1. The **Stage 6 Project Portfolio:Team** **Project Final Group** assignment must be submitted both to the [both to the ONLINE REPOSITORY if established] and on CANVAS in soft copy.

File(s) to be submitted to Canvas:

1. A zip file that contains all your **team** assignment files and folders.
2. The submitted folder should contain a soft copy of your team website.

Name your file as “[stream\_no, team\_no]*ssno*.zip**”**, compress all files into **zip** including html documents, image files etc.

***Submit it on Canvas at:***

# *Assignment 3: Team Project – Final Group Submission*

**Stage Six (Team Project Portfolio Submission):**

**Due:** The Project Portfolio is due Friday 09/06 mid-night [week 13]

**Team Components: Project** **details** can be posted to your **Team website**, addressing the set of requirements outlined in the Home page on the Technology topic/issue and Process Support Pages. This site will be submitted as a Team Artefact. The **Project Assessment Rubric** gives guidance on how the **Technology Topic/issue** addressed by the site is to be marked.

[If the GitHub hosting option is used, the site can be linked to from the Canvas discussion board set up for your team].

*42 marks*

Requirements for your web resource include scholarly expectations of design, referencing and the details of the team process indicated in the **Process Support Pages** including: **Meeting Minutes** links and files evidencing Teamwork, **Project Portfolio** link and any files evidencing your team’s work. Evidence can be posted to the Canvas Discussion Board for your team. Quality **guidelines** indicate the expectations with respect to size of the site and number of its elements.

*18 marks*

*[60 marks for both components]*

*[24% of Total]*

**The Team Project Portfolio is to be submitted to Canvas for Stage 6 files.**

1. Technology/Topic Selection. [Team]

Clear presentation and elaboration of the Technology/Topic, and its importance. The topic is crisply defined, and a focused investigation is presented of an interesting and novel area.

**AI-Generated Music**

Written by Sara Khalaf

**AI-GENERATED MUSIC**   
**A Technology Topic**   
**Group: 0509**

**What is AI-Generated Music?**

Artificial Intelligence is defined as “a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence” (Rekdal, 2023). In recent years, Artificial Intelligence has evolved as a composing tool, enabling artists to uncover new sounds generated from AI algorithms and software. In this rapidly evolving technological environment, we propose to investigate the impacts of AI-generated music on music production and creation.

What does it mean to expedite and streamline the creation of music? How will AI impact artists, record labels, and fans?

AI-generated music is used to mimic and augment human creativity by leveraging data and algorithms to generate original or innovative music. Seeing that music is a significant part of most people’s lives, uniting artists and people together, we are interested in the opportunities, risks and choices of implementation in society that it could bring forth.

This topic is crucial in the new era of artificial intelligence, since it has the potential to influence and modernise the industry of music, particularly among the younger generation and up-and-coming artists who are exposed to this technology. It also poses threats to record- labels and existing artists who may come across to legal and/or ethical challenges. The preservation of authentic music production is important for our generation as it may influence the forthcoming generations.

2. Critically review the opportunities for Society presented by the Technology/Topic. [Team]

Sound knowledge of the Technology/Topic and opportunities presented. A high level of synthesis and critique of the relevant literature and sources strongly supporting arguments made.

**AI-Generated Music: Opportunities**

**Written by Aidan King**

With the unparalleled growth of technology in recent years, Artificial Intelligence has now converged with the Music Industry, presenting different opportunities that AI could unlock in the Music Industry for innovation, creativity and creativity. One such opportunity that Artificial Intelligence could bring to the music industry is the ability to produce music much quicker and more efficiently than ever. Another opportunity that AI can bring to music is through revolutionizing Music discovery and music recommendation systems. Using context-based AI systems, music streaming platforms will be able to enhance music recommendation based on the users' personal preferences allowing for more user engagement and enjoyment through new music discoveries. AI Generated music could also be used as a tool to improve mental health and general mental wellbeing. It has been proven that music influences emotions and behaviours of Humans, therefore with AI, music could be specifically generated to help with mental health issues such as anxiety and increase overall moods. The final opportunity that AI presents to music is enhancing live music performances. Using AI, performers will be able to implement real-time adjustments or improvisations to their show, enhancing the uniqueness and creativity of the show and improving the experience for the fans.

