with AI technology it is possible to monitor worldwide greenhouse gas emissions such as methane.

Another area that AI technology can be benefiting, is the calculation of environmental footprints worldwide. The footprint of various products throughout their lifetime can be calculated, taking into consideration consumer use and supply chains. Lastly, AI can be used to determine different factors in variables that are difficult to pinpoint such as the fluctuating nature of climate change. Thus, thanks to its various abilities, it will be able to advise humans on the best course of action to

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[14] "How Artificial Intelligence Is Helping Tackle Environmental Challenges." UNEP, www.unep.org/news-and-stories/story/how-artificial-intelligence-helping-tackle-environmental-challenges.

tackle the ongoing crises, as fast and as efficiently as possible, in order to minimize future damages.

**Using AI's capabilities to prevent future disease outbreaks**

In the occurrence of a disease outbreak, the rise of cases produces a large amount of data, especially in the case of viral infections, as most viruses evolve and change from year to year, rendering previous methods to combat them useless, or in the case of a new disease the discovery, research and understanding of it takes a very long time, something that postpones the production of drugs to fight the disease even more. So, it's safe to say that time is of the essence, especially in the case of epidemics and pandemics where the cases rise exponentially, and many people's lives are at risk. But humans cannot respond to the threat at the necessary speed.

However, with AI technology, humans gain unparalleled advantages. The use of AI practically ensures the fast discovery of a new disease, from anywhere in the world, which would kickstart the research of the disease, as well as the development of a drug at faster speeds. Furthermore, the accuracy of the findings of AI as well as the diagnoses and screenings done with the help of AI are reliable. Lastly, with AI technology, healthcare will become more accessible to more rural communities worldwide.

**Challenges that arise when it comes to the practical use of AI**

Even though AI shows many promising signs, there are many issues that need to be addressed before it can be implemented to the environmental and health sectors. Firstly, AI is still early in development and thus we don't have a very clear view of its capabilities, something which creates the possibility of misuse of AI technology, which could cause a lot of harm. Furthermore, the use of AI promotes the generation of excess e-waste, which is a large contributor to pollution, as in 2022 59.4 million metric tons of e-waste was generated and it is expected that 61.3 million metric tons of e-waste will be generated in 2023.

Moreover, the oceans, that cover 71% of the world, present a number of problems when it comes to monitoring them, for example the large amount of money that is needed to deploy and maintain the equipment used to monitor them. Additionally, the practice of using AI in the medical field is often questioned based on its ethicality and accuracy. Lastly, the general cost of using AI technology is quite high.
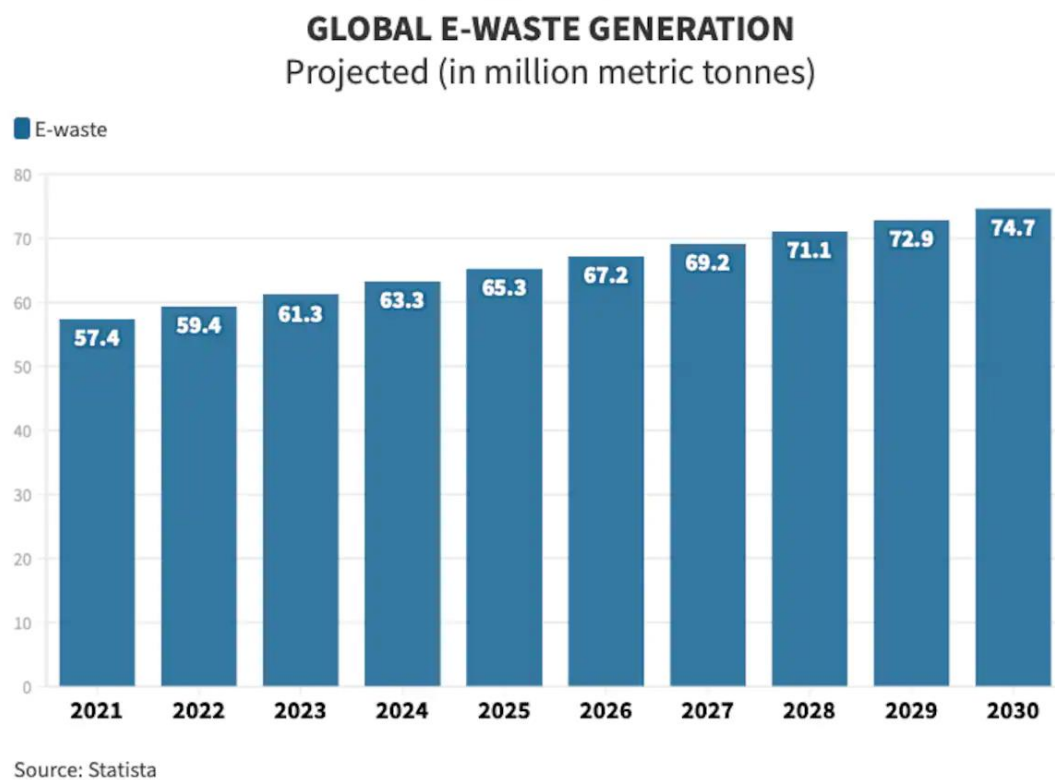


