

**Artificial  
Intelligence**

**Sense N' Science**

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The dilemma quotient of  
AI in growth and ethics  
by Anang Bhagwati

**Computers will overtake humans with AI within the next 100 years. When that happens, we need to make sure the computers have goals aligned with ours.**

**- Stephen Hawking**



**AI**



# Editor's note

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By the 1950s, artificial intelligence, or AI as it's more commonly known, had already been developed in numerous visions of machine intelligence and hasn't stopped evolving since. In the ever changing landscape of technology and the modern world, artificial intelligence plays a pivotal role in pushing the boundaries of science in addition to moving forward. With reasoning, problem solving, knowledge representation, natural language processing, perception, and more being enabled by AI, the world is progressing at a supersonic speed. To call its impact massive would be an understatement. With the use of AI in a plethora of fields such as medicine, business, psychology, and justice - to name a few - the world is improving dramatically.

We are proud to present the 8th edition of the Sense N' Science magazine, which revolves around AI. Read the issue and discover more about what is taking the world by storm. We thank all the students and teachers who helped us with this issue.

## **Editors**

**Vama Shah, Armaan Somani**

## **Graphic designer**

**Vama Shah**

## **Team members**

**Ayaan Bhatt, Anika Chopra**

## **Teachers in charge**

**Dr Kinjal Shah**

**Meenu Gupta**

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# The dilemma quotient of artificial intelligence in growth and ethics

Anang Bhagwati  
IBDP 1A

Suppose I told you that you would have to pay the hidden cost of pawning our freedom and individuality for the sake of “development of artificial intelligence”? Furthermore, AI would replace human beings and potential jobs for algorithms and technology.

Artificial Intelligence (AI), a term coined by Stanford Professor John McCarthy in 1955, is defined as “the science and engineering of making intelligent machines”. It has evolved much more than what it was originally envisaged. Positive use of technology is always development-oriented. However, sometimes excessive use of technology and programming leading to abuse of artificial intelligence interferes with the central or minimum consideration of values, ethics and good practices in moral parlance. It is the dilemma between leapfrog technology and some primary fundamental value where human beings have to interject or bring forth a balance between two divergent and opposing forces, values juxtaposed with unbridled progress in the opposite hands of a singular person.

AI will be a threat to most jobs in the future. Indeed, technological advancement has been a major contributing factor to job losses since the beginning of the Industrial revolution. In the long term, AI will ultimately extend its reach to fields such as medicine and law. These fields have been more conventional than automated, and the number of jobs will decrease drastically in the upcoming decades.

It's unclear what industries unemployed individuals will be able to shift into, while fields that need better care for others are more likely to attract those who want to work with humans and AIs. The main concern will be how humanity spends its time. What will these unemployed people do? How will they contribute to society? How will society keep them from being enraged and drawn into dangerous movements like white supremacy and terrorism? Those organizations that encounter a hold of AI will create more wealth at the cost of wages of the currently unemployed people and lead to economic disparity. This is a significant threat to less developed economies. Social media, smartphones and AI could aid but on the contrary, AI is a major cause of loneliness since people are used to facing screens instead of facing each other. Loneliness can be remedied by putting away AI devices and building strong bonds and in-person relationships in the form of caring. The moot question with artificial intelligence is what dissects into fundamental areas of softer spheres of philosophy, spirituality and religion. It also deals with the groping of discovery of our soul surpassing our intelligence. It remains a dilemma whether it will help or hamper our vision of creating a better humane world.



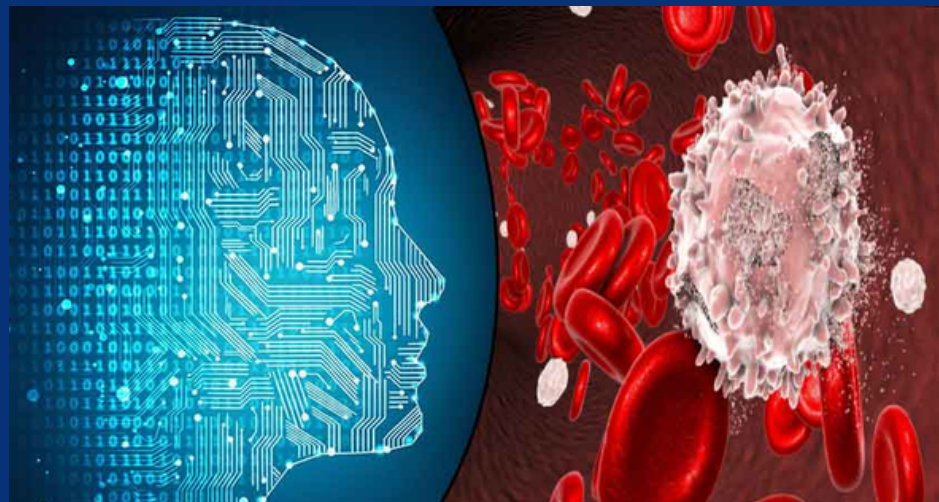
# AI in leukemia detection

Shona Patel  
10C IGCSE

What is AI? Artificial intelligence is intelligence demonstrated by machines, as opposed to the natural intelligence displayed by animals together with humans. At the moment, many AI imaging studies estimate diagnostic accuracy by calculating sensitivity and specificity. However, as AI often detects minor image alterations, more relevant outcome variables include new diagnoses of advanced disease, a disease requiring treatment, or conditions likely to affect long-term survival. The occurrence of clinically meaningful events—symptoms, need for disease-modifying therapy, and mortality—strongly affect the quality of life and should be the focus of AI-based investigations.

