MUSIC’S SMART FUTURE

HOW WILL AI IMPACT THE MUSIC INDUSTRY?
Artificial intelligence (AI) technology may conjure up visions of robots or sci-fi film Blade Runner, but in 2016 it has huge potential for the music industry. We are entering an era where humans – from artists and songwriters through to A&Rs and digital marketers in labels – will be complemented by AI in various forms, from algorithmic composition tools to hyper-personalised playlists and messaging chatbots. This report explores the key trends and why they matter for labels.
For most of us, the notion of Artificial Intelligence may conjure up visions of replicants from Ridley Scott’s dazzling sci-fi thriller Blade Runner, or the more recent humanoid offerings in Ex-Machina or C4’s Humans. Yet AI is no longer the province of science fiction.

In many areas of life, computers are now taking decisions or undertaking tasks (such as medical diagnosis or driving cars) that we previously assumed required human judgement and intelligence. The technology has the potential to revolutionise the way we live and to shape the nature of our society. It also raises profound questions about the very essence of consciousness, our identity as humans, morality, and, yes, the Meaning of Life itself.

Thankfully those broader questions are beyond the scope of this report, but we feel it is time for us to reflect on the impact that AI technology may have on the music industry – and on music itself.

Recorded music is a sector whose DNA is closely entwined with technology, having been born from the invention more than a hundred years ago of the phonograph. Music companies have
learned that while new technology throws up regular challenges to patterns of doing business, embracing new inventions to offer fans new and better ways to enjoy music is the long-term path to success. That’s why the BPI has been running regular Insight Sessions on emerging technologies that will affect the music ecosystem, from Blockchain systems, to Virtual and Augmented Reality, to Artificial Intelligence.

As a creative technology business, change is our stasis. Recorded music is in the middle of its latest transition right now: for many consumers downloads replaced the CD, but streaming is now moving towards becoming the dominant paradigm in the music industry, last year accounting for nearly a quarter of UK music consumption – and that excludes all the video streams on sites like YouTube. Streaming is clearly providing fertile ground for the application of Artificial Intelligence to music.

The first area in which this is obvious is the growing importance of playlists and music discovery or recommendation features. We are entering an era of hyper-personalisation, in which consumers expect services tailored to their own tastes and preferences. Early debate among music commentators pitched the merits of human curation against the power of algorithms, but this binary view missed the point that, here as elsewhere, humans can use the power of big data to better understand human behaviours and provide a more individualised experience.

“Spotify, Apple Music and Deezer all use AI to analyse users’ behaviour and to analyse the relationship between songs so as to mix in new relevant tracks among a user’s favourites. And a new strain of AI technology is rapidly emerging that can take much greater account of contextual data: Google Play now mixes signals like location, activity, and the weather with machine learning about a user’s music listening, to try to provide the right song at the right time.

The human-computer interface is also developing quickly, with AI powering a new generation of “smart assistants”, such as Apple’s Siri and Amazon’s Alexa, which understand human commands and make it easier and more intuitive for consumers to access music online. These assistants are likely to evolve into our de facto musical concierges around the home and in the car (which of course they will be driving too).

Labels and artists are also embracing AI to engage fanbases. Bastille and their label Virgin EMI used a Facebook Messenger chatbot in a brilliant campaign to promote the release of their new album Wild World, while Robbie Williams and Olly Murs have created their own chatbots to engage fans. And label A&R and marketing teams are using “big data” analytics to predict consumer reactions and shape campaigns.

At the BPI we believe that gut instinct, passion for the music and human experience remain fundamental qualities in A&R and marketing, but as a sector we should not ignore new tools that allow us to reach fans in innovative new ways or which enable us to better understand complexity.
Finally, what does Artificial Intelligence mean for the most important aspect of all, the creation of music and for musicians? Academic researchers have been using AI for some years to create generative music but now major tech companies, such as Google and Baidu, have created programmes to create music using algorithms.

We are seeing the beginnings of AI-composed music being used commercially, for example as background music in games and apps, such as by the UK startup Jukedeck.

Some may fear that this will mean the sheet music is on the wall for human composers, and that we will all be consigned to a dystopian future surrounded by soulless muzak. But we believe that while there may, in the short to medium term at least, be some impact in low value background music applications, the insurgent technology is likely to be embraced by musicians and used creatively.

There are already early signs of this, with Brian Eno using AI to create video for his song The Ship, and 65daysofstatic utilising AI to produce textures for games for original fragments they created. There is a long way to go, however, before AI can create music as meaningful for humans as that arising from the random serendipity of the meeting of Lennon and McCartney, or the revolutionary spark of genius in classical composition that Mozart brought to the world.

For the longer term, AI raises fascinating questions. Can music created by AI inspire human emotions, engage the soul as human music does? If AI machines pass the...

“Can music created by AI inspire human emotions, engage the soul as human music does?”

Ray Kurzweil at Google predicts that this singularity will occur by 2045. Even if he is right, we believe that fears of AI taking over all music creation and fan engagement and rendering human input obsolete – music’s equivalent of Skynet in The Terminator, if you like – are pure science fantasy.

Music is a fundamental expression of humanity, and humans will always want to use it to communicate their ideas and to connect to one another. AI is the latest in a stream of new technologies that the music business can use to enhance the connection between artist and fans. It’s time to embrace music’s smart future.”
When artificial intelligence technology attracts media coverage, there is often an implied – or, indeed, an explicit – threat to humans, from speculation about how AI will cannibalise human jobs through to the kind of existential challenges that were once solely the domain of science-fiction writers.

