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### Uses of artificial Intelligence in the Music Therapy

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#### Abstract

This paper aims to study the importance of artificial intelligence in the music therapy. Artificial intelligence (IA) in the music therapy use many different approaches to meet your needs. In general, the types of experiences you might have fall into two broad categories: Active interventions and receptive interventions. In active interventions, the people can play instruments. But in receptive interventions, persons

can spend some time together talking about music as a way to process their thoughts and feelings. However, the artificial intelligence will guide people in creating and/or listening to music during the session. Moreover, people can do one or more of the following activities: Create music, sing music, improvise, play on instrument, move to music and listen to music.

**Keywords:** Music, Therapy, Artificial, Intelligence, People

#### 1. Introduction

Music therapy is a method used since antiquity. Aromatherapy together with music therapy was used in medicine to treat some diseases in ancient Egypt. In wars this method was used to encourage soldiers going into battle (ex. the Spartans).

But music therapy was also used to stimulate the depressed or wounded due to war (ex. ancient Rome).

The Belgian painter Louis Gallait in the painting "Power of Music", in which he represents the importance of music therapy, as shown in Fig. 1 below.

This painting represents a brother and sister resting before an old tomb. That is, the brother who plays the violin tries to ease his sister's pain. After the songs, the sister falls into a deep sleep forgetting such pain, mental and physical <sup>[1]</sup>.



Fig 1: Power of Music

The great scientist Albert Einstein liked to play the violin when he was tired. Incidentally, Albert Einstein who was a fan of Mozart said “Mozart’s music is so pure and beautiful that I see it as a reflection of the inner beauty of the universe”.

Today, the music of Elvis Presley and the Beatles is at the forefront of music therapy to help people with dementia. Thus, the innovative approach combines music and dance lessons with speech and language therapy, alongside physiotherapy in retirement homes [2].

**2. Study of artificial intelligence in music therapy**

Music therapy can be addressed to a person or a group of people.

Before the use of artificial intelligence on people must be taken into account:

- Music preferences and interests.
- Age and developmental level.
- Physical and cognitive abilities.

In music therapy, different types of music are used: Symphonic (Mozart, Beethoven, Bach, Verdi, etc.), blues, rock and roll, etc.

Music therapy is used in various state institutions: Hospitals, schools, penitentiaries, reeducation centers, etc.

In addition to physical health, the music therapy sound healing is also used to release "blocked" energy from subtle energy channels to restore balance and emotions to patients. Specific frequencies are linked to specific patterns in numerology and geometry and are said to have specific effects on the body and mind.

The values of these frequencies can be seen in the table below.

**Table 1:** Parameters of a USV

S. No	Causes	Value (Hz)
1	Relieves pain and stress	174
2	Heals tissues and organs	285
3	Liberates the listener from fear and guilt	396
4	Facilitates change	417
5	Transformation and DNA repair	528
6	Brings the listener back to a spiritual order	852
7	Encourages a sense of oneness and unity	963

With the help of artificial intelligence, the best frequency for the interested person can be automatically chosen.

Robots can be introduced to replace singers or bands on various instruments: Guitar, piano, drums, flute, etc.

The use of artificial intelligence (AI) in the music industry has nothing like how technology is transforming industries. Artificial intelligence may now make music as a result of recent technological advancements. We will have to start by training AI technology by exposing it to a wide range of musical creation. We will have start by training AI technology by exposing it to a wide range of musical creations [4].

The traits and patterns of making music that its listeners are likely to enjoy are learned by artificial intelligence. It has the capacity to create new music by unexpectedly merging

several musical components.

The roles of Artificial Intelligence (AI) in the music industry:

➤ **Composition of music**

Customers may can use AI to gain access to numerous tools for music composition and remixing. So that, the customers will be able to build their own rhythms and melodies.

The songs generated by artificial intelligence (AI) can be developed by some well-known musicians.

➤ **Music Mastering**

Audio mastering was mostly done in a studio with precise acoustics. Thus, it allowed musicians to detect flaws with sound balance and spectrum range. This method helps to discover faults and optimize listening to music on any device.

