THE APPRECIATION OF THE SENSE OF SPACE THROUGH THE ACOUSTIC LANDSCAPE OF URBAN PARKS: CASE STUDY OF URBAN PARKS COLOMBO

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Abstract

*The main goal of this study is to analyze the human sense of space of an urban park through the **acoustic landscape** of it. The research will be done in sample four sites in and around Colombo Sri Lanka; viharamahadevi park, diyathauyana , independence square premises and the study was done maintaining the equality of the case studies by observing in the same time during congregative Sundays . And the **acoustic landscape** will be appreciated through several methods of study. the analyze will based on the acoustic characterization of the park's interior noise levels of selected functioning and isolates spaces , and by two separate socio- acoustic surveys to the visitors and selected sample of people to check there perception on acoustic quality , of the above mentioned urban parks . The measurement of acoustic characterization is done by recording the **sounds** and plotting in to graphs where decibels and frequency compared. And a social survey is done by giving a questioner to the random users of the parks .so that the data will be analyses on charts and graphs. The second phase of the study is done by giving the above recorded **sounds** to the selected group of people and through a questioner the idea on the **sounds** will be collected and graphed. The study and the summery prove that the urban parks in Sri Lanka contain lots of unwanted, unpleasant and unexpected **sounds** that the people does not expect or prefer other than the human favorable and natural acoustic **sounds.**So that the noises affect the concentration and disturbed the perception.*

Keywords: Acoustic landscape**,** Sounds, Sense , urban parks , perception , concentration

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Introdution

According to the biology there are five sense organs for human beings, those are eyes, ears , nose , tongue and skin . from above visual, auditory, taste and sense of touch are sensed most of the time the visual aspect is taken in to consideration . intis case the auditory aspect is going to consider .Sounds make an important part in physics and as well as in the environment. Sound is used as the main communication method from past to present in one way or the other .
Sounds in form of natural and artificial or else music or vocal , instrumental or larynical plays an main role in perception .each and every human being creates there own imaginations through the perceptions of what they sense through achieved experiences. so as from the sounds through the perception people tend to prefer what they mostly like to do or feel. According to the personality, personal aspects, mood, situation , the preferred difference from each other An urban Park or else a municipal park provides the recreation an green spaces to the residents and the visitors to the particular urban area or the township. And it providing the preserving and reserving the land area, may be valuable or memorial place . In an urban context urban park is a reserved space for the parks .play fields , or highly maintained greenery in terms of the ecology value of the area to increase the carbon foot print or the incensement of bio diversity or else to preserve a valuable monument or something .

Research Issue

Due to the sounds in urban parks the concentration and the human perception get disturbed .and it will be a great improvement if the designers could avoid the unwanted sounds through the design . so that the research issue was to identify the human unfavoravle sounds that we experience

Theoretical Framework

Let Maine begin with the phenomena and study of sound. As we've got seen, sound is clearly totally different from music. Certain by a heritage of cultivating non-public and public aesthetic experiences, “music and sound have each been wont to produce specific, emotive, symbolic and part expressions.” The capabilities of each music and sound have accelerated with a blooming convenience of sound media within the late nineteenth century (Born, 2013).
Whereas music is represented as unionized sound, sound is usually represented in terms of a perceptible loud atmosphere. To understand and outline each types of exteroception expression is that the ability to listen to, and quite hearing is that the ability to pay attention. Michele Chion posits 3 definitions of listening that discuss with numerous modes of perception of sound and differing approaches to listening and perceiving sound. These are reduced, linguistics and casual (Chion, 2012).
In the meantime the founding father of the term **“soundscape”** R Murray Schafer describes a soundscape because the perception And interaction with an acoustic atmosphere. To have interaction with sound is become tuned in to, attuned to the exteroception sphere, and infrequently an impulsive and environmental. Music is that the acutely aware construction of a part of that soundscape, “whereas sound is that the study of, manipulation of, and relationship with a severally occurring sonic atmosphere.”(Schafer, 1977)

According to the **disappearing sound theory** introduces in the physics , the sounds of “any category ".Any category or kind of sound that once existed, however has since been replaced, superseded, or has otherwise ceased to be detected except as a depository whole. Disappearing sounds are typically those related to group action, though some natural

species and their sounds have conjointly become extinct. Once the energy forms employed in society amendment, several direct and indirect acoustic changes result." According to that theory the best example is the effect of music ,"In regular music you don't have any models to find out regarding spatial aspects, as a result of typically the performers are on stage or the music is on the record and you don't very hear things isolated and you don't very hear things shut down and you don't hear nothings and you don't hear things disappearing and showing and everyone these sorts of shapes emerge" (Labelle, 2006, p.172).