There is no prospect of AI bots literally killing off musicians, thankfully, but any discussion about artificial intelligence technology’s potential role inevitably spawns the ‘will this put musicians out of work?’ question.

The answer? In some cases, possibly: for example, background music for games, online videos and real-world locations. But in other cases, AI may become a useful, creative tool for musicians to work with, rather than compete against.

The AI / music crossover isn’t a new trend, though. University of California Santa Cruz professor David Cope has been experimenting with ‘algorithmic composition’ since 1981, for example.
“It seemed even in my early teenage years perfectly logical to do creative things with algorithms rather than spend all the time writing out each note or paint this or write out this short story,” he explained in 2015.

Cope has argued that the goal isn’t to replace human composers, but rather to help them experiment with new ideas more quickly. “With algorithms we can experiment in those ways to produce that piece in 15 minutes and we can know immediately whether it’s going to work or not…”

**Research turns commercial**

There have been a number of research projects in this area besides Cope’s. A student at his university called Daniel Brown created an AI system called Mezzo in 2012, for example, which composes game soundtracks in real-time, adapting to what the characters in the game are doing at the time, using “theories of musical expression and semiotics in Classical and Romantic music” as its starting point.

Meanwhile, researchers at the University of Malaga have created two separate music-focused AIs: Melomics109, and Iamus. Both started with simple compositions, and have gradually improved with the complexity of the works they can produce.

“We have taught a computer to write musical scores. Now we can produce modern classical music at the touch of a button,” explained Gustavo Diaz-Jerez about Iamus in 2013. The research spawned a company, Melomics Media, to commercialise this new catalogue.

**British AI music startups**

In 2015 and 2016, there has been a flurry of activity around AI music-making, against a backdrop of a surge of research and investment in AI technology more generally. Startups exploring the area include UK-based firms Jukedeck and Melodrive.

Jukedeck’s service is aimed at independent video makers, who choose a mood, style, tempo and length, then have a track created by the AI system to match. Users can get five songs a month for free before paying $7 per track, although they’ll have to pay $150 if they want to own its copyright. The company has raised $2.6m of funding so far.

“Music production is limited to a small subset of people. But we’re giving everyone in the world their own composer,” explains its pitch.

Melodrive focuses on games developers rather than video producers. “By using artificial intelligence techniques, Melodrive allows game development companies to create custom soundtracks in seconds, reducing their music costs by up to 90%,” claims the company. Developers can create an entire score at once, or fine-tune the results, while genres include ‘fantasy’ and ‘8-bit’.

This is one area where music rightsholders might see Jukedeck and Melodrive’s AI composers as competition: not for the most lucrative sync deals in the TV, film and games worlds, but rather in the longer-tail projects where budgets are tight.
Another new AI/music project in 2016 is LnH, with its “artificial intelligence-based musical band” that takes requests on Twitter. Anyone tweeting the LnH bot can write a title, a genre – heavy metal, blues or jazz – a tempo and a randomness value (to dictate how experimental the results should be) and get tweeted back a 1-2 minute instrumental track composed by the software.

Some of the largest technology companies also have teams working on the intersection between music and AI. For example, in 2014 Google bought British AI startup DeepMind for £400m.

This year, the DeepMind team revealed a new project called WaveNet, creating “a deep generative model of raw audio waveforms… able to generate speech which mimics any human voice”.

The same technology has been used by DeepMind to synthesise other audio signals, like music. WaveNet’s ‘neural network’ takes in audio and can then push it out in new forms: the team trained it on a dataset of classical piano music, and it created some new piano pieces as a result.

Elsewhere within Google, a project called Magenta is aiming to use machine learning to create “compelling art and music”. It was unveiled in June 2016.

“Machine learning has already been used extensively to understand content, as in speech recognition or translation. With Magenta, we want to explore the other side – developing algorithms that can learn how to generate art and music, potentially creating compelling and artistic content on their own,” explained Google’s Douglas Eck.

Google also sees this as a tool for (human) music creation: “Daguerre and later Eastman didn’t imagine what Annie Liebovitz or Richard Avedon would accomplish in photography. Surely Rickenbacker and Gibson didn’t have Jimi Hendrix or St. Vincent in mind,” said Eck.
Big-tech experiments

Elsewhere, Chinese tech firm Baidu has created a technology called Baidu AI Composer, using image-recognition software and neural networking technology to take in an image, and turn it into a song.

“The company trained its AI to identify an image’s objects, colours, and setting, as each corresponds to certain emotions. Baidu then connected the composer to a database of musical compositions that are divided up into musical units and itemised by their mood. The system then reinterprets the elements of the image as a series of notes,” explained tech-news site Digital Trends in July 2016.

Sony CSL Research Laboratory in Paris has also been experimenting with AI music composition, in a project called Flow Machines.

“Our Flow Machines software learns music styles from a huge database of songs. Then, exploiting unique combinations of style transfer, optimisation and interaction techniques, it can compose in any style,” it claimed in September 2016.

A human composer is still required to arrange and produce the music, as well as write lyrics. Sony hopes to release an AI pop album in 2017.

“IBM’s Watson supercomputer is also being used for a new music-composition app – Watson Beat – using AI technology. “You can play a few notes on an instrument and it will use it as inspiration to DJ a new song. You can even tell it what type of song you want Watson to produce, like something jazzy or more uplifting,” explained Business Insider. The app needs about 20 seconds of musical inspiration to create a song, and will be made available by the end of 2016.

AI reinvents the video star

AI and music are also intersecting around music videos. In 2016, creative agency Dentsu Lab Tokyo used AI technology to create a video for Brian Eno’s song ‘The Ship’.

