VISIONS OF A BETTER WORLD

THE FUTURE IN STORIES

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Lannoo

SUMMARY

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INTRODUCTION
DREAM BIGGER

'*As inventors we're obliged to dream, to be unconstrained in our quest for progress. Always to be pushing at the barriers*'.
Clive Sinclair, in the TV movie *Micro Men*

It started in 1980. I was a shy and introverted 13-year-old boy who had just entered secondary school at the Athenaeum Adolphe Max. My new school was one of three lucky athenaeums chosen for a pilot e-learning programme. One day the prefect, Jean Berger, announced the installation of Control Data's PLATO (Programmed Logic for Automatic Teaching Operations) terminals in a dedicated room. As I had managed to avoid the Dutch language classes, I started to spend all those free hours tinkering with this system: terminals connected to the world by rudimentary modems, long before the birth of the Internet as we know it today. The terminals displayed very precise vectors instead of large pixels. The screen was even touch-sensitive thanks to tiny wires that formed a grid of one centimetre squares. It was a platform that was 20 years ahead of its time.

DISCOVERING INCREDIBLE POTENTIAL
My first hack was a little programme in TUTOR that mimicked the first screen, where users entered their login and password to start the terminal. When I was leaving the room, I would launch my program that displayed a fake screen with the mention 'PRESS "NEXT" TO BEGIN' to trick future users. The next day, I would collect the passwords of everyone – including teachers – that had used the terminals in the interim. One day, I even collected the password of a user from group S: the engineers who maintained the system, and then I could start playing network games that were blocked at school. I played Moria, an adventure game in a rudimentary isometric 3D maze, with monsters and treasures. I discovered «Dogfight», the first 3D air combat simulator at 0.1

fps. I was already playing on a network with hundreds of geeks across Europe and the US. The system's experience was very basic, but my imagination was running wild. I anticipated 3D images as realistic as the ones I saw during the CGI sessions at the Cartoon Festival. I imagined a much faster network and I felt that there was the potential to change the world.

LOVE AT FIRST SIGHT

In 1982, during a school trip to London, I spent all my pocket money for food to buy a Sinclair ZX81. As soon as I got back, I connected it to an old TV set in the attic and started to leaf through the manual which was dedicated to BASIC programming. After devouring it from cover to cover, I fell into coding. It was love at first sight. I spent my nights coding Breakout or Pong, copying pages from magazines, until my father cut the fuses on my floor to force me to go to sleep.

'*The most exciting phrase to hear in science,
the one that heralds new discoveries,
is not "Eureka!" but "That's funny..."'*.

<div align="right">Isaac Asimov</div>

After trying to code a version of the Moria game on a ZX Spectrum, I devoted myself to coding a Power 4, whose main quality was the multi-coloured interface and sound effects. The intelligence of the software was so rudimentary that it was impossible to lose against it. But I understood that the user interface design wowed players and could be used as an illusion to hide the flaws of a rather simple programme. I then devoured a book about the popularisation of computer languages, published in French by Eyrolles. I discovered Fortran, Pascal, Prolog and LISP. Then I got my first PC assembled at Infoboard, with my first database management tools – Dbase, Foxpro – and I sold my first software (an armory management system).

'*With great power comes great responsibility*'.

<div align="right">The Peter Parker principle,
in the *Spider-Man* comic books written by Stan Lee</div>

I understood that computers gave humans superpowers and that I could use them to compensate for my weaknesses. I also understood that this revolution would profoundly change the world.

THE FRUIT OF KNOWLEDGE

In 1989, my mother, who ran a word processing office, bought a Macintosh SE/30 which I promptly monopolised. I fell in love with its windows, its menus, and the mouse which made the software intuitive. I used it to make magazines with SuperPaint. I was getting incredible results at the time. I used to go to our Apple dealer to print my work on a LaserWriter.

