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Exploring music listening patterns: an online survey

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***Abstract*—An online survey was carried out to explore how respondents listen to music recordings. It was anticipated that the listener's preferences would be influenced by various factors, such as age, music genre, the contexts in which they listen, and their favored methods of music consumption. Consequently, the data were collected to analyze these relationships. The survey, structured as a web application, encompassed 23 questions, with seven specifically aimed at defining the respondents and the remainder contributing to the dataset for analysis. The results reveal a prevailing preference for listening to music via streaming platforms. Respondents predominantly engage in passive listening, where music becomes a background presence without commanding their focused attention. Moreover, the data also highlight a noteworthy correlation between preferred music genres and the age of the listeners.**

***Keywords*—way of listening to music; musical preference; music streaming; radio**

I. Introduction

THERE are many ways of listening to music, and every person has a preference for that. The research study aimed to gain insight into factors influencing how people listen to music. The scope of this study was to develop a web application that collects responses from an online survey about their preferred ways of listening to music. Subsequently, the obtained results were analyzed, including examining the correlation and interrelationships between them. The most critical and interesting were included in the paper.

Due to the small number of sources and the lack of up-to-date articles and studies performed in this research area, a few essential works presented in this paper cover the subject only partially. It is, however, worth pointing out that some broadcasting organizations and stations treat surveys directed at listeners as a gold standard as they are a tool for providing feedback on community radio listening habits [1].

The most related study examined personal music listening experience. It investigated which music people prefer to listen to and how they use the playlists—among others [2]: shuffling the whole collection, skipping songs, choosing the next song one after another, and having playlists depending on the occasion. The studied group primarily consisted of men with technical education and students. The survey contained 32 questions, and the methods used for analysis were mainly calculations of medians and modes.

Major findings of this research showed that familiarity with the songs, how distracting they are, and how much they fit in the listener's mood influence the choice of music. Additionally, it turned out that people wanted to have an impact on the music they listened to while minimizing the effort required to moderate their music [2].

The most common way of listening to music was by a prepared playlist; next in order was listening to a chosen artist, album, or genre and shuffling the whole music collection. Using radio, including online stations, is a much less popular option [2].

In "*Social and Emotional Function of Music Listening: Reasons for Listening to Music*" [3], it is proved that there is an extensive connection between the genre people listen to and their age. In childhood, respondents preferred listening to pop music and, later, during their university years – rock music [3].

The more recent study—"*Do the shuffle: Exploring reasons for music listening through shuffled play,*" researched why people listen to music, how they listen to, and why they download it [4]. The most popular way of getting access to music is a subscription to a streaming site, followed by buying a music piece online. Moreover, respondents prefer to choose the tracks they want to listen to at a given moment or use self-prepared playlists instead of using suggested playlists. They also download songs mostly because they like the artist or because of how it sounds. It turned out that the reasons people listen to music chiefly are their overall liking of it and its ability to enhance the activities people engage in [4].

The study "*The Sound of Software Development: Music Listening Among Software Engineers*" [5] shows relations between people connected to technical subjects at work and their music listening habits. The most significant reasons for listening to music at work are cutting off background noise, lifting workers' mood, increasing their focus, and relaxing them. Still, on the other hand, music can also be detrimental to workers due to causing problems with concentration and provoking distractions. Respondents also stated that the common types of music they listen to for pleasure are rock and metal, but when it is related to work, it is electronic or instrumental music [5].

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All that research work leaves no doubt that music is an integral part of human life, and there are apparent correlations between age, education level, current situation, and how people listen to music. Therefore, some of the recalled publications were used as a starting point to find the most accurate questions and methods of analyzing collected data.

II. Method

A. Technology aspects

The first step was to develop a web application and user interface that would collect responses from the participants about their way of listening to music. The whole project was based on the Python micro framework—Flask, the purpose of which is to create, e.g., such web applications [6]. A survey was designed with different types of questions that were crucial for the investigation.

MySQL database was connected to the survey on an online server, which collected the data directly from the website. The database was designed based on a 1-Tier Architecture, which was sufficient for that type of questionnaire.

B. Design of the survey and demographic data

The main task of this investigation was to create the survey, which included preparing a set of questions, connecting the app to the database, and distributing the survey. Questions were selected after analyzing the state of knowledge and similar solutions, which are relatively infrequent in the researched area. They were prepared in two languages—Polish and English—to expand the survey's target group. The anonymous short study consisted of two types of questions—to define the experimental group and provide data for analysis.

The survey encompassed 23 questions—16 of them were about how to listen to music, and 7 were 'personal questions.

