

You & The Popular Music Industry – A2

Introduction

In this essay I will be exploring the impact that artificial intelligence (AI) could have on the popular music industry and the developments that could lead to potential employment opportunities. I will critically evaluate my current position in the industry and identify the next steps I will make, referencing external literature to inform these decisions. Areas of the industry relating to my skills such as publishing, synchronisation and playlist curation will be researched, and potential employers noted for future reference. Secondary research will consist of research literature, company profiles, an overview of potential markets and how I will interact with them. Finally, I will produce a 12-month timeline on how I will become a working professional in the music industry, with a focus on career development theories. This will consist of a variety of materials which will include, but is not limited to; A portfolio of AI material as a practice-based CV; A website for a potential self-employed songwriting consultancy business; Analysing songwriting; Market trends and playlist curation using AI and the relevance this technology has in the current music industry.

Literature Review

- The Oxford Handbook of Career Development (2019) edited by Peter J. Robertson, Tristram Hooley and Phil McCash focuses on the wider context of career development and the decisions that could impact or influence a successful career. This book also offers an insight to work in the twenty-first century and the implications this has on career development. This has been helpful in relation to my own career plan and the decisions I have made and will make in the future.

- Melissa Avdeeff's (2019) article *Artificial Intelligence & Popular Music: SKYGGE, Flow Machines, and the Audio Uncanny Valley* presents an overview of SKYGGE's AI-human collaboration album *Hello World*. It features a case study on current and emerging uses of AI in popular music production, whilst addressing growing concern of the use of AI in music composition in general.
- Lucas Chu's (2021) article *How has Popular Music changed?* focuses on research that analyses playlist popularity. Based on published data of 169,000 songs from 1921 to 2020 from *Spotify*, thirteen audio features from the *Spotify Web API developer guide* are identified and analysed using histograms. These histograms show developments in each audio feature of time and could possibly be used to predict trends in the future.
- Eoin Murray's (2020) article *New Figures Show How Many Track Streams Needed For Artists To Make Minimum Wage*, compiles the most common streaming services and their rates of pay alongside prominent industry professional's comments on the matter.
- *This Is Music* (Edwards, 2021) provided by UK Music, is a report on how the music industry has changed and developed over 2020. It provides studies and figures on music creation, employment, the live performance sector and the impact this might have for the future of the UK music industry.

Popular Music Industry and Artificial Intelligence

The use of AI within the current popular music industry is mostly restricted to custom playlist curation, which currently consists of a small collection of algorithmically

curated playlists which stems from one particular artist or song the user has selected (Hu, 2020). Using *Spotify* as an example, the platform uses three different AI models just to power Discover Weekly, a playlist that is “made just for you” (Spotify, 2022). These three models are collaborative filtering, natural language processing (NLP) and audio models / convolutional neural networks. Collaborative filtering is commonly found in multiple companies such as *Netflix* and *Amazon* and is used as a method of recommending products and in the instance of *Spotify* is used to suggest songs to listeners (Hovsepyan, 2021). NLP is a machine learning tool that can interpret human speech via text, for example an NLP will scan countless existing playlists then tracks are assigned values such as ‘top terms’ and ‘cultural vectors’ which are then identified based on the relevancy to other songs. An example of this is

If the NLP revolves around ABBA, the top three keywords could be “dancing queen,” “mamma mia,” and “disco era.” Keywords can change their weights day by day. So if you play a random song by ABBA, “Dancing Queen” may pop up in your recommendations when you enter the app later (*ibid.*).

Finally, audio models help lesser known songs make their way into people’s libraries by utilising convolutional neural networks to assign variables such as tempo, danceability, energy and valence as opposed to popularity like NLPs. *Spotify* is paving the way by utilising all the opportunities to “deliver the right music to its listeners” (*ibid.*).

To further this, we can look at Chu’s (2021) research and start-up *HitWizard*, which together could potentially predict future songwriting trends. *Spotify* provides data for thirteen audio features which are categorised as: danceability, valence, energy, tempo, loudness, speechiness, instrumentality, liveness, acousticness, key, mode,

duration and time signature. Looking at these features from 1921-2020 with data from 169,000, Chu (2021) summarises that in the last decade:

Songs got faster, shorter, louder, less acoustic and more danceable, more speechy, but less live, less, but mostly major, a little bit sad, and a lot more popular. As the people change, so does the music. But luckily, we have the joy of looking back in time to see the best of the past, which stays with us.

HitWizard, a start-up developed by Goldmund, Wyldebeast & Wunderliebe, was an AI specifically developed and trained to predict the next big hit. It managed to achieve this with an accuracy ratio of “approximately 66 percent” (Mix, 2017), however *HitWizard* managed to predict which songs would be unsuccessful with an accuracy of 93 percent. To create these predictions, *HitWizard* utilises the aforementioned thirteen audio features and “compares them against airplay data sourced from Dutch radio stations and the local Spotify charts” (*ibid.*). Although not currently operational, *HitWizard* has shown the music industry what could be possible with the use of AI, Kobalt Music creator director Dominique Keegan remarked that “using such data is crucial to identifying hit songs before they’ve began climbing the charts” (*ibid.*).