Recently, medical professionals have expanded the use of AI capabilities in cancer detection. At Tulane University, researchers discovered that AI could accurately detect and diagnose colorectal cancer by analyzing tissue scans better than pathologists. Cancer is a disease in which some of the body's cells grow uncontrollably and spread to other parts of the body. Leukemia is a broad term for cancers of the blood cells. The type of leukemia depends on the type of blood cell that becomes cancerous and whether it grows quickly or slowly. Leukemia occurs most often in adults older than 55, but it is also the most common cancer in children younger than 15. The presence of cancer in the lymphatic system is often determined by analyzing samples from the blood or bone marrow. A team led by Prof. Dr Peter Krawitz from The University of Bonn had already shown in 2020 that artificial intelligence could help with the diagnosis of such lymphomas and leukemia. The technology fully utilizes the potential of all measurement values and increases the speed as well as the objectivity of the analyses compared to established processes.

The method has now been further developed so that even smaller laboratories can benefit from this freely accessible machine learning method. Krawitz, together with the bioinformaticians Nanditha Mallesh and Max Zhao, investigated how artificial intelligence can be used to analyze cytometry data. The team considered more than 30,000 data sets from patients with B-cell lymphoma to train artificial intelligence (AI). "AI takes full advantage of the data and increases the speed and objectivity of diagnoses," says lead author Nanditha Mallesh. The result of the AI evaluations is a suggested diagnosis that still needs to be verified by the physician. In the process, the AI provides indications of conspicuous cells. AI has been very helpful to doctors in detecting leukemia.



# AI and automation

Heet Ranpura  
IBDP 1A

Artificial intelligence (AI) and automation are commonly conflated, and the phrases are used interchangeably.

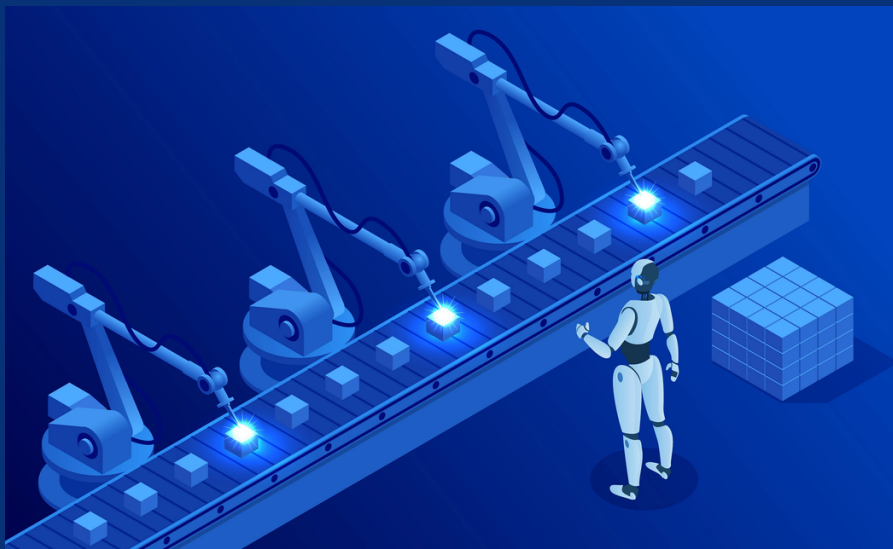
Automation is when a machine does basic, repeatable tasks based on specific instructions or procedures. Automation chores are tasks that are very repetitive and predictable. Consider an industrial machine that produces the same part in the same way over and over again. In order to work well, automation needs manual configuration and human oversight. As a result, people must plan for every conceivable behavior, and the computer is built to respond accordingly.

AI, on the other hand, allows a computer to absorb broad guidelines laid down by people and create its paths to success. Not to mention that it can learn what works and what doesn't, allowing it to operate efficiently by itself over time. AI refers to how computer systems may replicate human intellect and reasoning by analyzing large quantities of data and learning, predicting, and recommending what to do next. Natural language processing (NLP), computer vision, and facial recognition are examples of AI capabilities.