The survey's page concerning 'personal questions' is shown in Fig. 1. It should, however, be remembered that the survey was anonymous, so the person submitting data concerned only general answers.

In the questionnaire, participants were asked about:

- their mood when listening to music,
- how long does it take to listen to music actively and passively,
- what is their preferred way of listening, including streaming platforms, radio, and hardware records,
- which auditions seem attractive to them,
- and in which way they select songs that will be played.

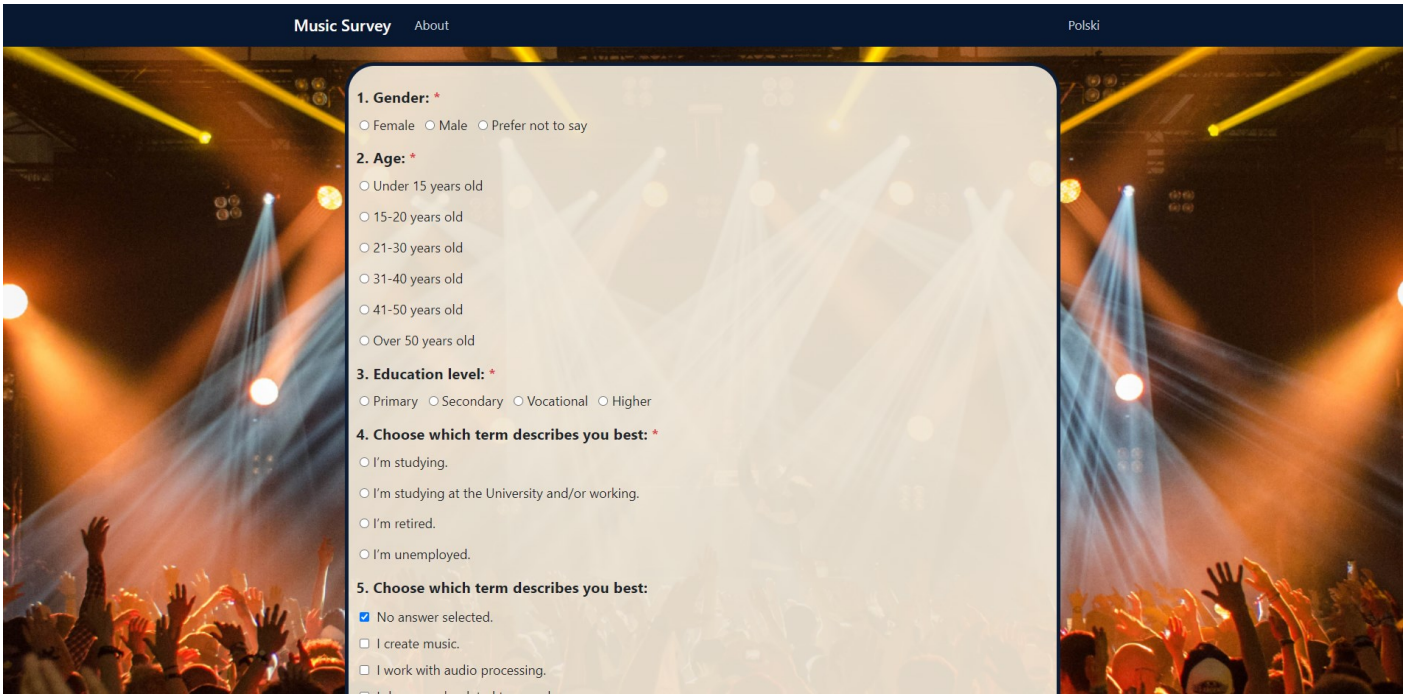

Fig. 1. Music survey's page concerning respondents' general information

The survey was completed by 239 people. 55% of the respondents were men, 43%—women, and 2%—people who did not want to specify their gender. Most answers were collected by people aged 20-30 (79%), followed by 15-20 (12%), 30-40 (5%), 40-50 (1%), and over 50 (1%). It means that most of the respondents were young people who were learning or studying. The answers show that the majority of respondents came from Poland (91%). The rest of the population participating in the investigation were from Singapore, Spain, Belgium, France, Ireland, Portugal, South Africa, the USA, Sweden, and Ukraine. The largest number of responses was collected from people living in cities with over 100 thousand inhabitants (65%), 20-100 thousand inhabitants (20%), 1-20 thousand (9%), and below 1 thousand (6%). 21% of the answers came from people educated in the field of music, and 31% from people who play instruments.