**Faster and Efficient Music Production**

With the insurgence of AI in music, it offers the opportunity for musicians to speed up and optimize the production process while keeping the creativity of the art intact. Using deep learning methods like deep neural networks AI can generate beats, pick samples, edit audio in several different ways and even generate lyrics. AI models like DeepJ have been trained to use deep neural networks to generate music in specific artistic styles and musical genres. Another example of An AI model that artists could use to help the efficiency of their work is Youling, which is an AI-assisted lyrics creation system designed to collaborate with musicians and aid them in writing and polishing lyrics. These AI models can be utilized by musicians and artists to compose songs in whatever style they want allowing them to save a lot of time on repetitive tasks like producing the beat, mixing audio, and writing lyrics.

**Personalized Music Recommendations**

Another opportunity that AI has brought to the music industry is the possibility of revolutionizing music discovery and recommendation for users. In today's scene it can be hard for listeners to access or find new music as there is just so many options available in the ever-growing catalogue of music woldwide. Using context-aware AI systems this problem could potentially be resolved as context-aware systems consider factors such as age, gender, language, culture, and location of listeners along with genre and stylistic preferences to suggest music that is specifically tailored for them. Music streaming platforms such as Spotify and Apple music have already begun to introduce AI onto their platforms through machine learning systems which recommend music to listeners. However, streaming platforms have yet to utilize a context-aware AI model. Implementing such a model would be much more effective than current systems in providing recommendations to users, as context-aware models help to provide more personalized and dynamic recommendations to the user which would help with user engagement and provide an overall more tailored and individualistic experience for the user. Streaming platforms could also benefit from the implementation of context-aware AI models, as it could help users discover new lesser-known artists and songs that they would have never heard before, which benefits the listeners, the artists, and the platforms.

**Using AI to Enhance Live Performances**

Artificial Intelligence can also be utilized by musicians to enhance their live shows and concerts, creating new possibilities to improve experiences for both artists and their audiences. AI could be used during live performances to provide real-time improvisation for any adjustments that the artist wants to make to their show. This could be done using AI systems that involve a method called Generation in Context. Examples of such AI systems that use this are LEMu (live electronic music) and JamBot (improvisatory accompaniment agent). Both systems work by taking an analysis of existing music and generating new music to go alongside it, these systems have also been created with the vision of being interacted with by musicians during live performances. LEMu works by analysing a MIDI file provided by the musician and generates numerous transitional options between tracks provided by the musician. This process is controlled in the performance through a MorphTable which allows musicians to manipulate the parameters of the music to their preference live. This option would be very good for musicians and DJs who create electronic music and are inexperienced in transitioning between tracks. JamBot on the other hand works by listening to an audio source and generating new sounds to play along with the source. It analyzes the audio and stores many different representations of the audio at once in what is called the Chimera Architecture which can be accessed by the performer to choose what variation of the track they want to play. Both options would be very beneficial to live performers as they can help enhance the experience at each show by altering their music slightly differently every time, giving the feeling of a personalized and unique experience to the audience and even the musicians.

**Improving Mental Health**

Since as early as 1789 music has been understood to have an influence the human mind and include therapeutic properties, since then the idea of music therapy has been extensively researched an experimented with and has been scientifically proven to work on people with mental health issues such as depression and anxiety. However, in this new age of technology a new opportunity has developed for Artificial Intelligence to generate music which includes these therapeutic properties to make music therapy an accessible option for struggling people around the world. Using the techniques of machine learning Artificial Intelligence can be used to generate music that has the potential to produce therapeutic soundtracks based on a listener's bio-signals, providing them with the assistance that their body and mind needs to stay relaxed, positive and happy when faced with mental health problems such as anxiety, depression, stress and general wellbeing.

3. Provide a critical assessment of the risks posed by the technology/topic. [Team]

Sound knowledge of the Technology/Topic and risks posed. A high level of synthesis and critique of the relevant literature and sources strongly supporting arguments made.