## A.I. and Automation

In a process, we can term "AI automation," automation can be utilized in conjunction with AI such as machine learning and deep learning to achieve even better outcomes. AI automation is strong because it combines the benefits of automation in business processes such as increased speed, efficiency, time savings, and scalability along with the insights, flexibility, and processing power of AI technology. AI automation allows businesses to expand their capabilities while offloading monotonous chores to the machine. This differs from pure automation in that the AI may start, stop, or even change what it's doing depending on its surroundings. Furthermore, because the finest AI systems enable marketers to define guardrails, there is little risk of unanticipated outcomes. Benefits of using A.I. automation:

- Increase productivity and save costs by increasing the workforce: Production may be sped up by automating systems and processes and using data and analysis to assure correctness.
- Boost quality by improving accuracy via consistent processes and approaches: The application of artificial intelligence to drive decision-making and offer a consistent approach to repeated operations is the strength of intelligent automation.
- Enhance the customer experience: Getting a higher-quality, more dependable product to market faster, or responding to customer inquiries sooner (or instantly), creates a richer, more favorable experience for the customer, and hence a competitive advantage for the firm.



# AI and social media

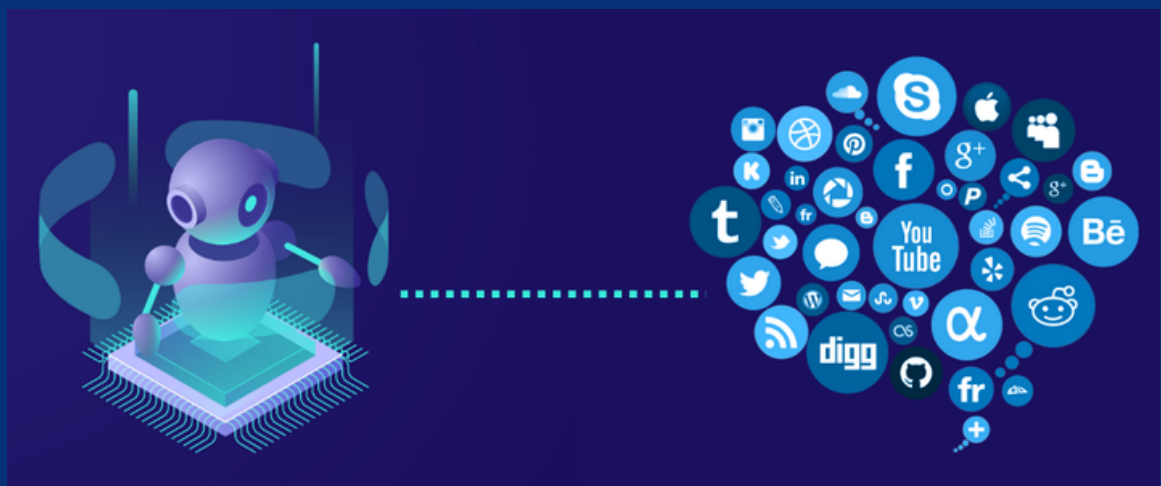
Haimi Kothari  
IBDP 1 B

Artificial Intelligence (AI) has been the talk of the town persistently for so long now that many people are aware of a lot about AI, however, there are a few things unknown about it too. Even if we aren't in the field of AI, actively using or researching it, a profound chunk of our life is heavily impacted by it. Media is one thing that the majority of us are enthusiastic about and interestingly AI plays a significant role in making the content creative for creators, productive for the editors and relatable for the viewers. Using AI the content is tweaked such that creativity and curiosity of human nature intertwine, giving rise to content that is freshly reformatted and repurposed.

Media companies are gradually digging deep into algorithms that provide them with data-first results which enables better returns on investments and lets the firm understand the market's operations and audience better. A primary example of the usage of artificial intelligence in media is the production and application of metadata tagging where keywords or phrases are attached to audio, video, image or video files, documents and HTML. A very basic yet known example that works on a similar principle of metadata tagging is the usage of hashtags on Instagram or other social media platforms and microblogging. This has been widely used due to the ease it brings in where specific text can be extracted from massive volumes of content in a matter of just seconds. Media companies have observed a good amount of savings since then. AI has been able to predict the demand to adjust resources on cloud models or disruptions in the supply chain caused by a content supplier missing the deadline. Not only has AI impacted positively on the media companies, but it has also brought tons of perks to consumers.

Apart from understanding users' preferences and delivering engaging content, AI is used to produce notifications on the lock screen of our devices. These notifications are managed by the recommender systems that store the individual's choices so that the data that pops up is similar to the interest fed in by the user. Social media apps like Facebook can identify faces in images and also use automated retargeting where you can view advertisements for the product you were previously eyeing. Apps like Snapchat use filters in a manner that moves as you rotate your face by using AI in real-time. Lastly, platforms like LinkedIn use advanced machine learning that uses similar principles to AI and suggest relevant job recommendations that might interest you.