According to ad-industry publication The Drum the agency “created a bespoke artificial intelligence that uses news stories and photographs to create a collective memory of humankind. It uses machine learning to create a ‘generative’ film that interprets its own ‘memories’ by associating them with current events”.

Another example: agency Saatchi and Saatchi commissioned an AI video for a French electropop song called ‘Eclipse’ – the computer was given the track, and came up with a script.
and a treatment, before drones filmed the footage and an AI-software editor cut the footage.

In September 2016, Accenture Strategy unveiled a project called Symphonologie, which used AI to help create a symphony to be played by a full (human) orchestra.

“First, algorithms were used to analyse the sentiment surrounding current business topics – such as cybersecurity and Internet of Things – and translate it into melodic patterns,” explained Accenture.

“The patterns then served as inspiration for a three-movement symphony scored by an orchestral composer and a digital art piece that expresses the sentiment through a data visualisation that will be generated in real time.”

Algorithms may be composing music, but there is no reason why humans can’t play it. In October 2016, the Vortex Jazz Club in London hosted a performance of “medieval chants, baroque chorales, and jazz and pop” composed using AI technology. A reminder that human interpretation of AI-composed music can still be an important piece in the performance aspect.

“Instead of thinking of it as computer-generated music, I tend to think more along the lines of ‘computer assisted,’ since whoever writes the code or whichever user sets the parameters is already going to be making many of the decisions about what the result might be like,” is how jazz guitarist Pat Metheny put it in 2016.

Metheny’s view is backed up by Eduardo Miranda, one of the leading researchers in the AI/music field.

“I prefer to think of AI as a means to harness humanity rather than annihilate it. For instance, I am interested in developing AI systems that help me to be creative. I am not interested in AI systems that compose entire pieces of music automatically,” he said in an interview for Landr’s blog in August 2016.

“I find pieces of music that are entirely generated by a computer rather unappealing. Instead I am interested in AI systems that will help me to create music that I would not have created otherwise. I often consider computer-generated
music as seeds, or raw materials, for my compositions.”

These are hugely important points for labels, musicians and the music industry more generally to bear in mind. For most of its history, the main question for the discipline of AI music has been ‘Is it possible for artificial intelligence to compose music?’ rather than ‘Can artificial intelligence compose better music than humans?’

Researchers mainly in the academic sphere have proved that the answer to the first question is yes, but the second question has not been on their agenda. In 2016, an algorithm is not going to out-sing Adele, out-strum Ed Sheeran, win an Ivor Novello or write lyrics that give Bob Dylan a run for his Nobel Literature Prize money.

**Good enough for your ears?**

As this technology commercialises and develops further, however, it will be important to reassess our definition of “better” in the comparison between music created by humans and by AI, particularly as it relates to non-consumer usage of that music.

“Good enough” may be a more important phrase than “better” in this regard. If AI composers prove to be cheaper than their human equivalents, and their output good enough to use as background music for online videos; for games and apps; for corporate videos and for some public spaces – to name but four uses – then AI composition may carve out a role for itself that will in some cases compete with the existing music industry and its creators.

There may be a greater opportunity for collaboration between the AI and the humans. In gaming, for example, with soundtracks that adapt to the on-screen action in real-time. For recent console game No Man’s Sky (pictured above) British band 65daysofstatic recorded a library of loops, melodies and audio ‘textures’.

“The audio system will randomly create music to accompany the gameplay, reacting to the changeable terrain and becoming more or less menacing depending on whether a character is in danger,” explained the Guardian, of the ‘generative music’ system used in the game.

For labels, there will be opportunities here – 65daysofstatic’s fragments also became a physically and digitally-released soundtrack album – while for artists and songwriters this is a reminder that human creativity and composition may still be a crucial element in the most successful deployments of AI music technology.
Can algorithms drive A&R?

We’ve discussed the role artificial intelligence and algorithms can play in music-making, but what about in the way human musicians are spotted and developed? A&R has always been an art rather than a science for labels, but here too there have been attempts to marry human gut-feeling with algorithmic inventiveness.

Industry veteran Lyor Cohen’s 300 Entertainment was described in 2014 as an attempt “to mine Twitter for music’s next big thing”, tapping into the social network’s ‘firehose’ of data to identify freshly-breaking artists. Cohen has since moved to YouTube, where he’ll have access to an even bigger collection of data.

One British company called Instrumental is already looking for musical needles in that particular haystack. The firm built software to scrape YouTube’s API for people uploading their own music, gathering a database of tens of thousands of artists and then analysing the data to understand whose audience and engagement is growing fast enough to make them worth a closer look.

Instrumental then signs them on development deals (three of its artists are pictured below). Warner Music was interested enough in the company’s model to invest in Instrumental.

“If we see the subscriber growth and engagement, it’s a great indicator of their potential,” CEO Conrad Withey said at The Great Escape conference in May. “It’s auto-A&R. Most music people will say ‘that’s just wrong’, but for us it’s a great indicator of future success.”

One of the people unsure about the concept is Simon Wheeler, digital head of independent label Beggars Group.

“A company like Beggars has a role in trying to find those artists that are unique and special, and maybe a little bit alien to people the first time they hear them, but which have the potential to reach a much larger audience,” said Wheeler at Midem in June.

“We have the role of finding things that people don’t know they’re going to like… and data is not very good at doing that stuff. That’s why people who are great A&Rs can see down the line about what this artist is going to turn into. I’ve never seen any data that can do that.”