***AI-Generated Music: Risks Posed***

***Written by Salman***

***Introduction to Risks Posed***

The emergence of advanced computational systems has revolutionised the music industry (Coleman, 2022), with AI-generated music capturing the attention of musicians and audiences. However, alongside the exciting possibilities, there are risks that deserve careful consideration.

One significant concern is the potential dilution of human ingenuity and uniqueness in AI-generated music. There is a risk that the resulting compositions lack the distinct human touch and emotional depth valued in artistic expression. This could lead to a homogenisation of musical styles.

Another pressing issue is intellectual property and copyright infringement (Reje,2022). AI algorithms trained on existing music may inadvertently produce compositions resembling copyrighted works, raising ethical and legal challenges. Determining the line between inspiration and plagiarism becomes increasingly complex when AI technology is involved.

Furthermore, AI-generated music raises questions about the authenticity and intentionality of the artist. When compositions are entirely crafted by algorithms, the connection between the listener and the artist can be compromised. The artist's intent, emotions, and personal experiences may become obscured, potentially reducing the profound impact of the music.

The risks associated with AI-generated music, including diminished human ingenuity, copyright issues, and compromised artist authenticity, highlight the need for careful consideration to ensure artistic integrity in the evolving landscape of music creation.

***Lack of Originality***

The rise of AI-generated music has sparked concerns regarding the impact on the originality and creativity traditionally associated with human musicians. As AI algorithms extensively analyse vast amounts of existing musical data, there is a risk that the resulting compositions may lack the distinctiveness and emotional depth that arises from human artistic expression(Karlberg, 2022).

AI models are trained on extensive datasets of music, enabling them to learn patterns and structures. While this allows them to generate music that may sound pleasing or reminiscent of established genres, it also raises questions about the authenticity and originality of the compositions. The risk lies in AI-generated music sounding derivative or formulaic, as the algorithms tend to replicate existing patterns rather than forge new artistic paths.

This lack of originality could potentially lead to a homogenisation of musical styles, with AI-generated compositions dominating the music landscape. The uniqueness and diversity inherent in human expression may be overshadowed by a flood of AI-generated tracks that conform to popular trends or adhere to predefined formulas. This could limit innovation and restrict the exploration of new musical territories.

Moreover, the absence of human creativity in AI-generated music presents challenges in establishing a meaningful connection between the listener and the artist. Music has always served as a medium for artists to convey their emotions, experiences, and perspectives. When music is solely produced by algorithms, the personal touch and intentionality of human expression are lost, potentially resulting in a diminished emotional connection for the listener.

***Job Losses***

The emergence of AI-generated music poses a potential risk in terms of employment within the music industry. As AI algorithms advance and gain the ability to compose music, there is a concern that human musicians and composers may experience a decrease in demand for their services (Gómez,2019).

The automation capabilities of AI-generated music have the potential to replace certain aspects of music production, such as composition and arrangement, which were traditionally carried out by human musicians. This could result in a reduced need for musicians, composers, and arrangers, as AI algorithms can swiftly generate compositions based on predefined parameters or emulate popular styles.

Additionally, the ability of AI to replicate specific genres or the style of particular artists may lead to a shift in consumer preferences towards AI-generated music. As a consequence, human musicians may find fewer opportunities to showcase their unique talents and perspectives, as audiences increasingly favour the convenience and familiarity of AI-generated compositions.

The impact of job losses in the music industry extends beyond musicians themselves. Professionals involved in the music production process, including recording engineers and personnel at music production studios, may also experience a decline in demand as AI systems can automate certain production tasks. The collaborative and creative dynamics that stem from human interaction within the industry could be compromised.

While AI-generated music presents exciting possibilities, it is important to carefully consider the potential repercussions on employment. Striking a balance that embraces the innovative capabilities of AI while safeguarding the livelihoods and artistic contributions of human musicians is essential.

***Copyright Issues***

The emergence of AI-generated music has given rise to intricate challenges surrounding copyright disputes and ethical considerations within the music industry. As AI algorithms meticulously analyse extensive collections of existing music to produce new compositions, there is an inherent risk of unintentional infringement of copyright laws (Reje, 2022).