AI’s use within popular music creation is currently “predominantly that of novelty, experimentation and largely as a tool for collaboration” (Avdeeff, 2018). This is seen in Taryn Southern’s *I AM AI* (2018) and SKYGGE’s *Hello Word* (2018), which use software *Amper* and *Flow Machines* respectively. There is an expectation that AI generated pop music will be missing something; one might call it emotion or passion. There is also a perception that AI generated music might take away the human beauty and understanding behind music creation (Sturm et al., 2018), however I would argue that it is imperative to explore and push the boundaries of machine

learning to understand what makes music creation so inherently human. I believe that viewing AI songwriting tools as a collaborative practice rather than discrediting human songwriters and removing them entirely from the process is a healthy middle ground in this argument.

Popular Music Industry and My Practice

I have already experienced success as a number one songwriter in a Norwegian regional radio chart (Radio 102, 2021), however creating a financially viable career from songwriting and producing might not be feasible due to the COVID-19 pandemic causing the collapse of the live music industry. Collective Management Organisations (CMOs) are seeing a significant decline in royalties collected due to closure of many public places. The Performing Right's Society (PRS), which collects music royalties for the UK, collected £650 million in 2020, which is reduced by 20% in comparison to 2019 which saw a collection of £810 million (Edwards, 2021).

My interest in AI and songwriting began when I realised that it took an average of 5.34 songwriters to create the top 100 biggest singles in 2018 (Music Week, 2019). In April 2020, it was calculated that it would take 357 streams to make £1, therefore an artist would need 3,114 streams to earn £8.72 which is the UK's minimum wage (Murray, 2020). These figures are based on the assumption that the artist owns one hundred percent of the rights, which is rarely the case. PRS for Music's Tom Gray stated that "On a major label the artist earns 20% of this (after debt repayment), and

the songwriter (if she writes 100%), at best, 8-15% of each rate” (*ibid.*). These statistics for other streaming platforms are found in Figure One. Therefore, dividing what little royalties are paid from streaming services between multiple writers makes it even more difficult to create a financially viable career from songwriting alone. To refine the songwriting process and remove co-writers that would require credit and a cut of the royalties, I began to use AI as my co-writer.

STREAMING SERVICE	Avg. payout per stream	Number of streams to earn one pound	Number of streams to earn one hour's UK Minimum Wage
AMAZON	£0.009	111	970
TIDAL	£0.007	143	1246
APPLE MUSIC	£0.0054	185	1,615
DEEZER	£0.0045	222	1,938
GOOGLE PLAY MUSIC	£0.0044	272	1981
SPOTIFY	£0.0028	357	3114
PANDORA	£0.0016	625	5,450
YOUTUBE	£0.0012	833	7,267

Figure 1 (Gray, 2020)

To experiment with the best workflow for composing with AI, I have endeavoured to create six one-minute songs using different software and AI models. The AI software used were *Audoir*, *Bored Humans*, *Magenta*, *Scaler 2* and *These Lyrics Do Not Exist*. The composition process has been documented and critically reflected on using Gibbs’ reflective cycle, shown in Appendix One. Since completing these six songs, I have discovered which software work best together. Using a combination of *Scaler 2* and *Bored Humans*, I created the song “Innocence” which felt the most unique and human-like out of the six tracks. Using a variety of current market leading AI songwriting tools has provided me with an insight into what I will prioritise when I create and program my own AI songwriting tools.

Due to music creator’s employment in the UK decreasing by 40% since 2019 (Edwards, 2021), rather than focusing on a specific job within the music industry and

working towards that goal, I have analysed my skillset, that would be valuable to potential future employers and discovered many prospective careers this way.

Audience and Market

Experimenting with AI and composition has led to an interest in music publishing and copyright. Due to the ever-changing nature of AI, there is not as much widespread information available on AI and copyright. Some existing software state how the work created can be used, for example *Audoir* states the music generated is licensed under a “Creative Commons Attribution-NonCommercial 4.0 International License” (Audoir, 2022). This means that any music created using *Audoir* can be shared and adapted but must be given appropriate credit and cannot be used for commercial purposes (Creative Commons, 2022). This is an area of the industry I will continue to monitor closely as AI becomes more commonplace as a music composition tool.

The Music Publisher’s Association (MPA) describes the business of music publishing as

concerned with developing, protecting and valuing music. The business is extensive and demands a variety of skills. Music publishers play a vital role in the development of new music and in taking care of the business side, allowing composers and songwriters to concentrate of their creative work (MPA, 2022).

As a songwriter who has self-published music and worked with artists who have released music themselves, I have been a member of PRS for four years and have knowledge of distributors, streaming services and royalty streams. The close locality in the music industry allows for progression across various potential career paths. Currently, I identify as a songwriter which is closely linked with publishing and synchronisation. Therefore, it could be suggested that some of the knowledge and skills required to progress in these areas could be similar. All three aforementioned

jobs require an in-depth understanding and comprehension of music publishing, royalties and copyright, which are areas I am developing as I wish to further explore the music publishing route.