However, Wheeler went on to stress that once an artist has been spotted, signed and developed, data can be crucial in helping them to find the audience that will love their music.

As with many other aspects of AI and big data, the potential is not about the technology replacing humans, but rather enhancing them, encouraging them to take risks and then helping them to understand the effects, rather than dictating their decisions.
The ‘humans vs machines’ arguments certainly aren’t confined to AI music-making. The debate about whether an algorithm can recommend music as well as a human has been rumbling since the days of Last.fm, but it has stepped up a notch in 2016 thanks to the growing importance of algorithmic curation on Spotify and Apple Music.

The binary nature of these arguments is false, even when they are being put forward by the most prominent companies in the ecosystem. Witness the launch messaging around Apple Music in 2015, for example, when Apple’s Jimmy Iovine placed a firm emphasis on his company’s team of human playlist curators, in opposition to the algorithms of rivals.

All too often in recent years, discussion of different recommendation systems within digital music services have boiled down to a false polarisation: human or machine. People versus algorithms.

In truth, the future for streaming music recommendations is neither human nor machine: it is about inventive...
combinations of the two: human intelligence and ‘gut’ feeling allied with powerful machine-learning systems drawing on massive quantities of data about songs and their listeners.

That may be algorithms creating playlists based on the consumption data of tens of millions of humans, or it may be clever code to match listeners with (human) curators for playlist recommendations. Apple Music now needs its machines as much as Spotify needs its human curators, in other words. The same is true of all their rivals.

**Humans meet machines**

“Yes, we use computer programs to help manage the mountains of music data, but so does everyone, and the way we get and use that data is just as human as anything else out there,” wrote Brian Whitman of The Echo Nest three years ago, before his company was bought by Spotify, which has since made it the core of its move into smarter recommendations and personalised playlists.

The Echo Nest was a pioneer in figuring out how to take approaches like collaborative filtering (‘You like X and Y, and people who also like X and Y also liked Z, so try that’) and content-based methods (where analysis of music suggests that artist X is similar to artist Y) and apply them at scale to streaming services, including combining the two systems to innovative effect.

One notable trend in 2015 and 2016 has been a shift towards personalised, algorithmically curated and updated playlists, led by Spotify’s launch of its Discover Weekly playlist in July 2015.

Every Monday, each of its 100 million-plus listeners gets a refreshed two-hour playlist of “deep cuts and new discoveries” based on their habits and tastes.

“We wanted to make something that felt like your best friend making you a mixtape, labelled ‘music you should check out’, every single week,” Spotify’s Matt Ogle told Music Ally as the feature launched. He went on to explain how Spotify’s 2bn-strong database of user playlists influenced the algorithm.
“Each one, especially when combined with other activity on Spotify, captures someone’s deliberate curatorial intent, and teaches us a ton about the relationships between songs,” said Ogle.

“So we take that universe of music, then look at what you’ve been listening to, giving more prominence to your more recent spins. By combining those two things, we can find the missing songs.”

**Spotify’s success**

By May 2016, more than 40 million listeners had streamed 5bn tracks from their Discover Weekly playlists, and its popularity has spurred further development from Spotify.

In August 2016, the service launched Release Radar, another personalised playlist for every user, updated every Friday with new releases from artists they have listened to. Then, in September, Spotify launched its Daily Mix feature, which provides every listener with 4-6 playlists based on their clusters of music interest.

“It’s a feature that essentially flips Discover Weekly on its head. What if, instead of being hyper-personalised in terms of stuff you haven’t heard, we could create a series of listening experiences for you, hyper-personalised based on the stuff we know you love, and then mix a bit of discovery in?” Ogle told Music Ally.

“We are pulling in pools of songs in each of the areas of your taste that we know you love, and then sprinkling in new stuff. We’re experimenting a little bit with sequencing in the way a radio DJ might. Let’s follow something we know you love with something from an artist you haven’t heard, followed by something from an artist you do know, but a song you haven’t heard…”

These algorithms are thus becoming even more ‘humanlike’ in their approach. Where Spotify has led, its rivals have followed: for example, the recently-revamped Apple Music now has a playlist called My New Music Mix, updated regularly with new tracks that each listener may like. Deezer, meanwhile, has its ‘Flow’ mix which is more akin to Spotify’s Daily Mix with its mixture of familiar tracks and new songs.
Google gets contextual

In November, Google redesigned its Google Play Music streaming service with a stronger emphasis on machine learning and contextual recommendations. Data including location, activity and even the weather will be used alongside each listener’s tastes to suggest music for them to stream.

“The Google take on music products should be as easy as radio: one button and you press it and it works. But because we’re not in a broadcast medium, it should be tailored to you with the content you like and the context you’re in,” Google’s Elias Roman told Music Ally ahead of the redesign’s launch.

“We’ve overhauled Google Play Music and brought in the full range of Google’s capabilities, including machine learning and contextual understanding. Is this when you usually run, bike or drive? Are you at home, work, the library or in the park? Are you in an airport needing some music to de-stress travellers?”

Roman said that Google sees this technology as an important marriage of machine-learning and humans, rather than the former displacing the latter in Google Play Music’s priorities.

“Should it be algorithms or should it be people is the wrong question,” said Roman. “It’s an amazing marriage of algorithms on one hand and expert human curation on the other.”

Label implications

What does this mean for labels? It’s important to think about personalised playlists and algorithmic discovery in the context of another current trend: the growing clout of the human-curated playlists on services like Spotify and Apple Music.

There, the relationship between labels and streaming services is not dissimilar to the traditional plugging process with radio stations, where labels seek to get their new tracks prominent placement in the streaming services’ genre-based new-music playlists. Spotify’s Today’s Top Hits playlist has 11.6 million followers, for example.