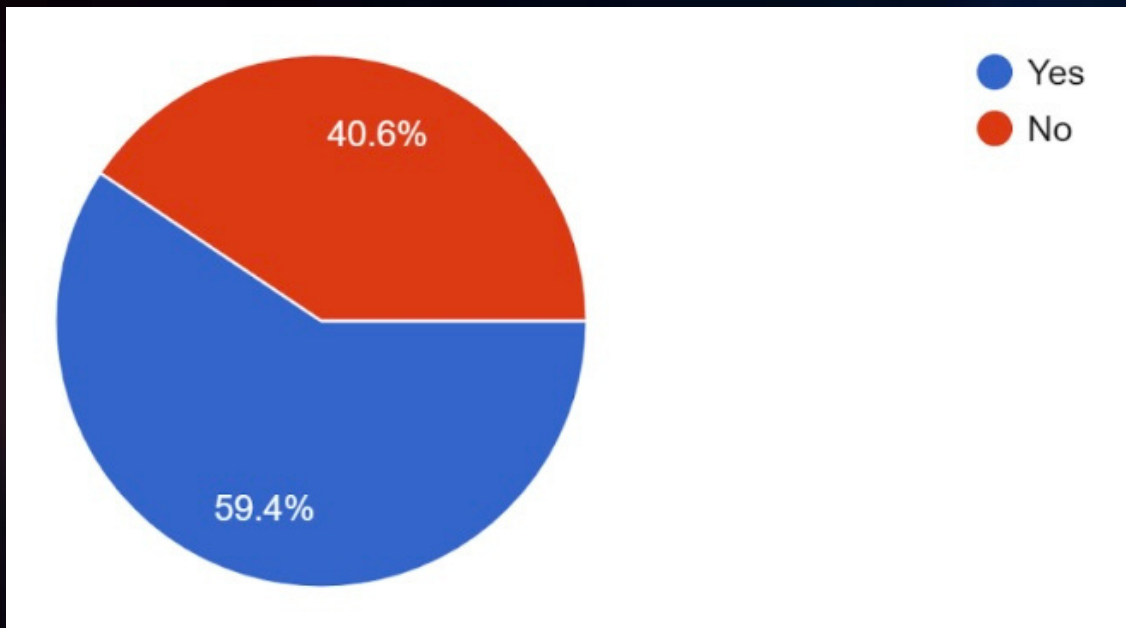
To conclude, in the digital age, AI is constantly transforming social media by augmenting user experience by looking forward to effective ways to market products. The next time you log on to your social media account and upload a picture, notice an advertisement or comment on a post, keep in mind that with the help of AI, your data is constantly compiled and analyzed, which impacts what you see and engage with in the future.