The shopkeeper was often impressed by my tinkering. One day in September, when I had just graduated – late – from high school, he offered me a job. The mission was to help a company that had just bought a brand-new, beautiful Macintosh IIfx for a few days. A total dream for me. I immediately accepted, and that's how I started a career as a graphic designer at Paparazzi, a below-the-line communications agency, where I worked for 18 months. I very quickly proved to be indispensable and converted the whole agency to Mac. While working at the agency, I had a short spell studying Typography and Graphic Design at La Cambre, a Brussels school of visual arts. Thereafter I moved on to computerising a photoengraving company with Scitex systems, which I connected to an Apple 'Tops' network to reduce costs and increase pos-sibilities with the first versions of Photoshop. I learned image processing, engraving, offset – and how to face sleepless nights.

One day, as I was stopping by the Paparazzi agency to collect payment on a late bill, the head of the studio, Catherine Decarpentrie, offered me a job to create our little prepress office. I accepted, and that same night I chose its name: Ex Machina. After a period in a shared office, we established our first private office in a garage in Forest, a commune of Brussels. The first 10 years were crazy; we did pre-press, CD-ROMS, interactive terminals, then the first websites, and basic video editing. I was living on-site, next to my servers that I babysat at night. I was working non-stop, and I loved it.

FROM EX MACHINA TO EMAKINA

Over time, our cutting-edge technological innovation attracted prestigious clients – Belgacom, Coca-Cola, Electrabel, Apple, Swatch, to name but a few – and proposals to buy out our little agency came pouring in. But I was not ready to give up my independence and freedom. In 2001, a group of entrepreneurs who had founded an e-business agency proposed that we join forces to found Emakina. This became a reality 20 years ago on April 1st, 2001. Since that day, we have never stopped growing and in 2006 we went public. The confidence of the market gave us the means to undertake an international adventure, first in Europe, then in Asia, the USA and Africa. We are now present in 20 countries, on four continents.

I have always tried to use technological innovations in a creative way to generate value for clients. The world is a big place with many people brighter than me, so I was unlikely to invent anything that didn't already exist somewhere. But by exploiting the latest technological innovations in a very creative and original way, with clear objectives, strategy and a good plan, it's possible to create unique new services, applications or content that create value for a customer, ex nihilo.

'*We believe in progress, scientific, rational.*
And we believe that it must be at the service of humanity
and that man must never be at the service of technological
progress that has escaped him'.
                    Emmanuel Macron during his 2021 speech about *Plan France 2030*

Emakina believes in progress through putting strategy, technology and creativity at the service of users. This has been Emakina's corporate culture since day one. It's this culture that underpins everything we do – our investments, our recruitment of talent, and our discourse within the market. Emakina is The User Agency. If our projects are innovative and creative, they are adopted by users, and that makes our clients successful. If our clients are satisfied, they continue their partnership with us. It's a virtuous circle.

APPLIED SCIENCE FICTION

'*We need dreamers and idealists, people who have an incredible and difficult vision of how the future fits together, to make things happen*'.

Michael Dell about Steve Jobs

To stay ahead of the curve, we must look at users; we must anticipate their needs and wants to be ready for our clients. We must constantly imagine a positive future to build the path that leads to it. We chose to start with a user experience in the future in the form of a fiction. Then we came back to the present, to its scientific publications, its innovations, its trends – in the form of an essay. We found our North Star and then we built the path to go in its direction. It's a new genre that combines fiction and essay. I've called it 'Applied Science Fiction'.

Ex Machina was founded 30 years ago. So naturally, we asked ourselves where we would be in 30 years. This book explores what might happen between 2021 and 2051, in 30 articles devoted to 30 areas. Each article begins with a short fiction. In our agency language: a User Experience consisting of a situation lived by one imaginary character (or more). Then we share our vision of a possible future. In our language, we start with insights to establish our foresight. Finally, we look at the technological trends, and the recent innovations that make these stories more or less plausible. With your smartphone scan the QR code featured on the first page of each article to access full online references.