Playlists like Discover Weekly and My New Music Mix, on the other hand, are driven not by human plugging relationships, but by big (and usually mysterious) data. In theory, these playlists represent a purer path to help songs reach the listeners most likely to enjoy them.

Spotify’s Ogle has described the way his company’s human and algorithmic playlist initiatives drive and overlap one another, starting with its Fresh Finds playlists, which are curated by humans working with data from music blogs,
as well as users identified as tastemakers.

“Quite often, getting featured in Fresh Finds helps an artist go from 500 listeners to 50,000 listeners. And if they’re making something good, people will save that track to their own playlists,” said Ogle.

“Meanwhile, Discover Weekly is powered by the curatorial actions of all our users adding things to their own playlists. So Discover Weekly is then the thing that takes those artists from that 50,000 level and tries to reach more fans. Fresh Finds accidentally but really serendipitously plugs in to Discover Weekly, which plugs in to this broader audience.”

Release Radar and Daily Mix now slot in to that ecosystem too: a structure that is based on the algorithms rather than on the size of a band’s marketing / plugging budget, or the personal relationships between their label and the distributor (Spotify, in this case).

It’s always foolish to describe algorithms as “neutral” – their biases just manifest in different ways to those of humans – but labels can and should be keeping close tabs on the analytics provided by streaming services, to understand how significant personalised playlists are in driving not just consumption, but in creating fans who will support artists in other ways.

**Algorithmic DJs on the dancefloor**

Another branch of machine-led recommendations that is interesting is DJ apps, and two in particular: Pacemaker and Serato Pyro, which have both gone beyond their genre’s initial focus on putting traditional DJ decks on to touchscreen devices. Both apps can do that, but they are even more interesting when considered as AI helpers.

Pacemaker even has a name for its system: Mållgan, which is a reference to the imaginary friend of the hero of Swedish children’s book Alfie and His Secret Friend. Mållgan suggests songs that will mix together well, and then does the beat-matched mixing – although its human owner can step in and tweak it.

Serato Pyro also has a smart-recommendations aspect, mixing tracks automatically and suggesting songs that it thinks will go well with the current mix – which the user can swipe left or right to accept or reject, Tinder-style.

Neither Pacemaker nor Serato Pyro is going to replace a professional DJ, and they are not intended to. But in situations where semi-professional DJs might play a set – a soundtrack in a bar for example – as well as for individual listening, the notion of an AI DJ is certainly not ridiculous.

It is worth noting that algorithmic music scheduling is far from a new technology in some fields. RCS developed its Selector music...
scheduling software for radio stations nearly 30 years ago, and it’s been used since by stations around the world to build their schedules, including whatever rotation rules they are applying to their playlists. Pacemaker’s Mållgan and Serato’s Pyro app are in some respects applications of this kind of technology to music fans’ listening rather than radio scheduling.

Paul Bennun, formerly of creative agency and radio production firm Somethin’ Else, described one possible evolution of this technology in an opinion column recently.

“Imagine a pop-up audio service programmed by bots that ensures everyone in an ephemeral social group (e.g. ‘trip to the pub’ or ‘Claire’s Hen Night’) can share a hilarious ‘radio show’ in their respective Ubers, where a personality-rich robot slags off their selfies and makes rude comments about Claire’s ex... Your politics and cultural preferences are just another pattern to be interpreted,” he wrote.

Bennun may not sound impressed by the prospect, but his piece raised an important point: the next step for music recommendations may be systems capable of ingesting even more non-musical data: people’s social graphs, their location and context, and their other interests.

They will then blend that data with the listener’s music profile to provide standalone recommendations; a regularly-updated playlist; or a ‘perfect for now’ personalised radio station.
Facebook Messenger, WhatsApp, WeChat, Line and their rivals are more than just messaging apps: they’re platforms. Platforms with hundreds of millions of users that have (in most cases) opened up to other developers to build on. And in 2016, some of the things those developers are building are chatbots.

Once again, this isn’t a new technology. The first chatbots were developed in the 1960s and 1970s by researchers, starting a line of digital ‘agents’ that has continued through to the present day in the academic and commercial fields.

At its simplest level, a chatbot is a computer program that you interact with by ‘chatting’ – traditionally by typing, although in the future voice interactions are likely to become prominent too.

The first music-focused chatbot of note was developed in 2001 for Radiohead and Capitol Records. It was called GooglyMinotaur and it lived on AOL’s Instant Messenger (AIM) desktop application. Fans could add it to their buddy lists and then ping it questions about the band and their album of the time, Amnesiac. It talked to more than one million fans by the time it was retired in 2002.
Facebook brings bots back

While past chatbots have been interacted with on computers, the wave of bots being developed in 2016 is mainly about messaging apps. Facebook opened up its Messenger platform to third-party chatbots earlier in the year, with more than 30,000 already available on the service.

Kik, which has a fervent audience of teenage messagers, has its own chatbots platform and ‘Bot Shop’ to help users discover them. From business services Slack and Skype to Chinese messaging giant WeChat, chatbots are proliferating at speed, even if the majority of music-focused activity is taking place on Facebook Messenger for now.

Labels and artist managers have been involved in several examples, and are quickly realising that chatbots can and should be about more than simply blasting marketing messages at fans. Dance artist Hardwell’s bot, for example, encourages fans to interact: voting for his Track Of The Week and submitting shout-outs to his radio show. In its first two weeks, 60,000 fans chatted to the bot, generating more than 1m interactions according to developer We Make Awesome Sh.