So as the other sounds the effect comes with the special aspects , resulting on the place , and under if it's a recorded ome or not and according to the location of the sound source .
It this affiliation between spatial property and sound that aural design as a term emerges, the basic sonic and spatial reciprocity of the supply of sound and it's behavior on a physical and cultural level when the sound has been created. Sound is ultimately a abstract term given to an awareness and manipulation of the incidental and intentional aspects of an aural atmosphere.
In this study the **sound signal theory** is applied , as the theory says that "compared to noise , that is unwanted sound , an indication is any sound or message that is supposed to be listened to , measured or hold on ". At the beginning of the theory they introduce the unwanted sound as the noise .With the increasing ability to convey emotional, geographic, logical, and every one styles of alternative data through sonic field suggests that, came an examination into sounds ability to explain, convey and shift perceptions of house "the most vital and distinctive side of exteroception expertise is its capability to reconfig. space" (Born, 2013). He argues that with a additional pronto out there sonic cultural expression, has shifted perception from a Cartesian rationalized grid of visual imagination to an additional "fluid, mobile and voluminous conception of space"

As how the sound effects the perception the **sound mark theory** comes , sound mark is a term derived from landmark , it states the studies to check with a with a "community sound that is exclusive, or possesses qualities that build it specially regarded or noticed by the individuals therein community. Sound marks, therefore, are of cultural and historical significance and advantage preservation and protection". So according to the sound makes a significance to a place as common or individually comes along with the theory of **bio behavioral** and the **spatial / place and space theory.**

Place theory may be a theory of hearing that states that our perception of sound depends on wherever every part frequency produces vibrations on the tissue layer. By this theory, the pitch of a sound, like a person's voice or a musical tone, is set by the places wherever the membrane vibrates, supported frequencies akin to the ton topic organization of the first modality neurons. More usually, schemes that base attributes of perception on the neural firing rate as of place are referred to as rate–place schemes.
The above described theories are implemented in the sense of space or else the appreciation of the space through the sounds.

Methodology

Research objectives and method of study

The research objective is to identifying the effect of human perception for the sense of space due to the acoustic landscape of urban parks in Colombo
For that, Different sounds and sound ranges in urban parks
Human favorable sound ranges and sounds

Human perception towards the “soundscape” concept
User preferences using through the sound effect

Effect of soundscape for the sense of space in urban parks Will be the study objectives. The study will be done using a social survey and by a quantitate measurements of sounds, for that basic equipment and questioners are made.

The social survey will be done in three selected urban parks in Colombo by giving a questioner moderated by a pilot online questioner. And the quantitative study will be done by recording the sounds in urban parks and technically graphing them using Spectrum, Ableton Live Spectrum Analyzer which has a higher accuracy.

Case / sample selection criteria

The case studies will be done in the selected significant three urban parks in and around Colombo according to the usage of the people.

Viharamahadevi Park - Colombo 7

Viharamahadevi park is one of the most user attracted urban park in Sri Lanka , a huge variety of users visit the park occationaly and even daily .

Diyatha Uyana – Baththaramulla

Diyatha uyana is a recent constructed urban park associate with a jogging track and shopping area. As because of its commercial activities and as per the location near the most functioning government institutes the place become more functioned in evening.

Independence Square Premises – Colombo

Independence square is one of dominant and historical urban recreational area in Colombo. Although it doesn’t have recreational elements such as play structures people use the place for the relaxation and recreation and in terms of physical exercises.

Data collection tools and measurements/scales

The data will be collected as

The tangible data– questioner papers
The audible data – sound records
The quantitative data - Sound graphs

The sound recording device will be an audio interface connected to a computer and mic with the capacity of recording the sounds of “mid-range” audio interface. a tool that lets audio engineers record their music, sounds, and songs on the computer and play them back. usually connecting to the pc via USB or FireWire, audio interfaces area unit used for skilled audio performance and once a range of microphones and instruments are concerned.

The sound graphing equipment will be a sound graphing software with 88% accuracy. **Spectrum,AbletonLive Spectrum Analyzer** introduced by the Abeleton universe in 2013 This is a tool used to perform signal analysis, in particular, working in the domain of frequency (as opposed to the oscilloscope working in the domain of time and showing us the input waveform) allows us to evaluate the values of the amplitude of our signal compared to theist frequency. We see with an example the difference in the representation between the oscilloscope and the spectrum analyzer of a signal placed in the two inputs .
(http://abletonuniverse.altervista.org)

Fig.1 spectrum albeton analyzer

Findings and Analysis

The study will be based on soundscapes studies and a human behavioral study .