AI systems, trained on substantial repositories of copyrighted music, may inadvertently generate compositions that bear striking similarities to existing works, prompting concerns regarding the protection of intellectual property rights. The delineation between drawing inspiration and plagiarising becomes increasingly intricate when dealing with AI-generated music.

The complexity of the copyright dilemma further intensifies when contemplating the rightful ownership of AI-generated compositions. Uncertainties arise regarding who should possess the rights to these creations: the developer of the AI system, the user utilising the AI system, or the AI system itself? This ambiguity can engender legal disputes and impede the equitable distribution of royalties and acknowledgment.

Furthermore, the utilisation of AI systems to emulate the styles of specific artists or genres blurs the demarcation between paying homage and infringing upon artistic integrity. While imitation has long been an element of music creation, the ability of AI to faithfully replicate an artist's distinctive sound and style raises inquiries concerning the originality and authenticity of such creations.

***Diminished Craftsmanship***

The rise of AI-generated music raises concerns about potential risks to the craftsmanship and artistic quality that are typically associated with human musicians. As AI algorithms analyse vast amounts of musical data and generate compositions, there is a possibility that the meticulous craftsmanship and attention to detail demonstrated by skilled human musicians may be compromised (Coleman, 2022).

Craftsmanship in music encompasses a range of elements, including composition, arrangement, performance, and interpretation. Human musicians dedicate years to refining their skills, developing a profound understanding of their instruments, musical theory, and emotional expression. This expertise results in nuanced performances and compositions that evoke deep emotions and establish a profound connection with listeners.

However, AI-generated music, while capable of producing aesthetically pleasing compositions, may lack the depth, intentionality, and subtlety that arises from human craftsmanship. AI algorithms rely on patterns and statistical analysis, potentially leading to formulaic and predictable compositions that lack the artistic touch and individuality found in human-crafted music.

Furthermore, craftsmanship in music extends beyond technical aspects to encompass interpretation and emotional delivery. Human musicians infuse their performances with personal experiences, emotions, and interpretations, establishing a profoundly human connection with audiences. AI-generated music, lacking such personal touch and lived experiences, may struggle to replicate the profound emotional impact achieved through human craftsmanship.

4. Provide a critical assessment of the choices available when adopting the technology/topic. [Team]

Sound knowledge and assessment of the Technology/Topic and choices available for its design and implementation in society. A high level of synthesis and critique of the relevant literature and sources strongly supporting arguments made.

# AI-Generated Music: Choices Available for its Design and Implementation in Society

*Written by Sara Khalaf*

AI-Generated Music is created using algorithms and software programmes that can analyse and create music. It can be utilised to produce a wide range of musical genres and styles in a variety of different contexts. It has the potential to expedite a new world of creativity, modernise the way music is created, as well as providing a profound way of experimenting and experiencing music creation that is far more complicated than what a human musician could create (Carter, 2023).

Evidently, AI technology will continue to grow at a remarkable pace, putting society in a position to assess the various possibilities that can shape the design and implementation of AI-generated music. Therefore, it is important to navigate the unfamiliar territory that exists between record labels acceptance of AI-generated music and the incorporation of AI artists alongside real-artists, to ensure appropriate and ethical use of this new technology.

The rise of AI-generated music and its impact on the music industry has ultimately led to discussions on how to achieve an honest balance between human creativity and AI-driven innovation. If this is challenged by those who use it, it is important that we carefully consider the possible consequences and implications for the future of music.

AI Artists Collaborating with Real Artists

AI-Generated music has created an opening for AI artists to imitate the genre, style, and voice of real artists. With easily accessible AI technology online, users can upload an artist’s vocals to an AI generator and use autotuning techniques to achieve the perfect pitch. Without input or involvement from the actual artist, AI artists can release and claim the work to themselves, taking advantage of AI technology’s capabilities in the creation of music.