That company has been expanding its technology into something called The Bot Platform – “The CMS [content management system] for bots” – which is currently in private beta. It helps clients create and run their own chatbots using starter templates, starting at £5k. Besides Hardwell, the platform has been used by Sony Music to launch chatbots for Olly Murs.

The former’s “Ollybot” – as label RCA Records is calling it – was launched as an attempt to re-engage Murs’ fanbase, who can ask it questions to access music, playlists, ticket links and exclusive content. The bot's responses were built partly based on fans’ questions from past Q&As with Murs online, with the team behind it regularly adding more answers in response to questions that stump the bot, as well as other trends and topical issues.

The chatbot is also able to group fans by their location, messaging (for example) fans in one part of the world about upcoming gigs there.
without bothering fans on other continents who couldn’t possibly attend.

**Bastille get evil**

Another label and artist experimenting with chatbots is Virgin EMI Records UK and Bastille, around the release of the band’s latest album Wild World. Bastille’s chatbot also launched on Facebook Messenger, tying strongly into the album’s dystopian theme by presenting itself as “evil” company WW Comms.

“The difference between us and the Hardwell bot was that Hardwell was about messaging; it was using messaging as a CRM tool, an email tool and a notification tool as a way to interact with the artist. This one sat quite differently as it became part of the creative of the campaign,” Virgin EMI’s Luke Ferrar told Music Ally.

“This evil company ended up being the spokesperson to help try and sell the record! It’s quite funny how it worked out in the end. It was useful to the artist as well because it gave us different avenues of communication. You can really see that in the live set where they have really embraced this evil company and the ideas around that.”

Sony Music UK has also launched an official chatbot for Robbie Williams, with the ‘Robbot’ developed by agency BAM. Fans can ask Williams' bot about his music and tour, as well as discovering playlists, visiting his online store and asking other questions, with the bot’s logic due to be updated in response to those interactions.

On the other side of the Atlantic, US startup Octane AI recently raised $1.5m and launched chatbots for 50 Cent, Aerosmith and Kiss. The company says its platform will “lower the barrier to creating and managing a bot and make it so you don’t have to design anything, you don’t have to program anything, you don’t have to be an expert on bots”.

**Recommendation chatbots**

These chatbots are an encouraging sign that labels can make use of chatbots without spamming fans. There’s a range of other
music-related chatbots out in the wild too, however.

Record Bird’s chatbot, which is available for Facebook Messenger and Kik, aims to keep keen music fans up-to-date on new releases, as they’re announced. Fans can also ping specific artists to see if they’re about to release something. The startup has also launched an app in recent months.

JustinBieberBot isn’t an official Justin Bieber chatbot, but rather an unofficial bot created by startup Sequel to show off its technology. The bot takes on the role of Justin, though, chattering away about his recent news – tabloid rumours included. In its first week, the bot exchanged 3m messages with fans on Facebook Messenger and Kik. Sequel has followed up with another bot dedicated to Ariana Grande.

More recommendations – but this time for concerts rather than songs – come from a chatbot named Karl, which made his debut earlier in 2016. He promises to deliver personalised gig recommendations to fans: “When you go out of work on a Thursday, just ping Karl, and he will algo-pick the best concerts and parties in town and hook you up,” explained his New York-based creators.

Loudie is another concert recommendations chatbot: a spin-off from the app of the same name, which sits in a similar space to Songkick and Bandsintown’s apps. Fans send it their location and then get concert recommendations back.

New platforms and startups

Rithm started life as a music messaging app, but has pivoted into a startup marrying music and messaging for clients in both of those industries. One of its services is creating chatbots, and its bot on Kik is a good showcase. People can search its catalogue for songs to share with friends. Rithm is also keen to open up its chatbots platform for artists to use.

AudioShot also started life as a social music app before spotting an opportunity in chatbots. AudioShot is almost Shazam-like with its ability to identify songs recorded using the microphone, although you can also type in titles. Once songs are found, users can listen to them and share with friends.

There is even one music-streaming service with its own chatbot. Indian firm Gaana launched its Facebook Messenger bot in November. Initially, the bot will tell users about new content on Gaana, as well as enabling them to search its catalogue, share songs with friends and send feedback to the company.

“Moving forward, the Gaana team will focus more on training the bot for smart conversations and users will be allowed to sync the bot with their Gaana profile to receive more personalised music recommendations & create playlists based on their conversations with friends,” claimed the company.

FooBot is another artist chatbot: an official bot for Redfoo out of LMFAO, offering “music, merch and live chat”. And, as it turns out when you ask about individual songs, Wikipedia entries. Fans can even type ‘Ride with Foo’ to connect their

“Ismail Elshareef: "These smart bots integrating with you as a fan and trying to figure out what your interests are"
Uber account: “The next time you’re in an Uber, I’ll message you with music for your ride!” explains FooBot.

Artist Christina Milian also has her own chatbot. “This is kinda like an app but inside Messenger,” – a simple way to access Milian’s music, videos and social feeds, as well as being walked through a Q&A interview, and requesting a “digitally signed autograph” as a keepsake.

The Brazilian startup behind the Superplayer Zak bot (pictured above) is creating themed playlists for music-streamers. Its chatbot offers another way in to its collection: ask it for a music genre or artist, and it’ll suggest a playlist. It’s not available here in the UK yet, so we haven’t been able to rate the playlist quality yet.