The knowledge I have gained from this research has many applications within the music industry, I have identified some current open positions such as the Music Publishing Assistant Position at BBC Studios in London. This job focuses on establishing and maintaining working relationships with other departments within the BBC Studios, negotiating and pitching ideas to clients, composers and production teams. It is stated that “an understanding and knowledge of music copyright and the music industry would also be of benefit” (BBC Studios, 2021). A similar vacancy I have located is the Royalty Assistant position at Universal, who also works with EMI and Polydor. This job is more focused towards numeracy and accuracy in figure work and requires an ability to analyse and interpret legal documents (Universal, 2022a), both are areas I am lacking knowledge in but am willing to acknowledge these weaknesses and improve on them prior to applying for a similar post.

Prior to beginning a Masters in Popular Music Practice, I applied for the Digital Internship at Polydor, this role focused on updating social networking sites, running analytics and finding, engaging and developing target audiences on digital platforms (Universal, 2022b). I was unsuccessful in securing the position but advanced to the final round of interviews and the Head of Digital, Luke Ferrar, provided plenty of advice about staying ahead of technological advancements, such as artificial intelligence and augmented reality.

Alongside applying for existing positions within record labels, I will also pursue a self-employed songwriting consultancy business. This will consist of songwriting and producing with and for other artists utilising the AI technology I have acquired through my research. I build a portfolio of songs using AI to showcase the material I can create, and this will be used alongside a website, electronic press kit (EPK) and CV to advertise my services. I will aim to have this up and running in some capacity by 2023. The initial focus will be on composing and programming the AI software. The timeline for the project is shown alongside educational deadlines, job applications and personal aims for the compositional process in Figure 2.

Career Strategies

Career development is defined in The Oxford Handbook of Career Development (Robertson et al, 2019, p.6) as a “key organising concept”, drawing on sociology and psychology with aspects of organisation and education. Career development can be split into three intertwining areas:

the wider contexts of career development, including government policy; the wide range of theory concerned with career-related experiences, phenomena and behaviour; and the broad spectrum of career helping practices.
(Robertson et al, 2019, pp.6-7)

Focusing firstly on the wider contexts of career development, this can include an assessment of work values and used to clarify the reasons for working and what an individual may expect to gain from a specific career (Swanson and Fouad, 2014).

Using the four work values identified in the article Facts of Personal Values: A Structural Analysis of Life and Work Values (1998, pp.55-56), I have categorised my personal career values. These four values are: intrinsic or self-actualisation values, extrinsic or security or material values, social or relational values and self-

enhancement or achievement values (*ibid.*). In the aforementioned article, their study was devised of ten value types and rated on a nine-point scale from “opposed to my values”, “not important”, “important” and “of supreme importance” (*ibid.*). When calculating my own work values, I have used the same scale from zero to ten, as shown below.

Work Value Type	Work Value Item	My value (out of 10)
I - Social	Contributing to people and society	5
	Work with people	5
	Social contact with co-workers	5
II – Extrinsic	Good salary and work conditions	10
	Job security (permanent job, pension)	10
III – Prestige	Authority to make decisions over people	1
	Prestigious, highly valued work	5
IV – Intrinsic	Interesting and varied work	8
	Work in which you are your own boss	1
Mixed	Opportunities for occupational advancement	8

Analysing my career values, which clearly prioritise extrinsic values, work stability and solid income are most important when I am searching for employment. Roberts et al. (1998) hypothesised that extrinsic and intrinsic values would oppose each other due to their possible contradicting nature, however I prioritise both job security, interesting and varied work and opportunities for occupational advancement, although the extrinsic values are clearly rated higher.

Secondly, career development theory links the wider context of career theory to the experience of developing a career. Our careers can be described as “the pathway we take through life” (*ibid.*), therefore the concept of a work-life balance, career values and time are critical to a successful and happy career. Throughout a career, one would make both cross-sectional and longitudinal decisions. The former consists of comparing one activity to another, for example, should I work on the essay that is due or compose new music? The latter, longitudinal decisions, inform long-term progressions, such as the decision to return to education, this postpones earning money currently but ultimately will result in more opportunities for higher earnings in the desired field.

Finally, the broad spectrum of career helping practices includes time management, developing skills and experimenting with options (Munro, 2021). Making the most of my time available has been the focus of my career helping practices, utilising the Pomodoro technique to maximise the work done in confined times has been beneficial. The technique was developed by Francesco Cirillo and is so effective because it minimises interruptions, estimation errors enabling the user to simplify and organise tasks better and improves motivation and content of work (Cirillo, 2021). By working in sections of twenty-five minutes with a singular aim to accomplish within the time, I am focused on achieving one aspect of my career which feels less overwhelming than viewing it as one whole task.

Looking at every aspect this essay has covered so far, a Gantt chart mapping the next twelve months has been created. The use of a Gantt chart was selected as it is clear to see the progression of various project's schedules and how the tasks relate to one another, for example I cannot set up my website for songwriting consultancy without curating the content prior. On the left is a list of the activities and along the top of the chart is a suitable time scale, in this case the next twelve months (Duke, 2022).