Study 1

The pre-prepared questioner will be given to randomly select 60 people in each park to evaluate the effect of sound for their preferences and perception of the particular park.

Study 2

Using the audio interface device sounds of several places of each park (at least 1 crowded and most using places and abundant places)

Data collection

Data collection was done in the Viharamahadevi Park, Diyatha Uyana And Independence Square premises .

The data was collected in between 7.00 pm to 8.00 pm in continuous three Sundays where the parks get mostly crowded.

As the quantitative analysis, the data was collected as mentioned above using the audio interface device.

Before the qualitative study, a pilot survey was done among 59 group sample of people and modulated the questioner.

And for the qualitative study a questioner was given to the users of above parks and collected the data from them. The data was collected from 56 number of people and minimum 15 people from each park .

The very first questions was the general questions so that those questions wasn't taken in to the consideration.

The question was asked to identify the human preferred experience type in an urban park. Out of the 90 responses 27 prefer sounds to be experienced. So that 30% of the sample appreciate the sound in the parks

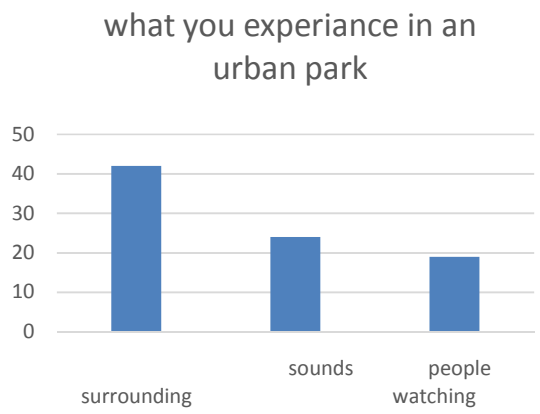

Fig. 22 experiance in urban parks analyzed graph

The next question was to identify the preference of natural or acoustic sounds in an urban park , out of 45 responses 32 people were preferring the acoustic sounds, the result is 71% of the total number of answers .

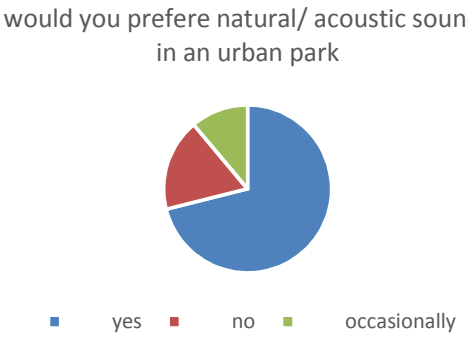

Fig. 23 preference of sounds in urban parks analysed chart

As the next specification it is surveyed that the sound verity preferences. As the first graph shows the expected verities of sound by coming to an urban park.out of 169 responses 82 responses were preferring the acoustic sounds . It is 48. 5 % of the total .

The next evaluation was to identify what they mostly experience from above verities of sounds those two graphs were compared in one graph to identify the deviations