**MTV, Ticketmaster and more**

MTV has always used its big awards shows to experiment with new technologies, and this year's European Music Awards (EMAs) in Rotterdam are no exception. MTV is launching a dedicated EMA Facebook Messenger chatbot, which fans will be able to chat to during the show asking questions and seeing “live updated show GIFs” through a partnership with Giphy. MTV is working with bots platform Conversable on the project.

In a September 2016 interview with Music Ally, Ticketmaster’s VP of open platform and innovation Ismail Elshareef identified musical chatbots as a hotspot of experimentation for developers at the company’s ‘devjam’ events.

“We’ve had a bunch of ideas come out at the devjams related to chatbots: these smart bots integrating with you as a fan and trying to figure out what your interests are, and what you want to go to see,” said Elshareef, who outlined one possible scenario for a live-music bot.

“All of a sudden you wake up one morning and get a message from the bot saying ‘Hey, do you know Adele or Christine and the Queens are going to be playing in your city next month? If you want tickets reply ‘yes’,” he said.

“And then if you say yes, it’ll ask you what kind of tickets you like: GA [general admission] or
mezzanine? And you’ll get more options relating to that all the way through to buying a ticket. There’s the delight of discovering an event for one of your favourite bands without you going and seeking it out. It got pushed to you through that bot... And imagine: a couple of days after you go to see Christine and the Queens live, the chatbot messages you to ask how was it? Did you enjoy the show? You’re building this artificial, almost friendship between you and the bot, as it asks you for feedback and recommends other acts you can go to see.”

It’s important to understand that most chatbots aren’t really artificial intelligence in the purest sense of the term: they’re more carefully-scripted question-and-answer programs capable of serving content. “Chatbots do not need much AI at all right now,” We Make Awesome Sh’s Syd Lawrence told Music Ally, warning that developers should not over-promise on AI in this particular field.

Finally, something that hasn’t happened yet, but might in the future, is the development of chatbots as an interface to digital music services. Could Spotify have its own chatbot to suggest playlists, or could Apple’s iMessage become an interface for Apple Music? Both are highly possible in the coming years.
One of the most interesting tech trends in 2016 is the rise of smart ‘assistants’ from some of the world’s largest tech companies. Apple’s Siri, Google Assistant and Amazon Alexa are the three that already have significant reach, interacting with humans via voice commands, and serving up a growing range of information and entertainment – as well as emerging as potential interfaces to music.

Apple’s Siri actually began its life as a standalone iOS app created by a team spun out from AI firm SRI International. Apple acquired the startup in 2010, and relaunched its technology as part of its iOS software in 2011, making Siri the veteran of the current crop of big-tech voice assistants.

In 2016, Siri is an interface for every Apple device, from iPhones and iPads to Macs, Apple TVs and Apple Watches, as well as – via Apple’s CarPlay and HomeKit platforms – controlling connected devices around the home, and people’s cars.

“Talk to Siri as you would to a friend and it can help you get things done — like sending messages, making calls and finding restaurants,” explains Apple’s website. “You can ask Siri to show
you the Orion constellation or to flip a coin... The more you use Siri, the more you’ll realise how great it is. And just how much it can do for you.”

In terms of music, Siri is predominantly an interface for Apple Music and the user’s own collection, with commands like “Play Norah Jones’ album”. However, it is beginning to extend out: “Play the number one song right now” taps charts information, while “Play more like this” digs into Apple’s Genius feature to add similar songs to the user’s play queue. Commands like “Add Shine by Leon Bridges to my library” also extend it into Apple Music.

As part of the iOS 10 software, Siri opened up to third-party developers, although there are restrictions: only apps focused on Voice-over-IP calling; messaging; payments; photography; workouts; ride bookings and restaurant reservations can take advantage, which means it remains a closed shop to non-Apple music-streaming services.

**Google joins the fray**

Google unveiled its Google Assistant in early October. “Ask it questions. Tell it to do things. It’s your own personal Google, always ready to help,” as the blurb put it. That means asking for translations and trivia questions, through to checking the weather and status for an upcoming flight. Google Assistant can also control other devices in the home, like music speakers, while also setting alarms and making reservations.

Learning from rivals, Google Assistant is available in a range of ways from launch. It is built in to Google’s new Allo messaging app for Android and iOS, but is also a native part of the new Google Pixel and Pixel XL smartphones. It is also built in to the new Google Home speaker – a rival to Amazon’s Echo – and capable of responding to voice instructions.

Google Assistant will also open up to developers in December in a similar way to Alexa’s “skills”. Google’s terminology is “actions”, with developers able to build interactions, and hardware firms able to build Assistant into their own products. It is early days for Assistant as a brand, but Google has been working on its voice-recognition technology for much longer.

**Alexa gets tuned for music**

Amazon’s Echo speaker has been a notable success for the company, with reports of more than 4m unit sales by mid-2016 in the US alone. A key part of that success has been its Alexa voice assistant, which ‘hears’ owners using the seven microphones built in to the Echo. When someone speaks ‘Alexa’ the speaker wakes up ready to interpret their voice commands.
Like Apple’s Siri: Alexa is a voice-controlled artificial assistant that responds to your voice commands. On the Echo, that means it can tweak the volume (voice command: “Alexa, turn it up”); skip tracks (“Alexa, next song”) and access the Prime Music catalogue (“Alexa, play Adele on Prime Music” or “Alexa, play the Sunny Day Classical playlist”).

In November, Amazon’s Paul Firth talked to Music Ally about Alexa’s music features. “We think voice is going to be really important. Voice control is the future of music listening in the home, and probably in the car as well,” he said.