THREE APPROACHES TO THE FUTURE

Three Emakina teams have been working on this project, each with a specific area of expertise.

BLUE ARTICLES. Our content specialists have an investigative journalistic approach. They investigate the state of the art, the latest technological trends and scientific publications to come up with their stories. At the helm are Manon Dubreuil, Paula Fitzhenry, Jean-Christophe Detrain and Cédric Godart.

GREEN ARTICLES. Our User Experience consultants are all part of the DXD (Digital eXperience Design) team at Emakina.BE. Their stories are intimately linked to their understanding of future user needs. They take into account the socio-

logical evolution of society, as well as the impact of technology to elaborate their scenario. The tandem consists of Content Designer Sarah Claeys, and UX researcher Iva Filipovic. Another DXD team-mate, Design Strategist Vicky De Mesmaecker, helped realise the 'RoboCop 2.0' article with her background and knowledge of criminology.

ORANGE ARTICLES. Our visionaries start from their imaginations, fed by their insatiable curiosity towards all sorts of subjects, and a technological intuition to discover improbable but often possible futures. This is the spitting image of Brice Le Blévennec and his talented sparring partner, Johannie van As.

FROM SCIENCE TO FICTION
The articles are ordered from the most probable to the craziest. Each article is placed on a scale from Science to Fiction.

SCIENCE	INNOVATION	DISRUPTION	VISION	FICTION

SCIENCE. The first articles are fairly close to the state of science and, barring accidents, their advent is highly probable.

INNOVATION. The following articles anticipate innovations that are fairly logical and, with the current acceleration in the pace of innovation, are fairly likely.

DISRUPTION. At the heart of the book, these articles explore possibilities that depend on radical innovations that are still at research stage.

VISION. These articles are predictions, disconnected from the feasibility of available technologies, but human inventiveness has no limits other than those of physics.

FICTION. The latest articles take the concept to its extreme. We will imagine the wildest possibilities in a world where today's physical barriers have been broken by scientific discoveries yet to come.

ART
& ALAN TURING
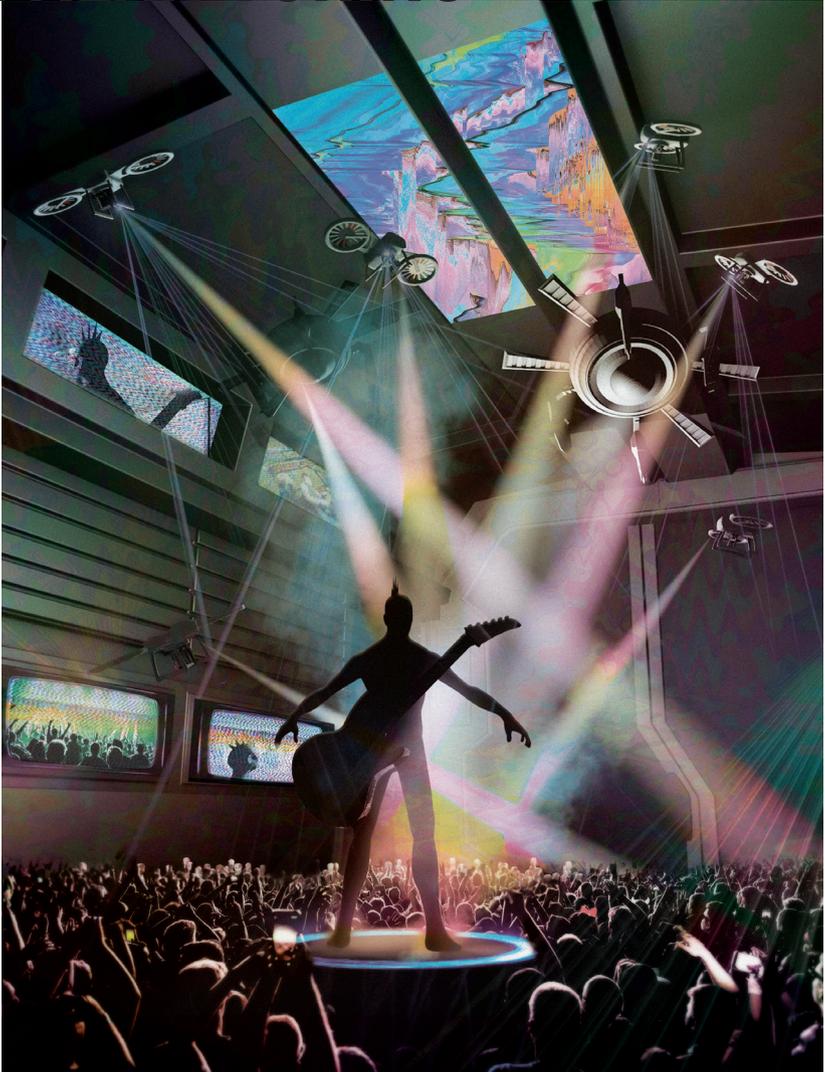
Maria is bored. As an entertainment lawyer, she has sat through some tedious negotiation meetings in her life, but this one takes the cake. It's only a few hours until she can escape to her absolute favourite past-time: attending an outdoor punk opera. Featuring AI punk band, The Last Eardrum, this sold-out show also includes a drone symphony designed by AI choreographer, Robot Wars. But the most exciting part? Debbie Harry will posthumously 'sing' a brand-new track, mashed up from her vast catalogue of songs. She will be accompanied by the PhilharSonic Orchestra, consisting of robot percussionists and humans on the strings. The track 'Maria' is playing softly in the background to get her in the mood. Maria wonders if there will be one million drone lights tonight... She traded one of her favourite digital art pieces for the concert ticket, so this had better be good!