**Figure 2:** Global e-waste generation projected to reach 74.7 million metric tonnes by 2030[15]

## Previous attempts at solving the issue

Even though the use of AI technology to help save the environment and prevent disease outbreaks is a fairly new idea, there have already been multiple implementations of such technology in those sectors, especially by the EU.

### WESR (World Environment Situation Room)

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[15] Tiseo, Ian. "Global E-Waste Generation Outlook 2030." Statista, 6 Feb. 2023, www.statista.com/statistics/1067081/generation-electronic-waste-globally-forecast/.

The main practical use of AI technology, serving the health of the environment is the World Environment Situation Room (WESR), which is a digital platform, launched by UNEP, that monitors, analyses and compiles real-time environmental data from around the world like sea levels, greenhouse gas emissions and atmospheric concentration, among others. After the data collection, analysis, and compilation, the WESR provides the best course of action to combat the issue at hand. Furthermore, UNEP constantly updates the WESR, with the end goal of it becoming a public source of information used in places from government offices to classrooms and houses. Additionally, UNEP is actively working on improving the WESR with the prospect of it becoming the world center of information for planetary issues.

### IMEO (International Methane Emissions Observatory)

Another initiative started by the UNEP, that works alongside the WESR, is the International Methane Emissions Observatory (IMEO), which monitors global Methane emissions with incredible accuracy. This initiative plays an important role in helping the environment, because reducing methane emissions is one of the most feasible and easiest solutions to the environmental issues we are experiencing. With the help of the IMEO tracking the progress that has been made has become seamless.

### GEMS Air

Lastly, UNEP has co-founded another initiative alongside IQAir, called GEMS Air Pollution Monitoring platform, which collects data from more than 140 countries worldwide, monitoring the global air quality in real time. This initiative provides vital information when it comes to choosing the measures we need to take.

### ProMED Mail

ProMED Mail monitors cases of multiple diseases from around the globe and looks out for irregularities like sudden rise in infections, which could be early signs of disease

outbreaks. ProMED Mail has been the leading tool used for early detection for decades now.

### HealthMap

HealthMap is mainly used in the case of emergencies and is not used for monitoring early signs of disease outbreaks, but it monitors how many people have been infected from a certain disease in a set amount of time, as well as possible protective measures.

### EPIWATCH

EPIWATCH is basically the newer and better version of ProMED Mail, as it looks out for early signs of disease outbreaks. It utilizes data from around the globe with unparalleled speed and accuracy. Furthermore, it provides multiple solutions and measures that can be taken if early signs of a disease outbreak are detected. Lastly, it constantly creates accurate statistical data like the probability of an epidemic, that helps specialists closely monitor the state of the world.

## MAJOR COUNTRIES AND ORGANISATIONS INVOLVED

### USA

The USA is without a doubt a leader in the field of AI development and practical use of AI technology, and it is actively searching for ways to use AI to help save the environment and stop disease outbreaks. Furthermore, multiple companies such as Google and Apple actively use AI technology in order to minimize their impact on the environment.

### China

China is investing heavily into research of AI and is a close second place to the US in terms of research and development of AI. With the Covid-19 outbreak of 2020, China is researching new ways to combat and prevent disease outbreaks and is looking into the possibility of implementing AI in the sector.