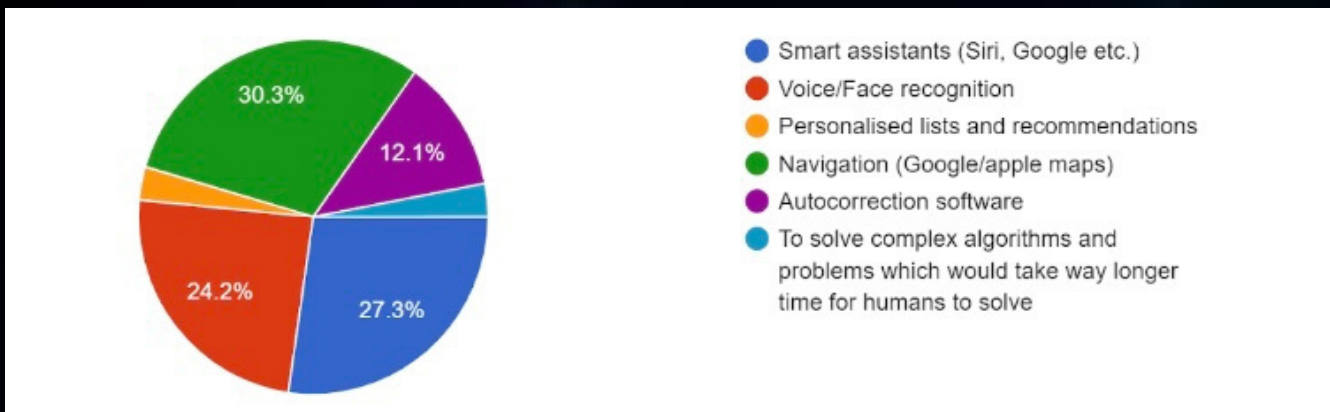


# Exposing perceptions regarding AI among a student body – a survey among AIS students

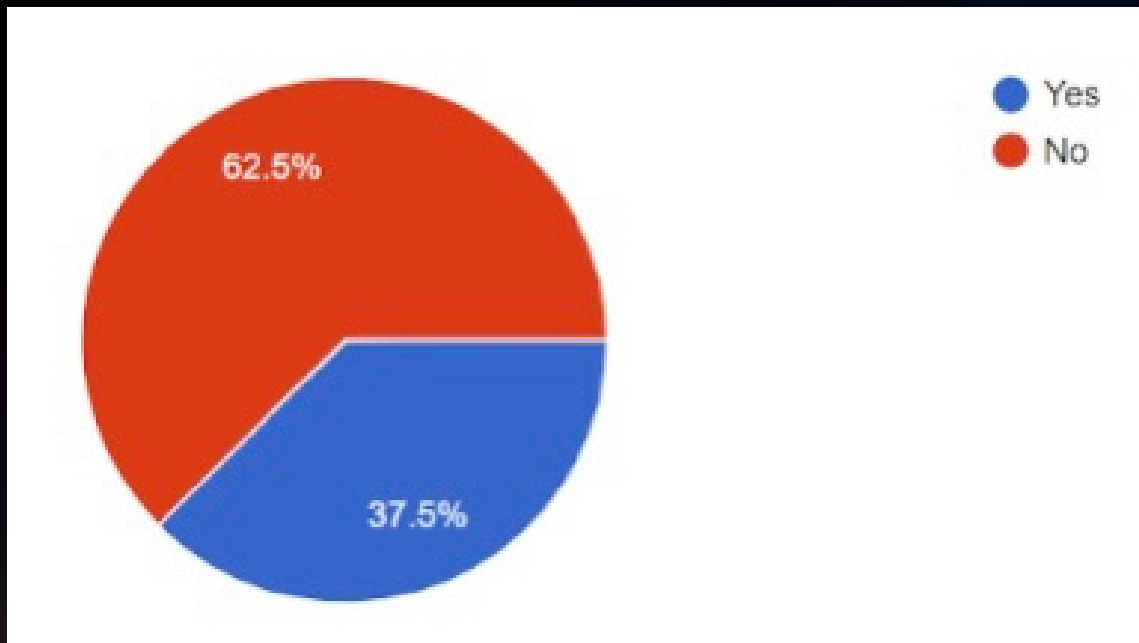
Should AI take on all jobs that require low human creativity to leave humans to do the more mentally stimulating work?



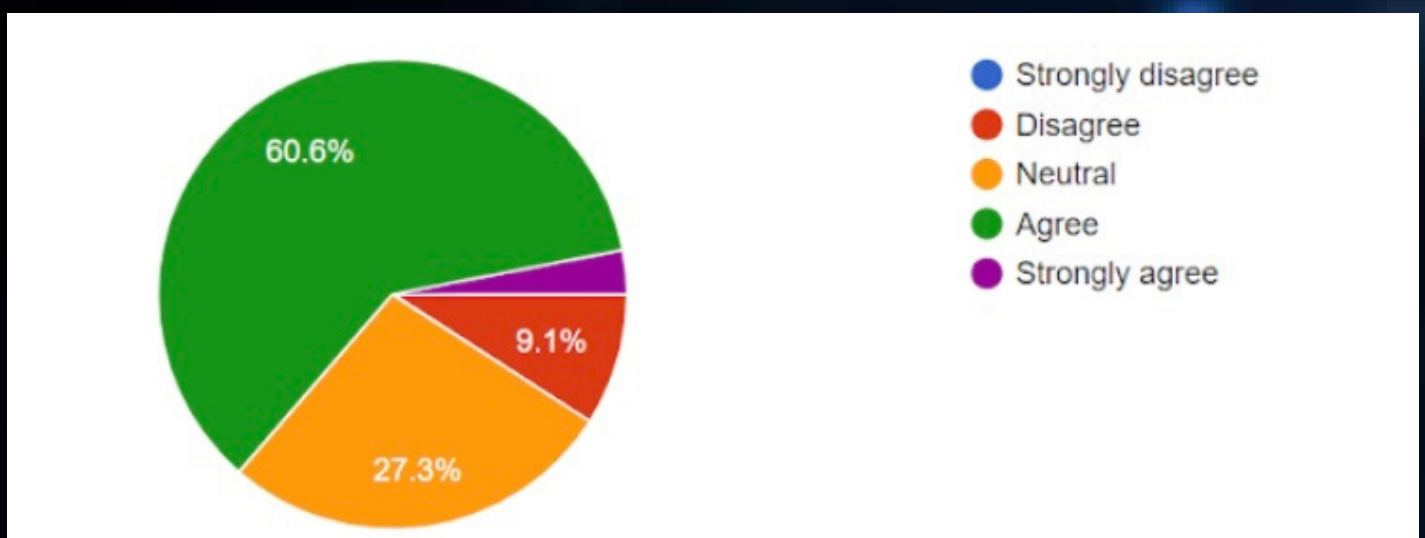
What is your most frequent use of AI?



Do you think AI will ever be able to experience human emotions?



It is said that the increasing use of AI for reasoning and judgment-based tasks is beneficial because intelligent machines are (typically) not biased. Do you agree?