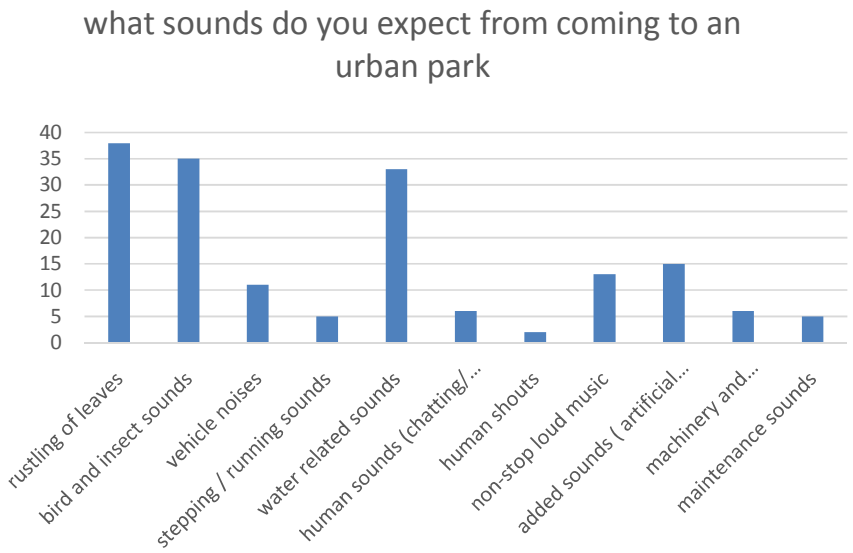

Fig. 4 sound expectations in urban parks analysed chart

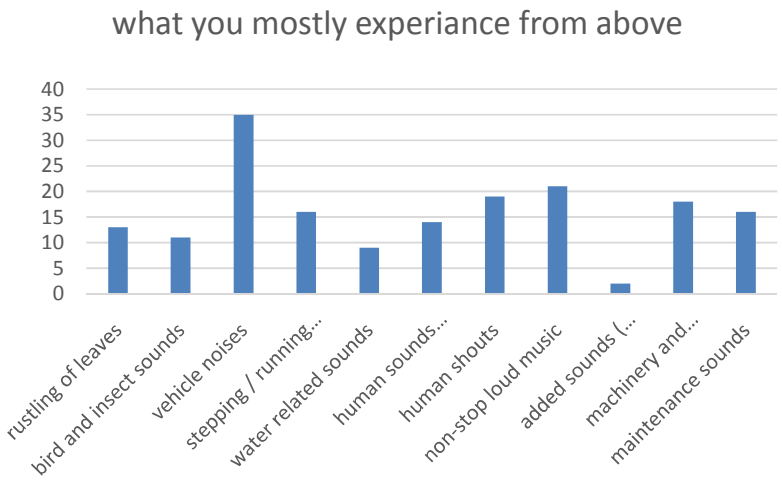

Fig. 5 sound expeiance in urban parks analysed chart

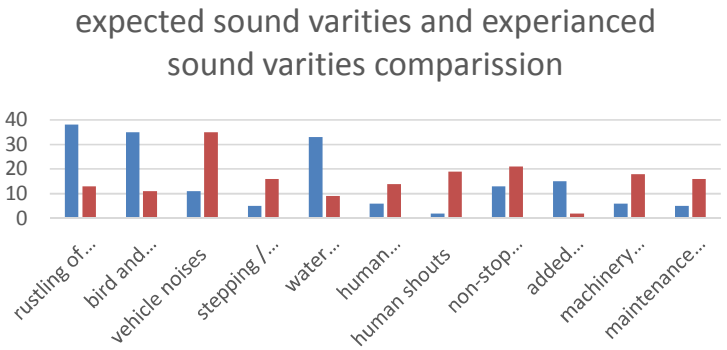

Fig. 6 sound expectation and expeiance in urban parks compared chart

The above two graphs are the most significant graphs extracted from the case study analyzing as it shows the expected sound verities from coming to an urban park and the experienced .

According to the chart human unfavorable artificial/ non acoustic sounds were most experienced in the above urban parks. According to the survey, people mentioned the experiences of the sound and how the sound effects the concentration.

As the overall analysis of the ideas people do not prefer the artificial sounds or noises and it disturbs the perception and concentration.

According to the preferences of people they usually prefer the natural sounds other than expected artificial sounds too.

At the end of the questioner, people have suggested the sounds to be increased or decreased or else to be removed from the urban park environment.

From the above combined questions the idea of users were collected , so most of them preferred the artificial and alien sounds to be reduces or removed from the particular environment through the different methods such as introducing new acoustic sounds and masking or buffering other sounds .

At the end of the questioner, people have suggested the sounds to be increased or decreased or else to be removed from the urban park environment.
Sounds to be changed

- increase the natural sounds
- Maintenance and artificial sounds
- Human shouts and vehicle noises
- Vehicles sound
- Human sounds, vehicle sounds
- Vehicle noises
- Vehicle sounds, shouting

if so how

- by creating a most natural environment
- More isolated freedom, brings me to a different world from the urban stress
- Adding sound barriers and giving sound controllable policies for people to follow
- I don t like it
- Use some natural sound proofing method or somewhat
- Having parks located away from noisy roads
- Need to tell people not to make like that sounds in the park and around the park
- Educate people about the importance of the silence for those urban parks because most of the people visit

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environment through the different methods such as introducing new acoustic sounds and masking or buffering other sounds .

Data analysis 2

The second data analysis is the sound recording and sound graphing analysis. For that the sounds were recorded throughout 60s in the most functioning place of the park. and to maintain the clarity of the work the sounds were recorded maintaining the controllable factors as a constant . as an example the equipment of the sound recordings , time recording equipment , the microphone and the time of the day .