But back to the task at hand. Maria's boss asked her to be physically present in this meeting as there's a lot of money at stake. 'Present', meaning she needs to show proof that she's locked out of the metaverse for that hour. 'Present' also by iris scan authentication, verifying that she is there (in the flesh) and it's not her digital twin. Yet, everyone else in the meeting is not human. On her screen, she is watching four legal bots argue about the artistic rights of her clients: the rock band AK40 Winks. She's finding it very boring because in her mind the case is cut and dried. Jon, Pol, Jorge and Ringoo are all established virtual entertainers who have decided to create this band for this two-album deal. Each bot is arguing for royalties for each of their clients, but Maria knows that the neural net that has written, composed and mixed this album is owned by the AK40 Winks brand. Therefore, all rights too. End of conversation.

As she listens to them drone on about legal precedents, the nano-sensor in her arm picks up that her heart rate and breathing are dropping (out of tedium, no doubt) so her personalised soundscape subtly accelerates in pace to lift Maria into action. Without noticing, she starts tapping her feet, then gets up and moves around the room, getting her blood circulation moving. Music mission accomplished.

A few hours later, when Maria has finally had enough, she tells the bots that AK40 Winks' proprietary neural network owns all the rights to these songs and

that the solo artists will only be compensated for their performances. Now she can finally click 'end' and get ready for a night out. From the window of her apartment, a mesmerising sight catches her eye. The learning centre across the road comes alive at night with randomly selected poetry, photography, theatre and science experiments transformed into exquisite ever-evolving artworks.

This reminds her to check in on her son, Seb. Tapping her AR glasses into his view, she can see him working on his latest AI choreography project. He has been briefed to turn movements and poses of every Swan Lake performance ever filmed into an AI sequence the Botshoi (robot) ballerinas can perform. It's their first rehearsal and the robots are quite comically struggling with the Black Swan movement.

POWER TO THE MACHINES

Imagine if you could collaborate with AI on almost anything? In 2020, OpenAI – the Elon Musk-founded AI research lab – announced that the newest version of its AI system could mimic human language. The largest neural network ever created, GPT-3, is trained on (almost) the entire Internet and has revolutionised the AI world. It has opened up a world of opportunities. The results were astounding. Soon it was writing blogs, poetry, songs, and scripts. It was musing about the meaning of life. It was generating pick-up lines, creating dating profiles, and building apps.