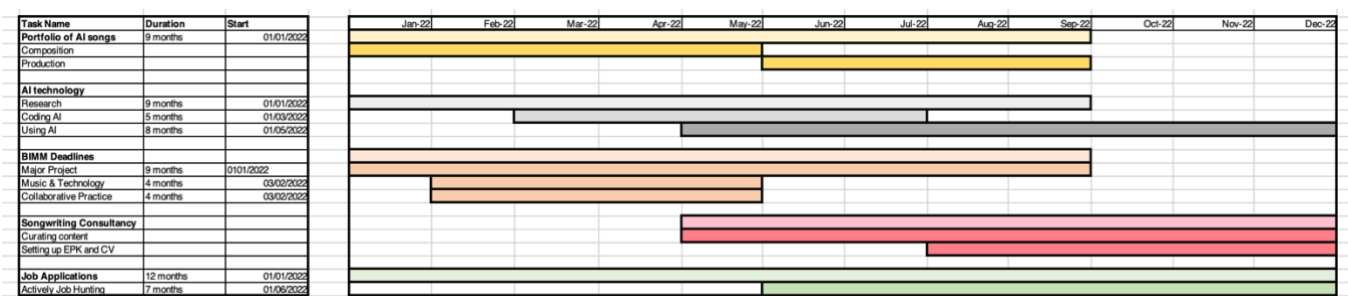


Figure 2 - (Meddings, 2022)

Conclusion

Furthering my own AI songwriting tools and songwriting portfolio will open the opportunity to collaborate with artists, songwriters and producers in a capacity that I haven't been able to previously, opening other possible avenues of employment. Although freelance and self-employed work doesn't align perfectly with my career values, many music creators are self-employed. However, the lack of income from live performances and the inability to create new recorded music in studios due to the COVID-19 pandemic has led to many seeking employment opportunities elsewhere (Edwards, 2021). The combination of the COVID-19 pandemic affecting freelance work and my career values has led me to prioritise music publishing as a career path.

The continued advancement of AI in the popular music industry is certain to become more and more prevalent as more uses for this technology are discovered and utilised. With the potential of playlist curation, music creation and hit song predictions already established as uses for AI, the next steps are to maximise the efficiency and effectiveness of the existing technology. The next phase for my personal career path will primarily focus on gaining steady employment, an aspect I clearly prioritised in my career values. This is will be gained by developing my unique standpoint of approaching music publishing and copyright from the background of working with AI and acknowledging my lack of knowledge in numerical data surrounding these areas.

3259 words

Bibliography

Literature

AUDOIR (2022), SAM AI Lyrics & Music Tool. Available: <https://www.audoir.com/> (Accessed: 7 January 2022)

AVDEEFF, M. (2019), *Artificial Intelligence & Popular Music: SKYGGE, Flow Machines, and the Audio Uncanny Valley*. Available: <https://www.mdpi.com/2076-0752/8/4/130> (Accessed: 6 January 2022)

BBC STUDIOS (2021), Music Publishing Assistant. Available: <https://careershubs.bbc.co.uk/members/modules/job/detail.php?record=57287> (Accessed: 7 January 2022)

CHU, L. (2021), 'How has Popular Music changed?' *Medium*, December 11. Available: <https://medium.com/@lucaschu/how-has-music-changed-diving-into-spotify-data-393c071b5941> (Accessed: 5 January 2022)

CIRILLO, F. (2021), Pomodoro Technique. Available: <https://francescocirillo.com/pages/pomodoro-technique> (Accessed: 5 January 2022)

CREATIVE COMMONS (2022), Attribution-NonCommercial 4.0 International (CC BY-NC 4.0). Available: <https://creativecommons.org/licenses/by-nc/4.0/> (Accessed: 7 January 2022)

DUKE, R. (2022), What is a Gantt Chart? Available: <https://www.gantt.com/> (Accessed: 5 January 2022)

Edwards, A. (2021) 'This Is Music 2021' *UK Music*, pp. 8-13.

GLASER, B. (1968), *Organisational Careers: A Sourcebook for Theory*. New Jersey: Rutgers.

HOVSEPYEN, T. (2021), How AI Is Transforming Music Streaming Services. Available: <https://plat.ai/blog/how-artificial-intelligence-is-transforming-music-streaming-services> (Accessed: 6 January 2022)

HU, C. (2020), 'Spotify and Apple Music Disagree on the future of radio. Who's Right?' *Water & Music*, August 24. Available: <https://mailchi.mp/cheriehu/spotify-apple-music-radio-streaming-amazon?e=29c88d58e2> (Accessed: 5 January 2022)

MIX (2017), 'Can AI predict hit songs before they've blown up? This startup thinks so' *Mix*, October 19 Available: <https://thenextweb.com/news/ai-music-hit-song-predict> (Accessed: 3 January 2022)

MUNRO, I. (2021), The roadmap for career development: How to set your course. Available: <https://www.betterup.com/blog/career-development> (Accessed: 5 January 2022)

MURRAY, E. (2020), 'New Figures Show How Many Track Streams Needed for Artists to make Minimum Wage', *DJ Mag*, April 20. Available: <https://djmag.com/news/new-figures-show-how-many-track-streams-needed-artists-make-minimum-wage> (Accessed: 6 January 2022)

Music Week (2019) 'Hit the roof: Number of writers on biggest hits soars again - but is ceiling in sight?' *Music Week*, 20 May. Available: <https://www.musicweek.com/publishing/read/hit-the-roof-number-of-writers-on-biggest-hits-soars-again-but-is-ceiling-in-sight/076239> (Accessed: 6 January 2022)

Radio 102 (2021) 'Uke 44, 2021' *Radio 102*, 8 November. Available: <https://radio102.no/spillelister/radio-102-topp-40/> (Accessed: 6 January 2022)

ROBERTSON, P. HOOLEY, H. MCCASH, P. (2019), *The Oxford Handbook of Career Development*. Oxford: Oxford University Press.