The recorded sounds are in Cartesian sound graphs of frequency against the dB (decibels) in perspective to different places

Diyathauyana

According to the recorded sounds the sounds were graphed in the stereo type , comparing the decibels against the frequency and captured the graphs in every 10 seconds of time .

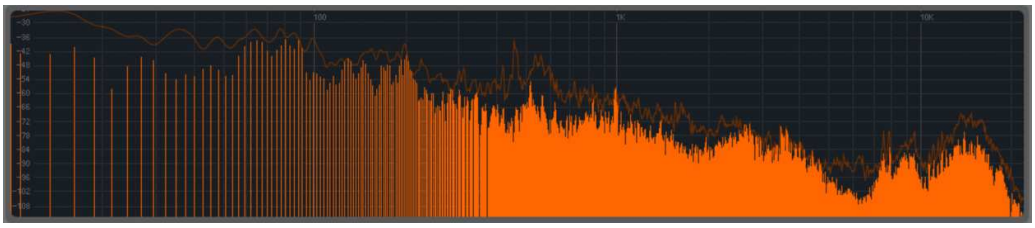

Fig. **7** sound graph of the decibel vs. frequency in the first 10 s at diyathauyana

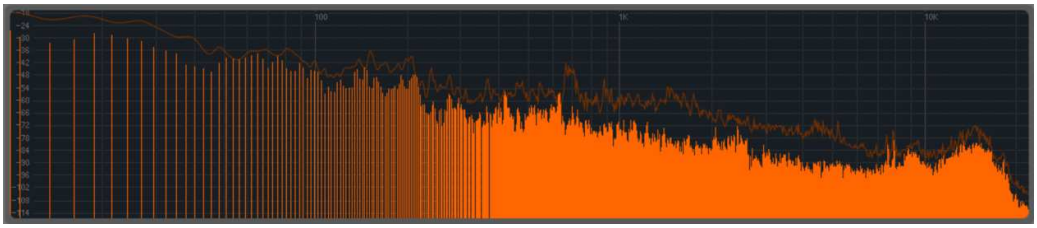

Fig. 8 sound graph of the decibel vs. frequency in the first 20 s at diyatha uyana

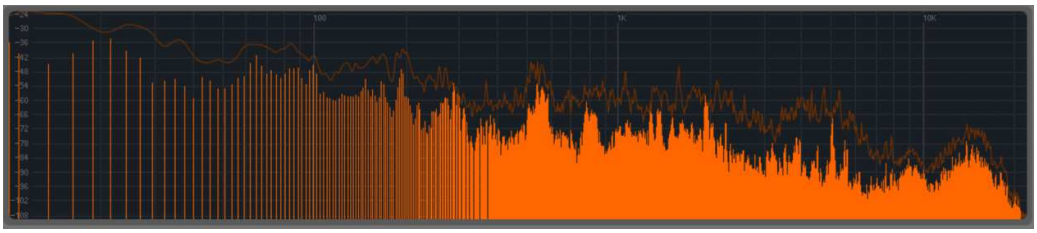

Fig. 9 sound graph of the decibel vs. frequency in the first 30 s at diyatha uyana

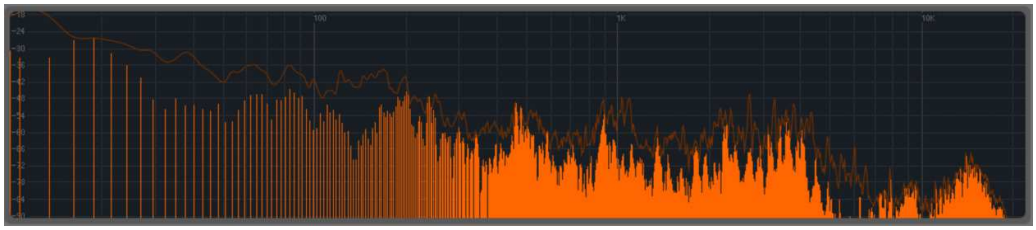

Fig. 10 sound graph of the decibel vs. frequency in the first 40 s at diyatha uyana