And it wasn't trained to do any of these things. GPT-3 learned how to learn. It is 100x bigger than its predecessor, with a whopping 175 billion parameters. When it comes out, GPT-4 will not just be more powerful, it might be capable of true reasoning and understanding. It will probably handle a much larger context. We'll be able to feed it with video, audio, books – you name it. Now can you imagine the possibilities of GPT-20? All we know is that it will stake its claim firmly in the world of art.

By 2050, the art we consume will be spectacularly personalised and co-created by talented AI musicians and artists. Humans will share artistic authorship and recognition with machines. AI will blur the very definition of art. Music will be much more than entertainment but a proven form of precision medicine. Generative music apps will pull your biological, situational, brainwave and mood data to create a custom-made, ever-adapting playlist just for you. Only, it won't be music as you know it, but all-new soundscapes. With the flutter of our eyelids or the warmth of our breath, the soundscapes

around us will adjust to keep us energised and comfortable. Songs won't be one-size-fits-all. Forward-thinking artists will realise that music can become a treatment and a 3D experience. Albums will be available as functional music – for example, to improve your memory, sharpen your focus or break bad habits. Paintings and sculptures will still be around, but artists will find the lure of the blockchain too irresistible not to dabble in digital art. Algorithms will be their new favourite pigment. Musicians will have hundreds of new sounds and instruments to play with – or simply use their bodies to create beats. You don't need to have a good voice or play an instrument to be a musician. You just need a vision. Lyrics and songs can be automatically generated from just a snippet of melody. AI will put together entire film scores, write soundtracks and set music to adverts.

Imagine how, in the world of marketing, you could tailor advertising soundtracks to a person's mood or location. Imagine being able to tweak your dinner party playlist as if you have hundreds of live bands right there in the room – jamming together. It's going to be such fun, we can't wait.

ARTIFICIAL CREATIVITY?

'Where computers complement the human creative process is that they create a type of beauty that is hard for humans to make on their own.' Spend some time on the Artbreeder and you'll see why its founder's words ring true. Inspired by evolution, artist Joel Simon's site uses a machine learning method known as a generative adversarial network (GAN) to manipulate portraits and landscapes. You can 'crossbreed' pictures of everything from animals and people to landscapes and objects to create uncanny and sometimes beautiful artworks.

As if by magic, your portraits can be adjusted through simple sliders to change age, race, emotions and much more. Before you dismiss this as just another fun face filter app, think again. This is the same tool that helped designer Daniel Voshart bring ancient Roman emperors back to life, transforming statues into photorealistic faces – and getting academics all excited about this new data.

GAN art is huge. Creations are not only visually stunning but earn their creators big bucks too. For instance, the artist collective Obvious fed an algorithm 15,000 images of portraits from different time periods. It then generated its own portraits (with some human intervention, of course), one of which sold for $432,500 at a Christie's auction. The algorithm is composed of two parts – a Generator that makes a new image based on the set, and a Discriminator which tries to spot the difference between a human and an AI-made image.

It's both forger and art detective. When the 'judge' is fooled, that's when the artists deem it a result, which was how the piece (*Portrait of Edmond Belamy*) was chosen.

This is an interesting notion, where the machine is both creator and critic. Another more impressive take on GAN is the 'creative' generative network built by the Art and Artificial Intelligence Lab at Rutgers University. AICAN is the first and only patented algorithm for making art using AI. It's trained on 100,000 of the greatest works in art history and it is specifically programmed to produce novelty – not emulate creativity like Obvious. From its data set of paintings from the 14th century, every creation is something completely different. The art is also largely abstract – as if it knows the direction of art's trajectory beyond the 20th century. AICAN's first NFT was released on Ethereum digital art market SuperRare in August 2021.