III. Results

The main goal of the survey was to determine how people listen to music. As seen in Fig. 2, the investigation shows that

streaming platforms are the most popular sources to play music—80% of respondents chose this method. 7% of respondents opted for FM radio, and 3% for CDs and vinyl records. Internet radio was the least popular option—only four respondents chose it (2%). The popularity of streaming platforms was also studied. As expected, Spotify turned out to be the most popular, and it was used by 73% of respondents. Spotify was one of the first music streaming platforms; it successfully decreased music piracy by introducing monthly subscriptions [7]. YouTube was originally a video streaming platform that made a huge impact on the music market, but even after introducing YouTube Music in 2018, most listeners preferred to use a more popular and dedicated (from the beginning) on-demand music streaming platform [8]. YouTube music was used by 17% of respondents. The remaining platforms collected an insignificant percentage of responses (Tidal—1%, Apple Music—3%).

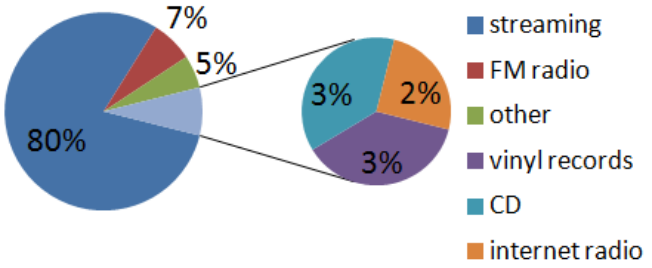

Fig. 2. Percentage of listeners who prefer to listen to music using various media

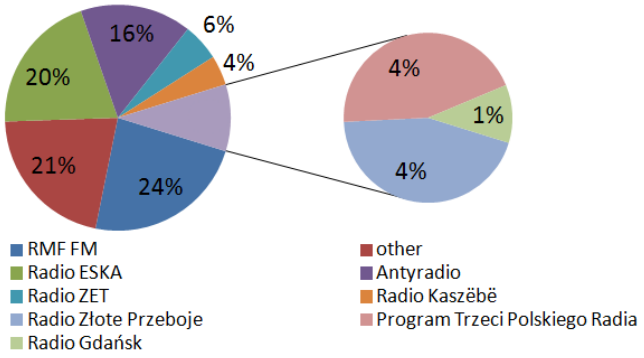

Fig. 3. The number of listeners of individual radio stations

Figure 4 shows the preferred way to select the songs to be played. Almost half of the respondents (49%) choose songs to play on their own, 18% are guided by the type of music, 14% by the playlists proposed by the algorithm, and 11% by the artist. As for the playlists presented by the algorithm, the degree of their tailoring was examined. 49% of respondents answered that the degree of tailoring is high, 38% that it is medium, and 4% think that the algorithm perfectly tailors the songs in their playlists. The proposed playlists have some drawbacks, resulting from the model of recommendations, most of which are not flexible—there are various mood changes between songs [9]. Nevertheless, the vast majority are satisfied with the degree of tailoring the songs—hence, they are happy to use the proposed playlists. Despite the high degree of tailoring, as many as 87% of respondents skip some songs, and 7% listen to entire playlists without skipping.

Among listeners of traditional FM radio, three dominant stations can be distinguished: RMF FM, Radio ESKA, and Antyradio. RMF broadcasts a music and information program, aired 24 hours a day. The station's music profile includes the biggest hits of the last 30 years (Adult Contemporary format). Radio Eska broadcasts a program aimed primarily at listeners aged 15-34. On the air, one can hear new songs from such genres as pop-rock, R&B, pop, hip-hop, disco, electronic dance music, and club music. Antyradio broadcasts music in the alternative rock format.

The percentage result of individual stations is presented in Fig. 3. The most popular internet radio is Antyradio (18%), followed by RMF FM (15%) and Radio ESKA (10%). The preferences of what the respondents like to listen to were also examined in detail. For 43% of respondents, music broadcasts are attractive. They prefer not only listening to music but also hearing auditions about music. 32% of respondents like listening to programs and reports interrupted by music. The remaining respondents commented negatively on the above-mentioned answers.