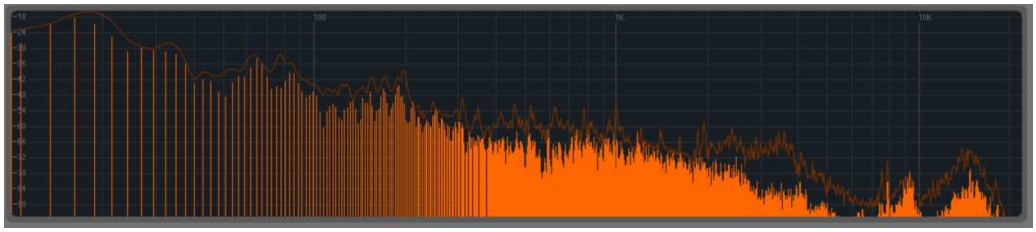

Fig. 11 sound graph of the decibel vs. frequency in the first 50 s at diyatha uyana

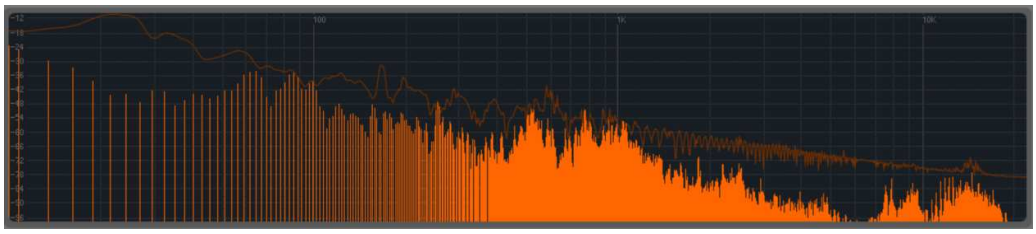

Fig. 12 sound graph of the decibel vs. frequency in the first 60 s at diyatha uyana

Viharamahadevipark

According to the recorded sounds the sounds were graphed in the stereo type , comparing the decibels against the frequency and captured the graphs in every 10 seconds of time .

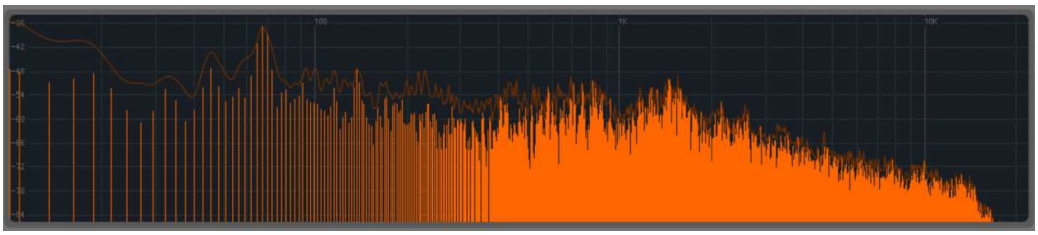

Fig. 13 sound graph of the decibel vs. frequency in the first 10 s at Viharamahadevi Park

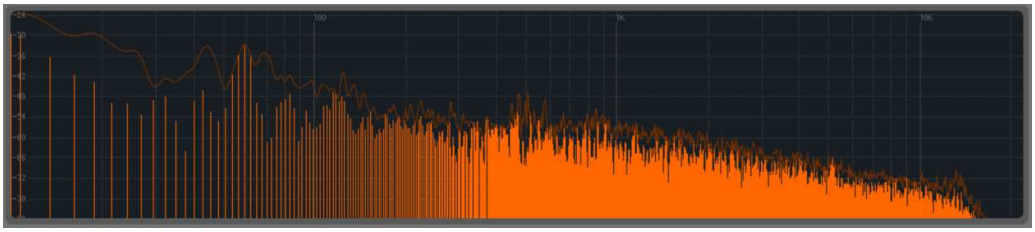

Fig. 14 sound graph of the decibel vs. frequency in the first 20 s at viharamahadevi park

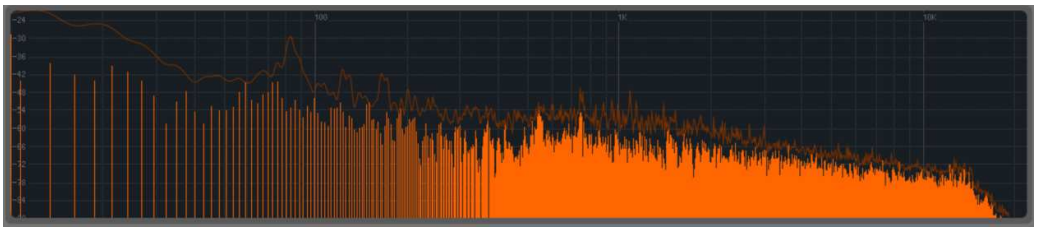

Fig. 15 sound graph of the decibel vs. frequency in the first 30 s at viharamahadevi park