For example, the song originally created and released by Ghostwriter977, “Drake AI – Heart On My Sleeve feat The Weeknd AI”, has gained over a million views on YouTube (Snapshot Edits, 2023). Despite potentially misleading Drake’s fans, the song quickly gained popularity. Numerous reaction videos were posted online, fans expressing their opinions and amazement at the quality and resemblance of “AI Drake” to the “real Drake”. This example communicates the power of AI-generated music and its ability to push limitations to inspire new music. However, record labels and artists, whose property and/or voice were used illegitimately, may not feel the same way. In another situation, Drake’s voice was used to cover Ice Spice’s Munch, a song you would never picture the artist singing in real life. He was quick to respond on Instagram, saying, “This is the last straw”. Expressing their irritation, Universal Music Group spoke up against the AI-generated cover, demanding Spotify, and other streaming services to remove AI versions of their artists and their copyright songs (Harris, 2023). Their reaction is reasonable as they ask for the protection of their rights and the rights of their artists and put a stop to illegal use of their music. In doing so, platforms refrain from sharing content that breaches these rights.

This serves as a small glimpse into the possible implications of utilising AI-generated music without implementing appropriate measures. This example showcases how the free-for-all use of AI-generated music can result in significant consequences, ultimately highlighting the need to lessen the potential risks and protect the rights of artists. The use of AI-generated music raises questions when it comes to imitating artists, that users must keep in mind. Do artists own the sound of their voice or do record labels own the sound of the artists’ voice. Nonetheless, this advanced technology is here to stay.

Therefore, collaboration between AI artists and real artists is an option that holds great promise for the integration of AI-generated music into society. Individuals who have an interest in creating music via AI algorithms, have the ethical responsibility to seek out permission from the artist they wish to replicate in their song(s) and provide them with respectful payment, if released. The Canadian musician, Grimes, took to twitter to voice her opinion on this matter, commenting on social media, “I'll split 50% royalties on any successful AI-generated song that uses my voice.” (Beato, 2023). Some artists, who are not signed with record labels and have no legal bindings may find this approach advantageous for their career and financial wellbeing. It also communicates the way in which successful and mutual collaboration can result in new processes and unique musical experiences. By seeking permission, AI artists can fairly claim the work as their own, without the possibly of facing severe consequences from record labels or the artists themselves.  
  
Establishment of Appropriate Guidelines and Standards

To ensure responsible and ethical use of AI-generated music, appropriate guidelines and standards are necessary to direct the design and implementation of AI-generated music in society.

Guidelines can “streamline certain processes according to what the best practices are.” Guidelines may provide flexibility for unexpected circumstances and are open to interpretation for the user (Spoden, 2017). Standards, on the other hand, are necessary courses of action or guidelines that provide official policies with support and guidance. They are used to indicate expected behaviour and must be strictly enforced to be beneficial (Spoden, 2017).

In the context of AI-generated music, proper guidelines and standards can help address important topics surrounding copyright and ownership of music compositions. They can provide a structure for determining who the rightful creator is and address any potential legal and ethical consequences that may surface from using these kinds of technology. However, questions related to the originality of their work should be taken into consideration, as well as the extent of their input, as well as the rights of the real artist involved. It can help to ensure that all parties involved receive adequate compensation and recognition to maintain a healthy and balanced implementation of AI-generated music.

When creating music, some AI artists dive into problematic and potentially harmful territory by stealing another artist's voice and style without their permission. To protect the artist’s interests, it becomes essential to develop effective AI systems that can identify and respond to suspected copyright infringements, eliminating unexpected consequences. This system should integrate an algorithm that can uncover whether the AI-generated composition has been granted permission to use specific elements, such as voice samples, and identify the sources of any voice generators used. By adding such protections, it can ensure all rights are respected.

Streaming Services for AI Artists

The creation of dedicated streaming services solely for AI artists has the potential to influence the music industry and encourage this form of music composition. Establishing a specialised platform, that is designed to display and promote the work of AI artists, offers a promising solution to challenges surrounding copyright.

To address these concerns related to unofficial use of artist’s voices, streaming services can create platforms for AI versions of real artists. It permits them to upload their music to the public, whilst clearly revealing whose voice and style was used in the song. Consequently, streaming services can ensure appropriate compensation by paying the artists or record labels who hold the legal rights to elements used in the AI-generated composition. Without such platform, AI artists are uploading their music onto platforms such as YouTube and TikTok, which can be taken down for copyright infringement if it is viewed as unauthorized use of the artist's property.