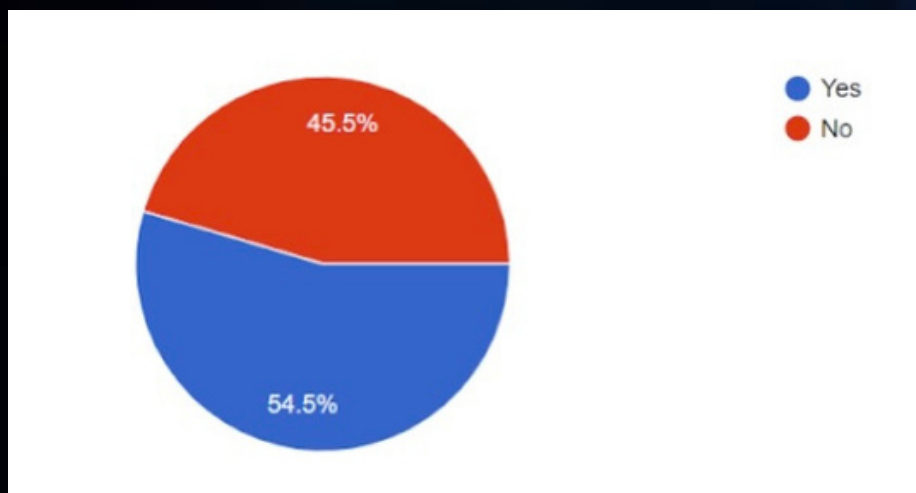


In today's world, machines using AI are capable of performing several tasks, and the range of their abilities is constantly increasing. What do you think is something that AI-enabled machines will never be able to do?

Common responses:

- Express feelings/ compassion
- Experience/ understand human emotions
- Think of original ideas and innovations
- Produce the human touch/ comfort
- Help with emotional bonding in humans
- Teach students
- Take decisions based on instinct and emotions
- Master human creativity
- Substitute human interaction

Will AI take over the world someday?



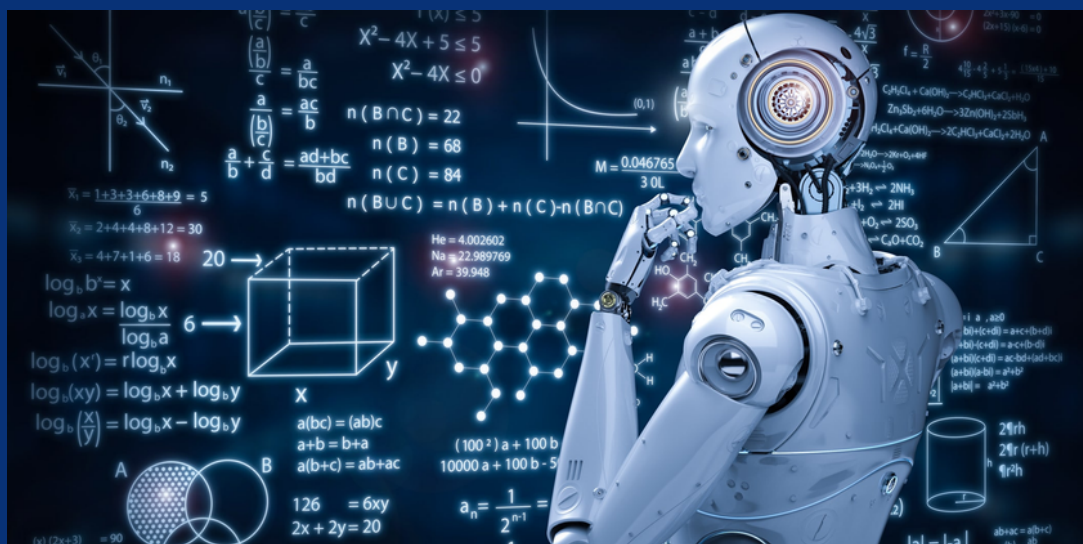
**Survey questions by Anika Chopra and Ayaan Bhatt**

# AI and physics

Manit Bhatt  
IBDP 1 B

There are so many aspects of physics that can be applicable to Artificial Intelligence(AI). Hence, it does not take one long to appreciate the value of this scientific discipline. One of the most significant discoveries in physics was the Higgs Boson Particle, often referred to as the God Particle, which was determined using an AI neural network to help identify complex patterns in particle collisions. AI-driven frameworks are accelerating a diverse array of critical areas of physics research. From protein structures to climate modelling, detecting gravitational waves to understanding the universe, these breakthroughs demonstrate the lasting impact AI is only beginning to have on scientific discovery. This means that with help of artificial intelligence, the growth of physics is necessary to live as we know it; this is because physics is a science we apply in daily life without ever considering or realizing how important it is.

Some experiments and readings considered to be impossible, previously have become easy with the help of AI. The more physics science progresses, the more it will rely on AI. To think of this simply, imagine there is a floorboard with the dimensions 1-meter x 1 meter, then imagine you have to write your name on it. How easy is that? Now imagine you have to write your name again, this time on a board that is 1-nanometer x 1 nanometer. That's impossible, isn't it? Therefore, we must use mechanization or AI to achieve this simple task. That's why the deeper we go into physics and the smaller or larger objects that are being studied get, the harder it is for us humans to even take simple readings. An example of a reading we cannot take is the time it takes for particles to collide in the Large Hadron Collider. AI has had an impact on every science however, its impact on physics has been the most productive. The impact of using AI to create new models for solving hard physics problems has the potential to dramatically quicken the pace of progress for scientific discovery across the most fundamental fields of knowledge that explain and shape the world and universe we live in. However, physics has also had an impact on AI, it is through physics that we can develop AI. Many acclaimed physicists purport that they are the major contributors to advancing the AI field, so rivalry friction in these disciplines, and pardon the pun. I am more of a physics fan, but even then, I cannot deny the rapid development that AI has provided the field.