ROS, M. SCHWARTZ, S. H. SURKISS S. (1998), Applied Psychology: An International Review Special Issue: Value and Work. *Facts of Personal Values: A Structural Analysis of Life and Work Values*. London: Taylor & Francis.

SPOTIFY (2022), Discover Weekly. Available:
<https://www.spotify.com/us/discoverweekly/> (Accessed: 6 January 2022)

STURM, B., BEN-TAL, O., MONAGHAN, U., COLLINS, D., HERREMANS, D., CHEW, E., HADIERES, G., DERUTY, E., and PACHET, F. (2018), Machine Learning Research that Matters for Music Creation: A Case Study. *Journal of New Music Research* 48: 36–55.

SWANSON, J. and FOUAD, N. (2014) *Career Theory and Practice: Learning Through Case Studies*. 3rd edn. Los Angeles: Sage

UNIVERSAL (2022a), Royalty Assistant. Available:
<https://jobs.jobvite.com/universalmusicgroup/job/o9KQhfwK> (Accessed: 7 January 2022)

UNIVERSAL (2022b) Digital Intern. Available:
https://jobs.jobvite.com/universalmusicgroup/job/oMgXhfw0?utm_campaign=google_jobs_apply&utm_source=google_jobs_apply&utm_medium=organic (Accessed: 7 January 2022)

Music

SKYGGE (2018), *Hello World*. Available at:
<https://open.spotify.com/album/0cGWC9bhEJA4I7jAaV7cqR> (Streamed: 5 January 2022)

Southern, T. (2018), *I AM AI*. Available at:
<https://open.spotify.com/album/4vfwJK0Rya7wufnj7PdQym> (Streamed: 5 January 2022)

Images

GRAY, T. (2020) [Twitter] 18 April. Available:
<https://twitter.com/MrTomGray/status/1251415657486471175/photo/1> (Accessed: 7 January 2022)

MEDDINGS, R. (2022) Gantt Chart.

Appendix One – AI Songwriting Diary using Gibbs' Reflective Cycle

AI Songwriting Diary

Reflective Diary documenting the composition process of each song using Gibbs' Reflective Cycle

Song 1 – 25th October – Cut Up Method “Don’t Know What I’d Do Without You”

1. Description

I started this session by selected the page I wanted to use from the book *The Futures* by Anna Pitoniak, then I cut the page into individual words and three phrases that were particularly memorable. I then randomly and blindly chose one word at a time and laid them out one by one to make some lyrics. After this, I took a more curated approach where I laid the words out alphabetically and chose one word at a time from the list. Following the lyric selection, I wrote down chords on pieces of paper and chose four randomly and blindly from a tub and used a combination of the lyrics and chords to compose the song.

2. Feelings

I felt happy that the stimulus I had created helped me compose a song much quicker than normal but creating the stimulus itself was quite time consuming which was frustrating. It made me sad to physically cut up a book, but it felt worth it for the outcome of the song.

3. Evaluation

The lyrics were a little nonsensical, even when I took the decision to curate the selection process. When I randomly chose the words, the lyrics made little to no sense, so I had to take a different approach. The chords that were randomly selected didn't make a cohesive sequence, so I opted to remove the non-diatonic option I had pulled out.

4. Conclusions

I learned that it would probably be better to use sentences or phrases rather than individual words as this could retain a sense of the original material whilst creating something new.

5. Actions

If I use a model similar to this method to create my own AI songwriting tool, I will need to code a way to remove excess and repetitive words. Need to ensure for future songwriting that if only provided with the lyrics, I don't compose melodies and chord sequences that are very similar to each other. Options to guarantee this include

Song 2 – 27th October – Songwriting Prompt “Beck & Call”

1. Description

I found the songwriting prompt from SongFancy's 5 in 5 challenge which is intended to inspire songwriters to quickly compose five songs in five days. I started by grouping words that would work well together, such as “whipped” and “whirring”, and chose which words from the prompt I would omit as they didn't fit with the others, these were “olive” and “apron”. I then used the chords provided with the challenge and started composing a top-line melody and slotting the words into suitable sections of the song and tried to steer away from the obvious uses of the words. For example, the prompts clearly lean towards a coffee shop or kitchen setting, yet I avoided any of these comparisons. I decided to create a lyrical theme around an unhealthy

relationship, being with someone who is sickly sweet and “tastes like syrup”, yet also makes you “whipped”, and your head feel like it’s “whirring”.

2. Feelings

I felt that the lyrical content, although curated by a pre-selected list of words, were authentic and the words felt like they had some real weight to them. I felt happy that I had composed a new song quite quickly from a starting point and that I had taken the lyrics in a direction that they weren’t intended for.