Ultimately streaming services have a legal obligation to protect the rights of artists. By providing a dedicated platform for AI-generated music, they can play a fundamental role in legitimizing and promoting this emerging form of technology and artistic expression all while ensuring fair treatment and compensation for all parties involved.

Producers and Songwriters using AI to Experiment with Different Artist Vocals.

An article written by Griffin Brown, discusses the way in which producers collaborate to create new music. He states, “One producer likely reaches out to another through social media… After deciding on a track, the rest of the collaborative process likely looks a bit like a tennis match. The first producer works on the track, then sends it off to the other. The second producer works for a bit, then sends it back. And so on and so on until the track is done.” (Brown, 2019). This method of collaboration lacks clear direction and strategy, and it reduces the true meaning of collaborative efforts because it occurs primarily in isolation.

To ensure effective collaboration, artists can use AI-music generators to experiment with different vocals and sounds. The use of this technology nurtures a modern and innovative approach to music collaboration, ultimately streamlining the decision-making process for producers and songwriters.

By combining this technology into the creative process, artists can test out unique and unconventional vocal sounds, and experiment with different artist collaborations, even autotuning to reimagine an artist’s vocals in different ways. These experimental methods allow artists to finalise the direction and vision of a song before engaging with specific artists or producers. An opportunity for feedback, improvements, and acceptance of collaboration can then be obtained by sharing song samples with the person they intend to work with.

Taking advantage of AI generated music in this way demonstrates a positive implementation of this technology in our society. It serves as a starting point, offering new creative possibilities for music creation that would not have been possible without the support of this technology. While it is undeniable that challenges may occur from the use of this technology, responsible and ethical use can result in the creation of true masterpieces that resonate with people.

**For the Process Support Page, inclue team contract and roles and responsibilities.**

**Team Contract**

**Project Name: AI-Generated Music**

**Project Team Members Names and Sign-off:**

|  |  |
| --- | --- |
| **Name** | **Sign-off on Team Contract** |
| **Sara Khalaf** | **Sara Khalaf** |
| **Aidan King** | **Aidan King** |
| **Salman Khawaja** | **Salman Khawaja** |
|  |  |
|  |  |
|  |  |

**Code of Conduct:** As a project team, we will:

* Treat our team members respectfully and fairly.
* Value each other’s input without discrimination.
* Act in the best interest for the success of our project.

**Participation:** We will:

* Divide the workload amongst ourselves to ensure fair contribution.
* Set aside time during the week to work on the project.
* Follow the assignments brief correctly.

**Communication:** We will:

* Set up a group chat to communicate on a weekly basis.
* Discuss the progress of our project and make sure everyone is fulfilling their roles and responsibilities to meet the requirements of the project.

**Problem Solving:** We will:

* Ask for assistance and guidance when necessary.
* Use appropriate resources to guide our research.

**Meeting Guidelines:** We will:

* Actively respond to the group chat
* Follow up with each other with regards to the progress of our work.

**Roles and Responsibilities**

|  |  |  |
| --- | --- | --- |
| Sara Khalaf | Aidan King | Salman Khawaja |
| Role: Research/Writing/ Presentations   1. Finalising the justification of our technology topic (its choice and importance.) 2. Researching AI-generated music and the choices available for its design and implementation in society. Presenting this to Aidan to be included in our source. 3. Writing and creating visually appealing PowerPoint presentations and submitting on behalf of my group to Canvas. 4. Collaborating with my team, dividing the workload, making sure everyone is on task and time. | Role: Research/Web Design and Development   1. Researching the opportunities that come with the use of AI-Generated Music and how those opportunities could affect society. 2. Developing the website where our findings/research will be presented. | Role: Research/Writing   1. Researching the risks of AI-Generated Music. What are the effects on society? 2. Writing the ‘Risks’ page for our website. |

5. Present Technology/Topic through a scholarly resource. [Team]

Demonstrates significant capacity to present at a scholarly level. Web resource is highly organised and logically integrated. The intent of the team is explicit and expressed with clarity and insight. Comprehensive and consistently reported references conforming to APA standards.

|  |  |
| --- | --- |
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