➤ **Streaming music**

This approach evaluates the songs and listening patterns of millions of people. On the other hand, it excels at detecting patterns in tens of thousands of classical pieces. For example, the Discover Weekly is an AI-powered tool on Sportify and creates a weekly soundtrack for each specific user.

➤ **Making of new sounds**

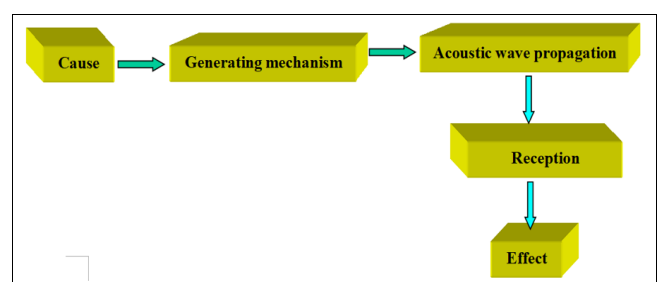
Artificial intelligence (AI) has opened up new avenues for the peoples of new rhythms and sounds. However, AI generated music tracks lack originality almost all time. They are great for providing good compositions that musicians can collaborate with to create new hits.

➤ **AI enhancing creativity**

Artificial Intelligence (AI) is revolutionizing the music business in a variety of ways. But the artist need not worry about being overtaken by modern technology. Because, we are still a long way from artificial intelligence creating songs on its own.

We currently believe that there are eight best AI music generations: Beatoven AI, Loudly AI, Splash Music, Avia AI, Soundful, Boomy AI, Wavtool and Ecrett music [5].

For a person in a room to assimilate IA music generations there must be five stages: Cause, generating mechanism, acoustic wave propagation, reception and effect, as shown in Fig. 2 below.



**Fig 2:** The stagiest of AI music generations

A simple example of sound propagation is in a room that has: Two windows, a door and one or two loudspeakers. In this case, the listening hears both direct sound and reflected sound, as appears in Fig. 3.

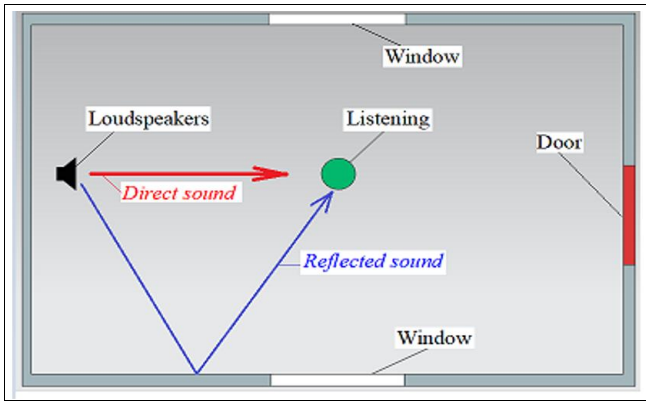


Fig 3: The sounds from loudspeakers to listening

In a room, the speakers are mounted on an adjustable speaker mounting rack in order to hear the sounds better, as it is presented in Fig. 4 below.



Fig 4: Adjustable speaker mounting rack

Sound pressure (acoustic pressure) is the deviation of the local pressure from the ambient average or equilibrium atmospheric pressure. However, the sound pressure that is caused by a sound wave. In any case, in air the sound pressure can be measured using a microphone or loudspeaker and in water with a hydrophone.

A sound wave in a transmission medium causes a deviation (sound pressure) in the local ambient pressure (a static pressure).

The total pressure (local ambient) is determined with the relationship:

$$p_{total} = p_{static} + p \tag{1}$$

Where:

- $p_{total}$  – total pressure.
- $p_{stat}$  – static pressure.
- $p$  – sound pressure.

In acoustics, it is known that in a sound wave the variable complementary to the sound pressure is the speed of the particles.