3. Evaluation

I think this song has some real commercial validity, the chorus and hook are catchy, the lyrics and melody are suitable and memorable and the songwriting process was significantly shortened by the inclusion of the prompt.

4. Conclusions

I don’t think that this method of composition can be really considered AI, as all the composition, except for eight words, came from a human. Though the resulting song is proof of a concept that these resources can assist songwriters in creating new music.

5. Actions

It might be interesting to experiment with an AI generated songwriting prompt that can create visuals with a selection of randomised words? As a general improvement on my songwriting outside of AI composition, I will use more songwriting prompts from the 5 in 5 challenge.

Song 3 – 11th November – Audoir AI “Another Rose”

1. Description

Audoir is one of the few AI software that can produce both lyrics and melodies, I took the prompt from Song 1 “gazes met in a mirror, and he smiled at me” into the lyric generator which gave me three paragraphs of material. I selected four lines from these paragraphs and input those into the music generator, which gave four different melody options that I exported as MIDI data. Once I had these MIDI files in the same key and tempo, I added chords underneath and simplified the melodies, as many of them had repeated notes that would be too quick and difficult to sing. I didn’t stray far from the original melody that was provided and only added three lines in total to the lyrics. I did, however, move a couple lines around to create a makeshift rhyme scheme that mostly consist of half and assonant rhymes.

2. Feelings

I felt relieved at how quick and efficient this software was to use, especially for someone who has never used it before. I felt happy to successfully complete a song using almost exclusively AI generated material and how quick the overall process was. I was a little bit sad that the AI came up with some lyrical content that I thought was better than I would have written given the same stimulus, for example: “I knew he wondered at the scheming universe”.

3. Evaluation

The lyrical content added more value to my songwriting process than the melody, but that could have been from the sheer number of lyrics that were generated in comparison to the four melody lines that were devised. The process required significantly less brain power and input from a human songwriter which meant I could achieve more for less energy.

4. Conclusions

I would use Audoir again, the lyric generator was more beneficial to my songwriting process and it created a vast amount of content from a small input.

5. Actions

I don't think I would change anything about the songwriting process with Audoir, it was very effective, quick and easy to use - the resulting song was indicative of this.

Song 4 – 12th November – Magenta AI “Duplicating”

1. Description

I used Google's Magenta AI to initially generate 4 bars of music, this composed a bass line, drumbeat, chord sequence and top line. I then took the drumbeat and fed that to the Groove tool which changed the MIDI drum file slightly and made it 'groovier'. I then used the Song Lyrics Generator, which is intended to create a starting line for a song rather than use the prompts in a linear verse like I did. The lyrics generated were a little nonsensical, with lines like "I've been hearing eyes" and "duplicating duplicating duplicating". I didn't change those though, I tried not to interfere with the AI generated material and create an authentic representation of what the software is capable of.

2. Feelings

This song didn't really hold any commercial validity, but I still thoroughly enjoyed the process of making the outrageously random lyrics have some coherence in the form of a song. The resulting piece made me happy as it showed the fun side of composing with AI and took the seriousness of composing music away, making the process enjoyable, if a little ridiculous.

3. Evaluation

Magenta creates Funk stems and audio well, but I would struggle to use the material generated in other genres or for another application. Perhaps with more experimentation I would be able to tailor the material created more to the styles of music I typically compose in.

4. Conclusions

If I was to compose another funk track, I would maybe use the Magenta Groove tool to enhance my MIDI drumbeats. Otherwise, this AI songwriting tool is not beneficial to the composition of my future songwriting portfolio.

5. Actions

Although, I enjoyed the songwriting process with this AI, I will not use it again.

Song 5 – 18th November – Amper AI “Mirror”

1. Description

I began this process by naming the track and choosing the duration of one minute and fifteen seconds, then choosing a base track from the existing pieces on Amper. I had the option at this point to change the instruments, key and section lengths, however I chose to keep them at the default. I then used These Lyrics Do Not Exist with the input ‘mirror’ to generate some lyrics similar to the original prompt “gazes met in a mirror, and he smiled at me”. I chose the emotion ‘happy’ and the genre ‘pop’. I composed the top line melody but left every other element as authentic to the AI material as possible.

2. Feelings

I felt like I’d cheated the songwriting process by choosing a pre-generated track and just adding a top line. However, it was satisfying to have an almost completed song so quickly. It made me concerned that if I was to use this song commercially, there is a possibility that others would use the same pre-generated track as therefore have a similar finished product.

3. Evaluation

Amper is a simple platform to use and its effective and quick at producing basic pop backing tracks, it is ideal for budding musicians who wouldn’t be too confident using a DAW to create their music. However, I don’t believe it would pass for the high-quality production standards that are found in the popular music charts. The export only allows for audio files rather than MIDI, so you are forced to use their instrument sounds, which are not necessarily the best quality or suit the genre best.

4. Conclusions

I would personally not use Amper again, but I see its validity and purpose for music creators who need a helping hand with starting to produce and write their own songs.

5. Actions

Don’t use Amper again.