# AI and disability

Eileen Patel  
IBDP 1A

Artificial intelligence (AI) is not just what you see in sci-fi movies, its uses are far more versatile than objects like holograms and fighting robots. One such field that AI can revolutionise is disabilities. AI devices can be programmed to help people with disabilities equivalent to those who are visually or aurally impaired. For example, a visually impaired person can use the voice-over app on iPhones to listen to any kind of text, and virtual assistants like Siri and Alexa make the usage of technology much easier for those with visual or physical disabilities.

They can be connected to all types of home appliances to make independent living simple and safer. Applications specially made for disabled people like Evelity or soundscape make navigation much more convenient. AI makes communication and technology much easy not only for those with disabilities but for all people alike. Moreover, it can be brought into play with the growth of prosthetics and instruments for surgeries that can go towards correcting or helping with disabilities such as paralysis or vision impairment. In conclusion, the possibilities for disabled people have been expanded to new horizons by the usage of artificial intelligence, that is constantly advancing.



# AI and music

Prisha Modi  
IBDP 1A

Artificial Intelligence (AI) is at its forefront in today's technologically advanced world. From medicine and healthcare to automobiles, households to farms and retail to sports and entertainment, AI has made its mark in many of our day-to-day activities. AI has also started being more and more integrated into the music industry.

Applications like the widely used Spotify and other music streaming services use AI algorithms to produce daily mixes for their listeners and recommend more songs they might be interested in. Several factors are calculated to select and make up the music choices and playlists based on their preferences. User data such as their most played songs, their liked playlists and artists, types of music they search for and their locations. Based on these factors, users can get relevant recommendations from other users with similar tastes and playlists. This provides a platform for newly released music and lesser-known artists along with keeping the users returning for more. Some of these apps for music like Shazam also contain AI that can identify songs based on their lyrics and tunes. This is done by transforming the sound into a unique digital fingerprint. These are compared with other fingerprints in the app database till the song is identified.

AI has also advanced in creating its own music. The AI picks apart and analyses patterns found in different music samples in its data. This is used by the AI to create new tracks based on different rhythms, lengths of time, lyrics, mood, etc. Some examples of this are the licensed music used by content creators in their videos, soundscapes used for creating a certain mood or effect for the listener, and some album lyrics. It can also create mashups and act as an important tool in producing or editing music. There is also a possibility of AI playing in bands. However, this doesn't mean that AI can develop good music all by itself. It still lacks the creativity and feelings that make up a song. Most people write from their own experiences and come up with something new which can connect people emotionally, which the AI is unable to do. The songs may sound generic and heard before since they are developed by analyzing the patterns of other music. It also has no way of knowing which track it produced is genuinely good and which parts aren't. This demands the presence of a human. AI still has a long way to go before it can create music all on its own, without the help of humans.



# AI and metallurgic production

Sanya  
Gangwani  
10 GB

Will artificial intelligence be taking over our world anytime soon? The answer is no.

The fear of dystopia has been instilled in us by dramatic movies and TV shows. Contrary to such beliefs, artificial intelligence doesn't mean robots taking over the world, it is simply a theory and development of computer systems that can complete tasks which normally would require human intelligence. In today's time, AI has had a massive effect on almost every existing domain, but one domain that it has helped develop exponentially is the development of metallurgic materials. Metallurgical materials are combinations of different elements and compounds which form stronger, better, and more efficient materials for our usage. These materials are generally used for technology such as phones or spacecraft materials.

Previously, scientists would spend hours in labs figuring out which two materials to mix, at what temperature, in which conditions, etc. In fact, many materials were mixed based on an individual's intuition and no specific scientific reasons. An example is the use of Japanese watered steel to make knives instead of normal stainless steel. Almost nobody could tell you why it's used over stainless steel. The people who discovered it are simply believed to have had an artisan's understanding of the relationship between the internal structure and awesomeness of the material.

However, with the progression of AI, this process has become much faster. Scientists can research certain results which have already been obtained from experiments over the years and also list all the physical and chemical properties of the elements. After this, they put it in a simulator and the simulator checks the results of what would happen if two certain elements were mixed, the amounts in which both are present, at what temperature, etc. After checking the results of many such simulations, the scientists conduct lab experiments according to specific simulations. These simulations have shown 95% accuracy, which has saved up to 20 years in the metallurgical combination department. The glass on today's iPhones has been made using a similar method. To conclude, we can see that AI is bringing an immense development in our world, but we can't expect it to bring change overnight. It could take years, maybe even decades. Meanwhile, we just need to stay patient.



# Fun facts about AI

## On the big screen

AI is already in the movies. Iron Man's "Jarvis," "Vision" from Avengers, or "The Terminator" are all part of the AI world in movies.

## Robots can have citizenship!

Saudi Arabia has given citizenship to the social humanoid robot "Sophia". She became the first-ever robot to get citizenship of any country in the world. She, or it, is also the first non-human to be given any United Nations title (the Innovation Champion).