AICAN's most staggering achievement yet? Its 2017 collection was the first machine-generated work to pass the Turing test at Art Basel. When human subjects were shown AI works mixed up with works from abstract expressionist masters and contemporary artworks, they were not able to distinguish between works of the algorithm and those made by human artists. Now to put it in context, almost no machine has ever passed the 65-year-old test where a computer must communicate indistinguishably from a human. Not Sophia the robot or Suri – only chatbot Eugene Goostman.

CAN DATA BECOME A PIGMENT?

Expressing how machines think and feel (even dream and hallucinate) is another popular focus point for media artists like Refik Anadol. Imagine if you can put together every single available photographic memory of New York into one fluid artwork. Refik's team used a GAN algorithm to scour the Internet for publicly available photos of New York City, gathering a whopping 213 million images – the largest dataset ever created for an artwork. With the 'poetics of data', the result was a bewitching 30-minute-long Machine Hallucination movie that predicts (hallucinates) new images, allowing viewers to step inside a dreamlike vision of both an old and a future New York.

In another example, Refik collected all the performances ever delivered at the LA Philharmonic orchestra and the WCDH. Working with the Artists and Machine Intelligence programme at Google Arts and Culture, 77 terrabytes of digital memories dating back one hundred years were parsed and turned into data

points. These were then categorised by hundreds of attributes, reshuffled and then projected onto Frank Gehry's Walt Disney Concert Hall. If ever a building could dream, this was how it was brought to life between man and machine.

IBM's Watson was also 'inspired' by Antoni Gaudí to create a jaw-dropping installation for Mobile World Congress 2017. Watson was trained to detect patterns and trends as it was fed documents, song lyrics, and historical articles about the legendary architect. Using Watson's insights, the creatives at SOFTlab then created the sculpture's framework, which would also move in real-time with Watson's 'tone analyser' as it extracted the mood from tweets at the event.

Currently, humans are still very much in control of the creative process, training AI to collaborate in their artistic visions. Taking thousands of photos of tulips in bloom, UK artist Anna Ridler famously trained AI to generate videos of thousands of the flowers blooming, controlled by fluctuations in the price of bitcoin. Sougwen Chung has trained AI on her own drawing style, then co-creates with a robotic arm alongside her.

The exciting news about AI art is that it's becoming so accessible. AICAN has built Playform to make AI available to all artists – no coding experience required. Google's DeepDream lets artists create trippy algorithmic paintings through a process called inceptionism. There is also Google's more pedestrian Arts & Culture app that lets you transform photos into the style of Vermeer, Kahlo, or Van Gogh. Not forgetting the exciting potential of Dall-E – the latest release by Elon Musk-backed OpenAI. This neural network is trained to create images from text captions for a wide range of concepts. For now, you can command it to make silly things like a carrot-shaped penguin or an axolotl hugging a turnip, but one can easily imagine a scenario where you can give it much more complicated written instructions. Even a whole animated storyline?

If you scroll down the list of founding members of AIArtists.org – a global clearinghouse and the largest community of AI artists in the world – you'll see that it's largely dominated by visual artists. According to artist and sceptic Mario Klingemann, it's perhaps because our eyes are much more forgiving than our ears. This is exactly the reason why OpenAI decided to tackle music for its Jukebox AI model – 'because it's hard'. Its first attempt does a pretty good job in generating genre-specific music in the style of specific artists. Want to hear Céline Dion sing *No Diggity*? Can be done. Billie Eilish singing reggae? Sure. Want Elvis to sing your own composition? That's also possible. Give it