Song 6 – 30th November – Scaler 2 AI “Innocence”

1. Description

I began with the lyrics, using the AI GPT-3 text generator Bored Humans. This AI doesn’t allow for input data so I couldn’t use the phrase I have with the previous songs and the theme of the song is different to all the previous tracks. I randomly generated two separate lyrics and made a combination of the two for the final track. With the lyrics compiled, I used Scaler 2 to compose and arrange a piano and string section. I decided to use Bb mixolydian as the key and chose a pre-determined chord sequence intended for a Future Bass track. I then used the melody generator

in Scaler 2 to compose a melody and used the same chord sequence in various performances as the string section parts.

2. Feelings

I felt that this was the most unique and commercially viable song out of the six created, it made me happy that I had a finished product with an arranged string section fairly quickly compared to the time it would have taken to manually arrange the string section. The Bored Humans lyric generator is trained on poetry and so

3. Evaluation

Scaler 2 gives more in-depth options than the previous AI songwriting tools I've used, different scales, time signatures, genres and instrument sounds make it the most versatile software I've used so far. The lack of input for the lyric generator is frustrating as you would have to refresh and generate new lyrics to get a specific topic, however the lyrics that it creates are the best and most creative I've seen so far.

4. Conclusions

I would use both of these programs again, both separately and in conjunction with one another. This song was the most creative and quickly completed out of the six I composed.

5. Actions

I will use these two AI models as the basis for the start of my songwriting portfolio, using Scaler 2 I can experiment with irregular time signatures and various modes and with Bored Humans my lyrics will have a wider range of topics.

Appendix Two – Spreadsheet of AI software used

AI Name	Information Available	Uses	Practicality	Link
Audoir (Agent L)	SAM was trained with hit songs, using copyrighted material for "transformative uses" falls in the Fair Use doctrines under US copyright law. In addition, SAM uses a plagiarism checker to ensure that none of the generated music and lyrics plagiarises from the hit songs. Our plagiarism checker makes SAM one of the most ethical AI music tools ever developed.	Generates lyrics	Generates large amounts of text using GPT3. Input data can either be a mood (any/happy/sad), text to lyrics or rhyme line. User interface is simple and easy to use. This process takes between 30 and 60 seconds.	https://www.audoir.com/sam-agent-l
Audoir (Agent M)	SAM was trained with hit songs, using copyrighted material for "transformative uses" falls in the Fair Use doctrines under US copyright law. In addition, SAM uses a plagiarism checker to ensure that none of the generated music and lyrics plagiarises from the hit songs. Our plagiarism checker makes SAM one of the most ethical AI music tools ever developed.	Generates music (either MIDI data or audio)	Generates audio and MIDI data based on either a mood (any/happy/sad), text or for a topline melody. User interface is simple and easy to use. This process takes between 30 and 60 seconds	https://www.audoir.com/sam-agent-m
Amadeus Code	Amadeus Code is an artificial intelligence powered songwriting assistant. Primarily used for creating chord sequences to inspire topline melodies.	Generates music (either MIDI data or audio)	Generates audio in the app quickly but many of the songs clearly take inspiration from other popular songs. Amadeus does tell you which song it has taken inspiration from but I felt this could actually influence my songwriting negatively by being aware of other melodies that coincide with this chord sequence.	https://amadeuscode.com/en/
Jukebox				https://github.com/openai/jukebox
AIVA	AIVA assists with the creative process of creating music by leveraging the power of AI-generated music	Generates music (either MIDI data or audio)	Generates music based on pre-set styles such as modern cinematic, jazz, pop etc. This is then customisable through key signature, pacing (tempo), instrumentation, duration and variations on a theme. It will produce these with or without a melody. Alternatively, AIVA will accept MIDI or audio as input data or use an existing influence.	https://creators.aiva.ai/
Flow Machines	Flow Machines is a research and development and social implementation project that aims to expand the creativity of creators in music. Music has been expanding together with new technology and creators who have applied them to music creation. Flow Machines is working with creators to generate new music using cutting-edge machine learning technology.	Unknown	Unavailable for download/purchase currently	https://www.flow-machines.com/
Magenta	Magenta is an open source research project exploring the role of machine learning as a tool in the creative process. Currently in the beta stage, the magenta studio includes continue, generate, drumify, interpolate and groove which each manipulate and generate midi and audio data.	Generates music (either MIDI data or audio)	Very simple, quick and easy to use.	https://magenta.tensorflow.org/

Nsynth	Also known as the Neural Synthesizer, Nsynth uses deep neural networks to generate sounds at the level of individual samples. Learning directly from data, Nsynth provides users with intuitive control over timbre and dynamics and the ability to explore new sounds that would be difficult to acquire with a traditional synthesizer.	Generates audio for use in a synthesizer	Haven't used, struggling to find a download link	https://magenta.tensorflow.org/nsynth
Scaler 2	Scaler 2 features Audio and MIDI detection, melodic phrases and performances, modulation presets and suggestions, new chord pad and playback editing modes. It also contains more than 30 built-in sounds and 200 chord sets created by artists.	Generates MIDI data for use within a DAW	Costs £50 but well worth the investment, very quick and easy to use.	https://www.scalerplugin.com/
Bored Humans	The song lyrics on this page are generated using a language model named GPT-2, which was created by OpenAI. It works similar to autocomplete on your mobile device, where it predicts the next word based on what you are typing. We fine-tuned this model on song lyrics, and have it predict lines for a song instead of only predicting one word at a time. Link to article on how this was made: https://towardsdatascience.com/how-i-created-a-lyrics-generator-b62bde13badb	Generates lyrics without an input	Free and easy to use, due to the lack of an input the lyrical content can be quite random and occasionally repetitive or predictable.	https://boredhumans.com/lyrics_generator.php
These Lyrics Do Not Exist	This website generates completely original lyrics for various topics, uses state of the art AI to generate an original chorus and original verses	Generates lyrics with an input	Free and easy to use, can be very repetitive and rudimentary but is intended mainly to inspire songwriters rather than be used as it is	https://theselyricsdonotexist.com/