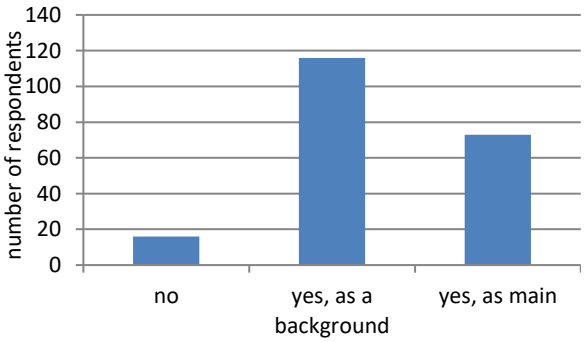

Fig. 5. Social activities/meetings surrounded by music

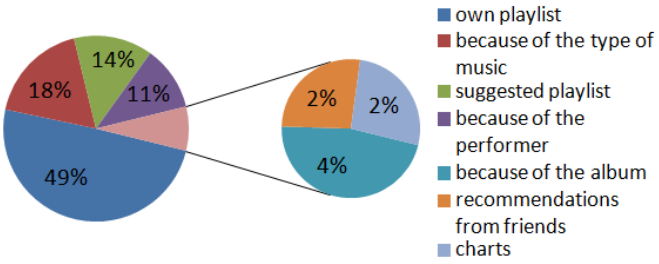

Fig. 4. The preferred way to select the songs

Music can have many functions, including separation from the environment. The results show that 88% of respondents listen to music for this purpose. These data were compared with the answers describing musical education. All people who process sound or do audio research listen to music for the purpose mentioned earlier. Another purpose of listening to music can be entertainment. Therefore, whether people listen to music during social activities has been studied. The result is presented in Fig. 5. In most cases, the music is played during social activities, both as background and leitmotiv. It means that during these meetings, the respondents passively listened to music.

The respondents also gave answers about the active and passive ways of listening to music, as shown in Table I. The respondents listened to music in an active way much shorter than in a passive way. The vast majority listened to music passively for more than 3 hours a day. Gradually, as the length of time decreases, so does the number of people. On the other hand, the data on active listening to music showed an inverse relationship. Most respondents listened to music actively for less than 30 minutes or about 1 hour. As time increases, the number of listeners decreases. It was also examined whether humor affects the choice of songs listened to—96% of respondents answered that their mood affects the songs they listen to.

TABLE I
WAY OF LISTENING TO MUSIC

	active	passive
less than 30 min	70	18
between 0.5-1 hours	64	25
between 1-2 hours	48	37
between 2-3 hours	10	43
over 3 hours	13	82

During the analysis of music data, music genres should not be forgotten. According to the answers collected, the respondents listened to rock, pop, and hip-hop/rap the most. A division was also made there due to musical education. It has been noticed that people who are not related to music in any way listen to the most popular genres presented above. Among people from the music industry, metal, other genres, or rock were the most listened to. According to the collected data, age also impacts the genre of music the respondents listen to. Figure 6 shows the dependence of the most popular musical genres for age groups. Younger people (20-30 years old) often listen to Rock, Pop, or Hip-Hop, but the respondents from the 30-40 and 40-50 age groups also listen to less popular genres, such as alternative or classical music, to a greater extent.

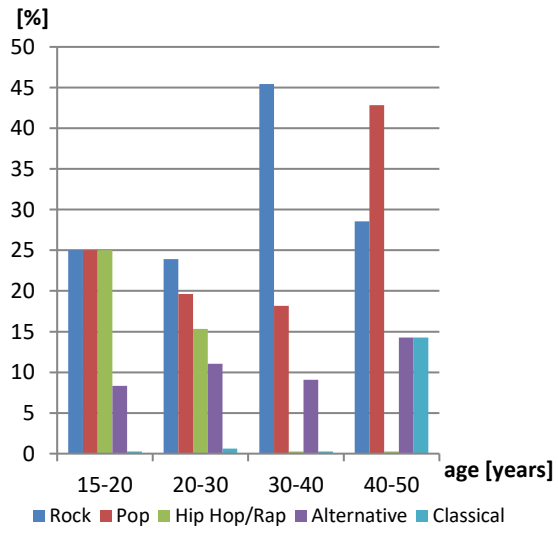

Fig. 6. The most popular music genres among age groups

It is interesting to see what similar studies carried out recently discovered in connection to listening to music, specifically concerning music genres. The experiments consisted of collecting album cover assignments to music genres from respondents using a web application and comparing their results with the predictions of the trained deep classifier. The designed questionnaire form consisted of a total of 7 questions regarding general information, such as gender, age, way of listening, etc. The genres included in the study were selected based on popularity rankings on iTunes. They were as follows: jazz, dance, punk, blues, metal, hip-hop, rap, electronic music, film music, classical music, disco polo, folk, soul, pop, and rock. In addition to the species mentioned, control questions regarding age, gender, and education were also included. The last question included in the survey was in the form of a text answer; the respondents were asked to add their preferred genres that were not included in the list of genres from iTunes. This allowed for containing genres that are potentially popular among the surveyed population and were not present on the list based on iTunes.