## AI Pets feel like real

Yes, you heard that right, AI pets exist. While real pets are needed to be taken care of, AI pets are robots that look, feel, and act like real animals. It is widely expected that AI-driven pets will be available in the market by 2025.

## AI can replace the human workforce, sooner or later!

As cited in The Guardian, customer service jobs (85%) are expected to face the highest AI threat in the coming years. More so, because AI helps reduce business costs, hence it is expected to replace the human workforce anytime now.

## Products you buy are suggested with the help of AI

Did you know that the products which are recommended to you on online retailing websites, such as Flipkart and Amazon, are done with the help of AI? In the words of Amazon CEO Jeff Bezos, most of the company's machine learning systems are being used to suggest products to customers. Also, AI helps to determine which deals are offered when and to which category of customers.



– Vama Shah, Armaan Somani



# AI in cardiovascular disease diagnostics

Tanya Shah  
IOC

Cardiovascular disease is a heart condition that includes diseased vessels, structural problems and blood clots. High blood pressure, high blood cholesterol, and smoking are key risk factors for heart disease. Several other medical conditions and lifestyle choices can also put people at a higher risk for heart disease, including diabetes, overweight and obesity. Artificial intelligence is the ability to make computers or machines learn to solve problems that would otherwise require human effort. AI is being used to program computers to process and respond to data quickly and consistently for better treatment outcomes. Uses include detecting heart disease, treating strokes faster and enhancing diagnostic radiology capabilities. For example, a Mayo Clinic study applied AI techniques to a new screening tool for left ventricular dysfunction in people without noticeable symptoms. The AI-assisted screening tool identified people at risk of left ventricular dysfunction 93% of the time. To put that in perspective, a mammogram is accurate 85% of the time. These technologies complement the knowledge of doctors.

Ideally, by bringing together direct care and data analysis, AI cardiology allows doctors to spend more time with their patients and improves the shared decision-making process. For example, In emergency rooms, when people come in with a stroke called an intracerebral hemorrhage, they get a CT scan. That scan is examined by a computer trained to analyze CT data, cutting the time to diagnose and limit brain damage which would help people who just had a stroke.

Applying AI to ECGs has resulted in a low-cost test that can be widely used to detect the presence of a weak heart pump, which can lead to heart failure if left untreated. Mayo Clinic is well situated to advance this use of AI because it has a database of more than 7 million ECGs. First, all identifying patient information is removed to protect privacy. Then this data can be mined to accurately predict heart failure noninvasively, inexpensively and within seconds. To sum it all up, AI is the future of medicine as it vastly helps cure the health of others.



# AI in breast cancer diagnostics

Anaya Patel  
IOC

Breast cancer, a dreadful disease usually affecting women and rarely men, is the second most common cancer in women. 8 in 10 women in the USA suffer the horrors of this disease. Breast cancer occurs when cancerous cells in the breast grow out of control. Breast cancers can start from different parts of the breast. The breast is an organ that sits on top of the upper ribs and chest muscles. There is a left and right breast and each one has mainly glands, ducts, and fatty tissue. In women, the breast makes and delivers milk to feed newborns and infants. The amount of fatty tissue in the breast determines the size of each breast. The most common symptom of Breast cancer is lumping growing on the breasts. Despite recorded cases stretching back to ancient Egypt, breast cancer was considered an “unspeakable” condition for years. Women were expected to suffer in silence and “dignity.” This stigma created academic ignorance, with breast cancer as a relatively unstudied disease until just a few decades ago. For most of the last century, a woman suffering from breast cancer would be offered radiation therapy and/or surgery, often radical surgery, leaving them disfigured for little benefit, while the treatment of other cancers was researched and cures were found.

Artificial intelligence is playing an increasingly critical role in identifying and curing breast cancer. This year, Britain’s National Health Service announced a study of how AI could screen for breast cancer. While intended to assist, not replace, human doctors, this would help to cure the shortage of radiographers — 2,000 more are needed to clear the NHS’ backlog in scans caused by the pandemic. Start-ups are also using AI to tackle this shortage. Britain’s Kheiron Medical Technologies plans to use AI to screen half a million women for breast cancer. Spain’s Blue Box is developing a device that can detect breast cancer from urine samples. India’s Niramai is working on a low-cost tool that could help screen large numbers of women in rural and semi-urban areas. We can also use AI to deepen our understanding of why the most aggressive forms of breast cancer are resistant to certain drugs, helping us to develop new, tailored drugs that discriminate between healthy and tumour cells better than chemotherapy. While AI’s influence is increasing, equally important to improving outcomes is the recognition that healthcare is a fundamentally human endeavour. No algorithm could ever comfort a patient in their darkest moments, and no machine could ever instil and inspire the resilience that every patient needs to beat their disease. While AI can help us make Breast cancer history, spreading awareness is essential.

We may never fully eradicate breast cancer. But with AI helping to diagnose patients earlier and enabling the rapid development of treatments, it is possible that in a few decades, we may no longer need Breast Cancer Awareness Month.





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