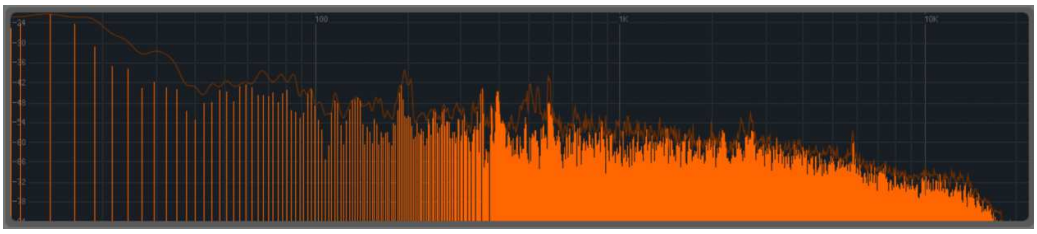

Fig. 16 sound graph of the decibel vs. frequency in the first 40 s at viharamahadevi park

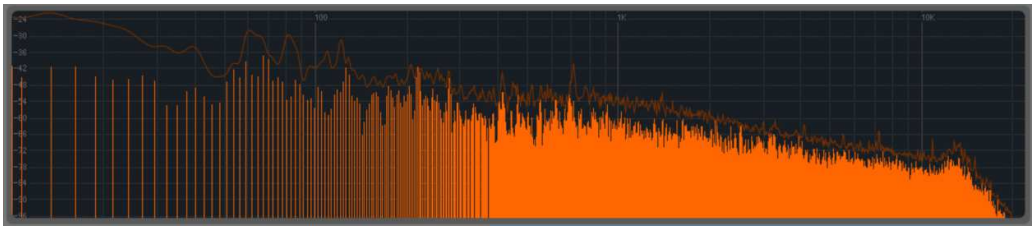

Fig. 17 sound graph of the decibel vs frequency in the first 50 s at viharamahadevi park

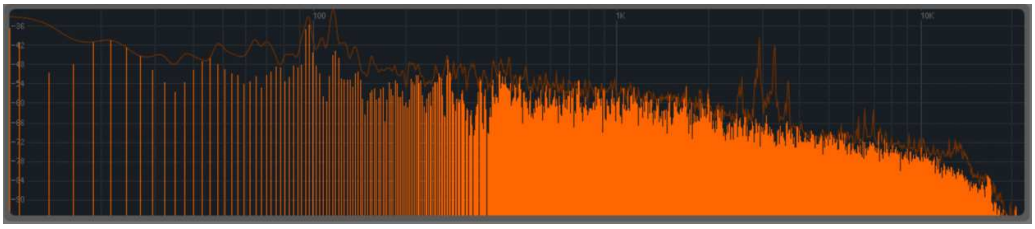

Fig. 18 sound graph of the decibel vs frequency in the first 60 s at viharamahadevi park

Independence square premises

According to the recorded sounds the sounds were graphed in the stereo type , comparing the decibels against the frequency and captured the graphs in every 10 seconds of time .

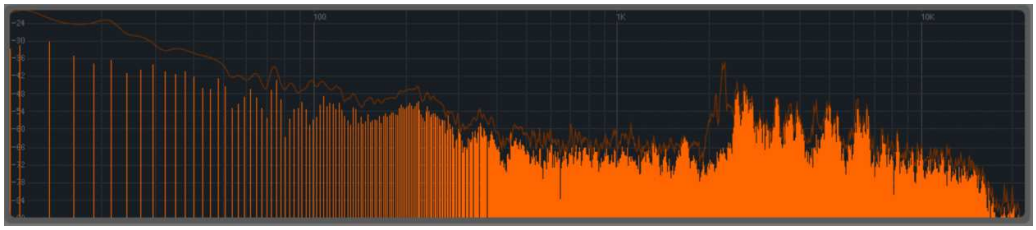

Fig. 19 sound graph of the decibel vs. frequency in the first 10 s at independence square premises.