“Music is one of the most important things on Echo: it’s been a key part of the experience from day one. And we know that people want to talk to Echo in a much more natural way than you might expect for a voice-controlled device. The way you and I would talk about music together is the way people want to talk to Echo and Alexa about music.”

Firth used the example of asking Alexa to play “Adele’s new song”, noting that Amazon has had to teach Alexa how to understand what’s being demanded in that query.

“We’re having to invent new metadata: ways to say that this track has just been served to radio, or this is the one that’s climbing the singles chart, so that when people ask for an artist’s ‘new’ song, they get the one they’ve just heard on the radio or wherever it was,” he said.

Alexa is also influencing the way Amazon’s Music Unlimited service serves up music, through its ability to recognise commands like “Alexa, play happy 80s pop music” or “Alexa, play sad indie music from the 90s” and respond accordingly.

“These aren’t playlists or stations: we’re building you a list of music on the fly, using a combination of genre, the decade – the original release date, not re-releases – and a mood,” said Firth. “Alexa is going to become smarter and smarter, and encourage more and more listening this way.”

Alexa is about much more than music though. It’s capable of understanding a growing range of commands, from controlling other smart-home devices and ordering products from Amazon’s online store (“Alexa, order AAA batteries”) to providing cinema times, weather forecasts and sports scores.

Alexa also has “skills” that can be developed by other companies and added by Echo owners according to their needs. Amazon hopes that businesses and services will develop Alexa skills as they’d develop smartphone apps.
StubHub’s Alexa skill enables people to find out about local events in its database (“Alexa, ask StubHub what’s happening this weekend”); Lyrical identifies song titles from snatches of lyrics (“Alexa, ask Lyrical what song has the lyrics ‘we will rock you’”); Uber has a skill to order a car (“Alexa, ask Uber to request a ride”) and so on.

More than 40% of Echo owners are using it as an information provider responding to questions according to Consumer Intelligence Research Partners, while nearly 20% are using it to control other devices.

Amazon has more than 1,000 staff working on Alexa, which is moving beyond the company’s own devices. It’s also available through the Triby family hub, the Nucleus intercom, the Pebble Core wearable and CoWatch smartwatch for example. Ford is exploring the potential for putting Alexa in its cars too.

**Facebook lays its plans**

Finally, there is Facebook, which has yet to launch a clearcut voice assistant along the lines of Siri, Assistant or Alexa, but which is nevertheless exploring adjacent technology.

In early 2015, the social network bought a startup called Wit.ai, before announcing plans to launch a virtual assistant called Facebook M, which in truth was more of a chatbot than a voice-controlled system.

Users would be able to talk to M within Messenger and get it to perform a range of tasks, from reserving tables in restaurants to buying presents and booking hotels. In theory it would understand natural-language requests, and will be able to follow up with more questions if needed, learning from the user’s behaviour over time to make it more relevant.

“An engineer went to Paris for a couple days, and his friend asked M to redecorate his desk in a French style,” Facebook’s David Marcus told Wired in August 2015. “Twenty-four hours later, the desk was decorated with a proper napkin, baguette bread, and a beret.”

Facebook M wasn’t pure AI. In fact, there is a team of “trainers” working behind the scenes, taking over when there is a request that M can’t understand – although it learns from their actions in those cases.

What about a Facebook equivalent of Siri or Alexa, though? There is such a project, but for now it’s more a personal hobby for CEO Mark Zuckerberg, who is building his own AI ‘butler’ to
run his home as his latest year-long challenge, following past years where he read a new book every fortnight, learned Chinese and even wore a tie every day.

“You can think of it kind of like Jarvis in Iron Man,” said Zuckerberg of his new project earlier this year.

“I'm going to start by exploring what technology is already out there. Then I'll start teaching it to understand my voice to control everything in our home -- music, lights, temperature and so on. I'll teach it to let friends in by looking at their faces when they ring the doorbell... On the work side, it'll help me visualise data in VR to help me build better services and lead my organisations more effectively.”

There may be less of a direct way for labels to take action based on the smart voice assistants trend, but they should certainly follow its evolution. Siri, Assistant, Alexa – and any future iteration of Jarvis for Facebook users – could become increasingly-common middlemen for people's interactions with music. Not just playing, skipping and pausing it in the home, but providing recommendations for artists, playlists and concerts.
It is not an original thought to suggest that the music industry can reap rewards from embracing new technology rather than fearing it. Still, the hard-learned lessons of the last 15 years mean the industry can approach the fields of AI composition, machine-learning recommendations, chatbots and voice assistants in an optimistic, practical frame of mind.

Seeing AI-music startups as potential partners rather than sync-revenue cannibalisers is one example. Ensuring that the relationships with streaming services include frank and thoughtful discussions about the impact of hyper-personalised playlists and contextual recommendations is another – a policy that also applies to Alexa, Siri and their like.

Meanwhile, chatbots is the area where labels and artists can quickly gain first-hand experience: not just experimenting with the technology, but helping to shape how it develops and what that means for the way music is found, consumed and shared.

In all these areas, terminology and technical complexities can feel like barriers to understanding, but music companies and technologies alike have much to gain from surmounting them.
ABOUT US

Music Ally is a UK-based company providing information, training and consultancy for the music industry.

We run a premium research service that includes a daily news bulletin, a monthly analysis report, and a fortnightly digital music marketing report.

The company also runs training sessions for companies across the industry, and has provided consultancy services for music firms from startups to large label groups, digital service providers and technology companies.

You can sign up for a free trial to our research service here on our website – http://www.musically.com/subscribe/ – or email anthony@musically.com for information on our other services.

This report was written by Music Ally for the BPI.