**Canada**

Canada is also a leader when it comes to practical use and research of AI. It is planning to expand and implement the practical use of AI in multiple other sectors including the environmental and health sectors.

**Japan and South Korea**

Although the US, China and Canada are the front runners in the AI arms race, Japan and South Korea are not lagging behind. Both countries are investing heavily into research of AI. They show very promising signs of development, and they are rapidly introducing AI to new sectors.

**France and Germany**

European countries are generally behind when it comes to the AI arms race. France and Germany are the front runners in the European region and although their development isn't great, they show promising signs of growth in the field in the near future.

**Organisation for Economic Co-operation and Development (OECD)**

The OECD believes that in the future AI could significantly impact the issue of disease outbreaks in a positive way and it has even started trying to implement the benefits of AI when it comes to combating COVID-19.

**UNEP**

The UN has launched an AI platform developed by the Statistics Division of the United Nations Department of Economic and Social Affairs (UN DESA), the UN Environment Programme (UNEP) and the Basque Centre for Climate Change (BC3). The platform

## TIMELINE OF EVENTS

| Date | Description of Event |
|------|----------------------|
| 1950 | Alan Turing publishes a paper named Computing Machinery and Intelligence, which is widely considered as the official beginning of AI |
| 1955 | Allen Newell, Cliff Shaw, and Herbert Simon created the first AI program, Logic Theorist |
| 1970s | AI has started making its way into healthcare, as a non-practical tool |
| 1980s | AI has started being implemented into practical situations in the health sector. AI technology is starting to be implemented into the environmental sector |
| 1994 | ProMED Mail was first developed |
| 2016 | Development of Epiwatch as a manual system |
| 2018 | The Epiwatch program becomes semi-automatic |
| 2022 | Launching of WESR |

## Possible solutions

With the ever-evolving technology sector more and more practical uses of AI in the environmental and health sectors are discovered.

### Satellites

Launching and using satellites that monitor the environment on a global scale could prove to be incredibly useful and could help provide crucial data that could lead to an even faster response.

**Autonomous and connected electric vehicles**

Autonomous and connected electric vehicles could be used in the future as an eco-friendlier alternative to traditional cars, as they have already started to be, but they could also help significantly lower car accidents, something that will significantly lower global waste as a whole.

**Energy management and preservation**

AI can also be used for the better management and storage of energy throughout the global energy grids, as the abilities of AI could help predict the demand for energy and thus significantly improve energy efficiency, as well as help integrate more alternative sources of energy that are more environmentally friendly.

**AI in the agricultural sector**

AI could be used to help improve agriculture, something that will positively impact the environment to a large degree, for example by monitoring the use of pesticides and other harmful substances, as the agriculture sector is a serious contributor to pollution.

**Monitoring the consumption of cities**

AI could monitor cities based on their energy consumption, water consumption, amount of waste produced, and amount of greenhouse gases excreted, among other things, something that could significantly help in deciding the best course of action.

**Improving the tools that we currently have**

Even though we currently have a lot of AI tools in our possession that are actively tackling environmental and health issues, there is still a lot of room for improvement. For example, AI programs such as EPIWATCH, even though they serve their purpose efficiently, there is still a large possibility of error, thus there is a lot of room for

improvement in relation to the accuracy, as well as the speed of identification of possible pandemic and epidemic threats.

## FURTHER READING

i) A company that actively prevents illegal deforestation, animal poaching and uses bio-acoustic monitoring to help save rainforests: https://rfcx.org/

ii) A study that shows that with the use of AI, greenhouse gas emissions could be reduced by 4% by 2030, which is approximately 2.4 gigatonnes of CO2 emissions: https://www.pwc.co.uk/services/sustainability-climate-change/insights/how-ai-future-can-enable-sustainable-future.html

iii) A company based in south Africa that produces AI bracelets for rhinos, to prevent poaching: https://www.rouxcel.com/

iv) A video that shows the capabilities of connected cars:

https://www.youtube.com/watch?v=zgk-nE1nsfw

v) Five startups that are using AI to help solve climate change: https://blog.google/outreach-initiatives/entrepreneurs/how-4-startups-are-using-ai-to-solve-climate-change-challenges/

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