just twelve seconds of *Seven Nation Army* and the result is not wonderful, but quite surprising. Especially if you consider that it matches music and voice and suggests snippets of lyrics. It just goes to show that all you need is a good riff. No look into AI art would be complete without a mention of deepfakes. Vocal Synthesis, a YouTube channel dedicated to audio deepfakes, has brought up an interesting debate in terms of usage rights. It uses AI-generated speech to mimic human voices, synthesised from text by training a state-of-the-art neural network on a huge amount of audio samples. Some of the videos are silly and fun, like Bill Clinton reciting *Baby Got Back*. Others, like Jay-Z rapping Eminem's *Lose Yourself*, was so realistic that his label Roc Nation filed a takedown order, claiming that the content 'unlawfully uses AI to impersonate the client's voice'. The claim was dismissed – maybe because AI impersonation can be seen as innocuous as human impersonation. Or perhaps since Google itself successfully argued in the case of 'Authors Guild v. Google' that machine learning models trained on copyrighted material should be protected under fair use.

Is AI music mainstream yet? Depends on your definition, but absolutely. In its simplest form, Spotify uses AI daily to sift through thousands of newly loaded tracks to suggest the most popular ones (probably not based on the fairest data sets). Tech companies are putting big investments behind AI composing and music creation. Sony has created Flow Machines, an AI system that has released the songs *Daddy's Car* and *Mr Shadow* plus a whole album – *Hello World* by the music collaborative Skygge. Google's Magenta project, an open-source platform, has helped produce songs like the first-ever pop album by Taryn Southern. The YouTuber also used tools from the IBM Watson suite, Amper, Aiva and many more.

Aiva is mostly known for classical music composition but has recently branched out into rock with the song *On the Edge*. By learning and interpreting music from Bach, Mozart, and Beethoven, Aiva creates soundtracks for game studios, film directors and ad agencies. The AI virtual artist has released an album called *Genesis* and is the first AI ever to officially acquire the worldwide status of 'Composer'. It now owns copyright under its own name, registered under the France and Luxembourg authors' right society (SACEM). In another first, tech startup Auxuman released an album created entirely by artificial intelligence. 'Vol.1' is the work of five artificial intelligence 'artists': Yona, Hexe, Mony, Gemini and Zoya.

POWER TO THE MACHINES (AND THE PEOPLE)

As with AI art, there are many options for the amateur musician, from Popgun to Amper (owned by Shutterstock) to Jukedeck (owned by TikTok). The openness of these programmes gives untrained musicians the opportunity to express themselves with sounds and beats our ears can't begin to comprehend. It's not just music producers and DJs who are using machine learning to mix new sounds. Just as Instagram levelled the playing field of photography, so too will AI democratise music production and distribution.

Soon, everyone will have the modern-day version of the Madwaves MadPlayer at their disposal. Released over 20 years ago, the MadPlayer was a pioneer in making AI-assisted composing mainstream. With a bank of over 600 instruments and sounds, MadPlayer's unique Generative Music Algorithms (GMA) helps you mix endless tunes in any genre – from techno and ballads to R&B and house.

The use of algorithms to create music is nothing new. In the 1950s, computer programmes were used to generate piano sheet music and in 1958 Iannis Xenakis famously wrote the first algorithmic piece ever (using Markov chains). Generative music is well-trodden ground. Brian Eno's Bloom app is over 10 years old – the original '21st-century music box' that can create an infinite selection of compositions and visualisations to match. French composer Jean-Michel Jarre's Eon app also produces a constantly evolving suite of music. Where it's different is that each time you play the album, it generates something special for you.

It varies for every individual – truly personalised music just like Björk's AI-powered composition, *Kórsafn*. This lobby score created for the Sister Hotel in New York uses Microsoft AI and a rooftop camera to record and translate sky activity (planes, clouds, birds) into data. From this data, the AI programme creates a unique symphony with snippets of Björk's choral archives and recordings by the Hamrahlid Choir of Iceland. As the seasons change, as the sun rises and sets, as birds flock to the city in springtime, the AI learns about new and different weather events, and adapts these influences in the music.