In the equation below, the sound pressure together with the speed of the particle determines the intensity of the sound wave:

$$I = v \cdot p \tag{2}$$

Where:

- $I$  – intensity of the sound wave.
- $v$  – particle velocity.

Suppose there is a bed in the middle of a room, Fig. 5. The room is made of bricks that have the following standard dimensions:

- Length: 4 meters.
- Breadth: 3 meters.
- Height: 2.5 meters.

The solid pine wood bed has the dimensions:

- Length: 1.670 meters.
- Breadth: 2.130 meters.
- Height: 1 meter.

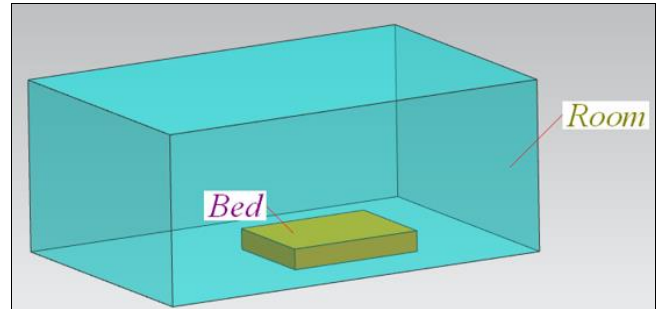


Fig 5: Model of room with bed

Source region of sound wave from wall 1 goes to wall 2 namely target region, as shown in Fig. 6.

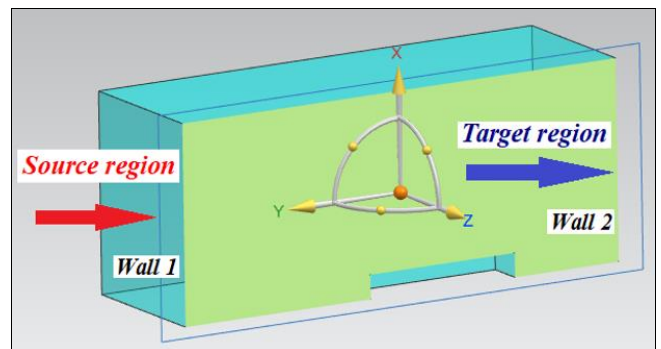


Fig 6: Source and target region into room

In the room shown above, the minimum pressure is in node 2005 and has the value  $p_{min} = -9.94737 \cdot 10^{-8}$  MPa. And the maximum pressure is in node 1085 and has the value  $p_{max} = 1.0678 \cdot 10^{-7}$  MPa, as in Fig. 7.

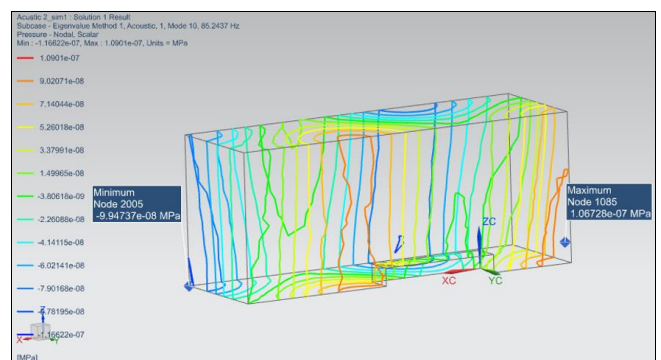


Fig 7: Sound pressures in room

### 3. Acknowledgement

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#### 4. Conclusions

The benefits of artificial intelligence in music therapy depend on the condition or symptoms that the PERSONS are treated with. Overall, research shows that IA (intelligence artificial) music therapy can:

- Relax people.
- Helps you explore people's emotions.
- Reducing the anxiety or depression of closed people.
- Reducing the level of stress at work.
- Regulation of the athletes' mood.
- Strengthen your communication skills.
- Improve speaking and language skills.
- Develop social skills.
- Strengthening self-confidence.
- Developing work problem solving skills.
- Improving the quality of life for the elderly.

In the future, the music therapy will develop more with the help of artificial intelligence.

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