A total of 54 people took part in the study. The vast majority of them were men, i.e., 72.2%. Among respondents, students and high school students dominated. In Table II, respondents' age is shown. Moreover, it occurred that every second person listens to music while relaxing. Also, listening to music when traveling, studying, or working was also a very popular choice. This shows that a significant number of respondents treat music as an addition to the activities they perform. In Table III, activities performed by respondents when listening to music are shown.

TABLE II
RESPONDENTS' AGE

Respondents' answers [%]	15-25	25-35	35-45
	77.89	18.5	3.7

TABLE III
ACTIVITIES PERFORMED WHEN LISTENING TO MUSIC

Respondents' answers [%]	Relaxing	On one's way/traveling	Working/ studying	Cleaning	Other
	51.9	46.3	42.6	20.4	3.8

It is also interesting how long respondents listen to music during the day. This information is included in Table IV.

TABLE IV
HOURS SPENT LISTENING TO MUSIC DURING THE DAY

Respondents' answers [%]	1-2 hours	2-5 hours	>5 hours	<1 hour
	40.7	27.8	16.7	14.8

The most popular genre turned out to be rock (31 people). The difference between music genres was small. Rap was chosen 21 times. Subjects selected an average of 3.5 different genres from the proposed list. This means that they listen to different types of music. Only 14 of 54 people reported additional genres that were not on the list. Techno (3 times) and computer game music (3 times) were repeated most often. This shows that the vast majority of preferred genres were included in the prepared list, and omitted genres were not repeated between different responses.

Table V shows the number of respondents listening to particular music genres.

TABLE V
PERCENTAGE OF RESPONDENTS LISTENING TO PARTICULAR MUSIC GENRES

Rock	Number of respondents
Rock	31
Pop	28
Electronic music	23
Rap	21
Hip-hop	17
Metal	16
Film music	16
Classical	12
Jazz	12
Dance	10
Punk	8
Blues	7
Soul	4
Folk	4
Disco Polo	
Other (Techno)	14 (3)

It is interesting to compare results from Fig. 6 with those contained in Table V. Obviously, they are comparable only to some extent, as Table V does not show division into a group age. Still, it seems that even though these respondents were recruited from different areas (among the respondents were also students from other countries other than Poland), rock and pop were the music genres that were most listened to the most.

CONCLUSIONS

Streaming platforms, mainly Spotify, were the preferred source to play music. We predict that streaming platforms will be developed, e.g., using artificial intelligence, which could increase the percentage of tailoring songs in proposed playlists to a user. When listening to playlists, most respondents skipped a small number of songs. This small number is due to the high or medium selection of songs proposed by the algorithm.

FM radio is losing popularity, but people, mainly the older generation, still prefer to use it. RMF FM and Antyradio were the most listened-to radio stations among the respondents.

Most of the respondents listened to music in a passive way, mainly as a background for studying or during parties. Some people also listen to music in an active way, in which they pay attention to the lyrics. In addition to music, they also liked to listen to programs interrupted by music or radio broadcasts about music.

Focusing on music, the vast majority of respondents created playlists themselves; they rarely used the songs suggested by the algorithm. However, according to the study, the degree of tailoring was satisfactory for the majority. In addition to their own playlists, the respondents chose playlists with a specific genre of music. Rock, Pop, and Hip-Hop/Rap playlists were the most popular. Nowadays, people tend to discover new genres and explore the music world. Considering this fact, we predict that more people may have difficulties describing their favorite music genre.

It should also be noted that BBC very recently published a report entitled “Spotify Wrapped 2023: 'Music genres are now irrelevant to fans'” [11]. This is based on the notion that in the era of streaming, approximately 100,000 fresh tracks find their way onto Spotify daily, each of them categorized into one of over 6,000 genres. Hence, it is no longer possible to choose music by its genre. Moreover, it is said that “genre has become a very data-driven way of "compartmentalizing music" in a digital world,” so this is another point showing that streaming is the most common way of retrieving music, dictating what and how people would listen to.

Further research about music is needed to determine how the proposed playlist could be more attractive and what impact it has on people. It could be helpful for radio stations and streaming platforms to deliver the best product to their clients. Moreover, future studies should be devoted to the media management organization and their mechanisms [12]. It should also be taken into account that individual and freelancing producers are involved in media creation and become the central core contributors to the so-called user-generated content. In addition, Kotsakis *et al*. [12] pointed out that the audio repository should be dynamic for effective broadcasted data management, as well as for radio content description and archiving purposes.

Finally, future work could be performed on research similar to the one carried out by Weerathunga et al. [13], which focuses on various audio patterns in the broadcast context and a supervised learning approach to predict radio broadcast context automatically.

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