MUSIC THAT HEALS

Music that follows the nuances of the weather or the movement of birds – what's more beautiful than that? Personalised audio has heaps of exciting potential – something that Samsung will bring to market soon with its Generative Soundscape. This is no ordinary sound system – it will analyse your home environment and use AI to create real-time ambient sound for work,

rest or sleep. Music for wellbeing is going to be huge over the next few years. A Samsung UK survey discovered that, compared to 2019, roughly a quarter of millennials are now listening to over five hours of music a day and more than 50% of participants cite music as their number one 'feel-good' source. First there were meditation apps; soon big-name stars will sing adult lullabies or create anti-anxiety albums. Grimes (aka Claire Boucher) has already collaborated with Endel – one of the pioneers in generative sound technologies.

By capturing biometric and situational data, Endel creates an ever-changing sound environment to energise or relax your brain and body. Endel doesn't call their soundscapes music; they see it more as an ambient 'sound blanket, almost like adding another biological function as unconscious as breathing'. When you think of music as something therapeutic, it's not that hard to imagine soundscapes for calming you down, lifting your mood, or curbing your appetite. Even the way we listen to music is changing, with apps like Audible Reality promising stunning immersive audio through AI-driven, 3D audio enhancement.

We haven't touched on vocals yet. With Yamaha's Voicaloid, you can create songs just by inputting lyrics and a melody. From its many Voice Banks, you can cherry-pick a voice to match your style – recordings of actual human voices, for example 'Amy: Female English' or 'Ken: Japanese Male'. By using deep learning to analyse singing traits such as tone and expression within singing recordings, Vocaloid can also synthesise singing with any melodies and lyrics, matching unique mannerisms and nuances.

Hatsune Miku is one of these singing voice synthesisers featured in over 100,000 songs. Her name means 'the first sound from the future' and if you consider her meteoritic fame, it certainly is a taste of things to come. She has over two million followers on Facebook, has opened for Lady Gaga and performed from LA to Europe. Since she was released in 2007, her fandom has exploded. Her image is licensed out for all sorts of merchandise, games and products, and she is by far the biggest J-pop star of all time.

Back in 'real' life, Yamaha also used Vocaloid to reproduce the singing of the late singer Hibari Misora for a brand-new song, released in honour of the 30th anniversary of her passing. Actual recordings of the artist's songs and speech made while she was still alive were used as machine learning data to reproduce her singing.

PROBABILITY

SCIENCE

INNOVATION · DISRUPTION · VISION · FICTION

You might as well get the popcorn – AI art and music are here to stay. On the music front, it's a buddy to jam with, a powerful composing tool, and an endless source of inspiration. It doesn't have any taste, but it learns fast. With GPT-3, we already have the lyrics sorted. They may be a bit formulaic now, but imagine the creativity by the time GPT-20 comes out. With Vocaloid, synthesised singing is here, and very soon, probably virtual choirs and bands singing beautifully together. And of course, the actual instrumentals and music mixing will be enhanced further and further until they can create symphonies and scores on their own.

With art, perhaps things are a bit more subjective. Is AI art really art? Who is the artist here? Who deserves the ownership? The definition of authorship will start many debates. If the artist is the one that creates the image, then that would be the machine. If the artist is the one with the artistic vision, it's the humans. Right now, humans are driving the artistic vision but that may well change fast. For Refik Anadol, data is his material and machine intelligence is his artistic collaborator. Together, man and machine will do magnificent things.

Ahmed Elgammal, the developer of AICAN, compares AI art to photography – an art form that was initially dismissed by tastemakers. When photography was first invented in the early 19th century, it wasn't considered art. After all, a machine was doing much of the work. Critics eventually relented. A century later, photography became an established fine art genre. Perhaps art produced by artificial intelligence will go down the same path.

The argument used over and over about whether robots will take our jobs is that they are simply not creative. Still worried that painting will be 'dead', as the French painter Paul Delaroche pessimistically declared in 1840? We'll let artist Mario Klingemann have the last word. 'In the end, competition always forces us to get better. To see what makes us as humans still special.'