Appendix Three – Timeline of AI in music

padlet

padlet.com/rachel_meddings/df4nvr1qjpc6uwt

AI and The Music Industry

A history of artificial intelligence and the popular music industry

RACHEL_MEDDINGS OCT 19, 2021 03:59PM

1951

Alan Turing creates the first computer generated music. Several melodies were created, including "God Save the King" and "Baa, Baa Black Sheep".

computer-generated music. EMS were responsible for the development and research of many crucial computer music technologies such as: real-time digital synthesis, live keyboard input, graphical score editing, programming languages for music composition and synthesis.

1957

The first musical work written by a computer, developed by Lejaren Hiller and Leonard Isaacson, the Illinois Automatic Computer (ILLIAC I) generated compositional material that was entirely written by AI. The resulting piece was named 'Illiac Suite for String Quartet'.

1974

The first International Computer Music Conference was held in Michigan State University, it is now yearly international conference for computer music researchers and composers. The conference for 2021 was held at Pontificia Universidad Catolica de Chile from July 25th-31st.

1960

The first academic paper on algorithmic composition was published by Russian researcher, R. Kh. Zariyov. He focused on music composed using the URAL-1 computer and the paper was titled "An algorithmic description of a process of musical composition".

1975

Researchers from the MIT Experimental Music Studio published a paper "Machine perception of musical rhythm" and developed software for intelligent music perception that could register and infer a count, tempo and note duration as a musician played on an acoustic keyboard.

1965

The first instance of computer-generated piano music. Ray Kurzweil, an American inventor, premiered a piano piece that was composed by a composer that was capable of pattern recognition in a variety of musical compositions. This computer was then able to analyse and use these patterns to compose and create new melodies.

1980

Experiments in Music Intelligence (EMI) had a major breakthrough in 1980. EMI could generate new and unique music compositions based on generative models that analysed existing music. Using the specific framework of music genres, EMI has created thousands of different works based on countless composers.

1973

MIT's Experimental Music Studios (EMS) was founded by professor Barry Vercoe and became the first institute to have digital computers solely dedicated to researching the creation of

1988

Sony Computer Science Laboratories were founded to solely conduct research relating to computer science. This company would later be considered as one of the milestones for utilising

AI in music research and Sony would later produce Flow Machines, one of the current industry leaders for AI composition.

1995

David Bowie and Ty Roberts develop an app named the "Verbasizer". This, similar to the cut-up method, took literary source material and randomly reordered the words to develop new combinations and potential lyrics.

1997

The music research team project at Sony Computer Science Laboratory Paris was founded by Francois Pachet. He started research that focused on music and AI, his team wrote and pioneered many technological advancements and filed more than 30 patents focused on AI and electronic music distribution, audio feature extraction and music interaction.

2002

A new algorithm "Continuator", designed by Francois Pachet, could learn and interactively play with musicians when performing live. Once a musician stopped playing, Continuator could continue to write a piece of music from the place where the live music stopped.

2009

A program named Emily Howell composed an entire musical album aptly named "From Darkness, Light". Emily Howell is an interactive interface that registers and takes into account feedback from listeners and creates its own compositions from a database.

2010

Iamus Computer, an AI, creates its first musical composition named "Iamus' Opus One". It is the first instance of professional contemporary classical music to be composed by a computer AI using its own unique style.

2012

Emily Howell, the aforementioned program releases 'her' second album named "Breathless".

2016

Researchers at Sony create "Daddy's Car", an AI-generated pop track entirely composed by AI. Sony's software "Flow Machines" drew from a large database of songs to compose new music, in this instance the track was mostly based on The Beatles' catalogue.

2016

An AI generated track composed with artist Alex Da Kid enters the Top 40 charts in the USA. The AI software, IBM Watson, analysed a large number of articles, blogs and social media data to feature the most current and up-to-date topics to characterise the overall emotional mood.

2017

Taryn Southern released her album "I AM AI", a collaborative project between Southern and AI music composer tool Amper. Amper created the music structures but the rest of the work, including lyrics, were added by Southern.

2019

AI meets death metal! Dadabots set up a constant 24/7 livestream YouTube channel playing heavy death metal music that is completely generated by AI algorithms. To train neural networks using machine learning, the developers used the music of "Archspire" a Canadian metal band. The resulting compositions sounded like real death metal music.

2019

Björk collaborated with Microsoft to create AI-generated music named "Kórsafn", which is based on the changing weather patterns and position of the sun. Kórsafn used Björk's back catalogue of 17 years to create new arrangement in a familiar style.