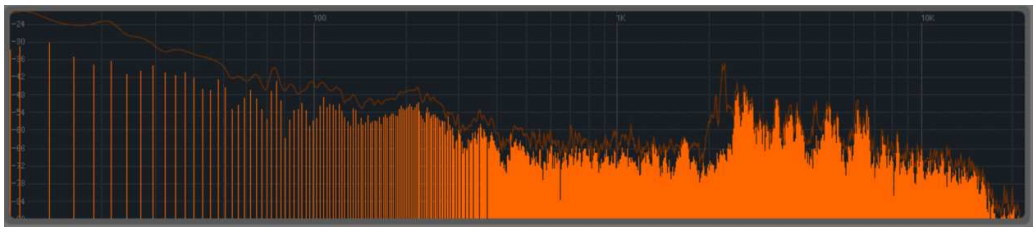

Fig. 20 sound graph of the decibel vs. frequency in the first 20 s at independence square premises

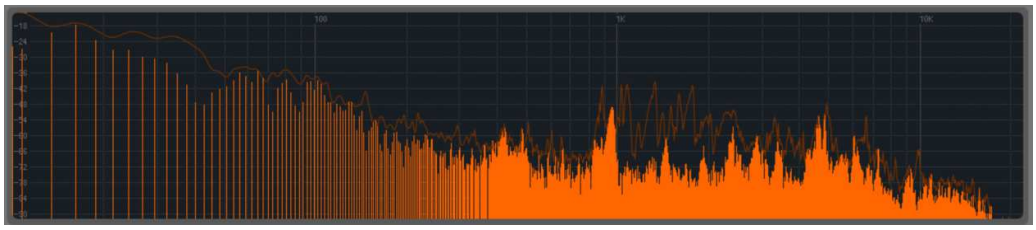

Fig. 21 sound graph of the decibel vs. frequency in the first 30 s at independence square premises

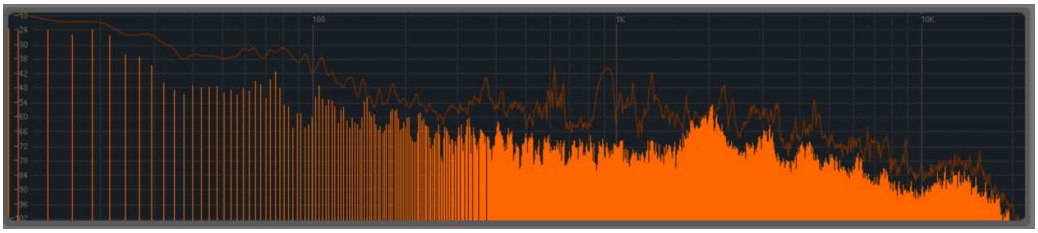

Fig. 22 sound graph of the decibel vs. frequency in the first 40 s at independence square premises

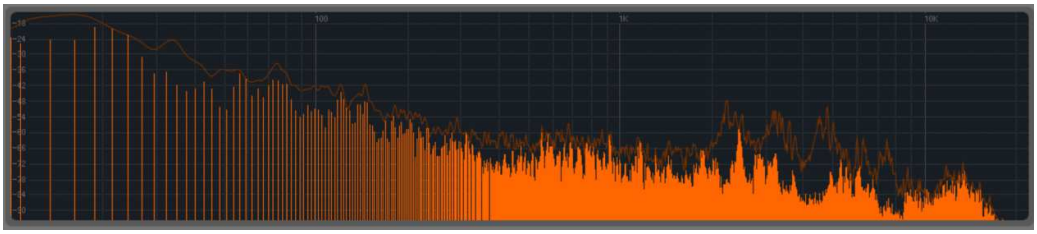

Fig. 23 sound graph of the decibel vs. frequency in the first 50 s at independence square premises

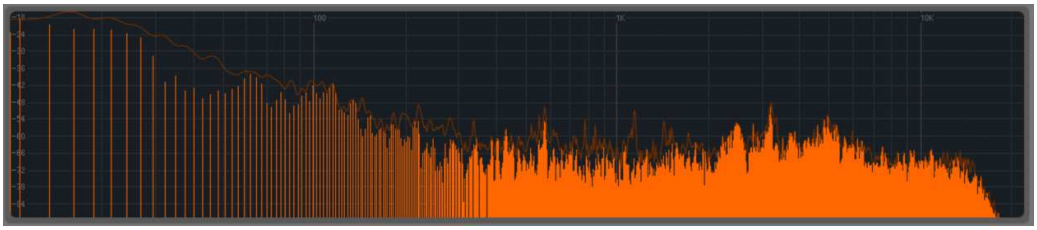

Fig. 24 sound graph of the decibel vs. frequency in the first 60 s at independence square premises

According to the Lynch, E., Joyce, D., & Fristrup, K. (2011) of their research of an assessment of noise audibility and sound levels in US National Parks. They prefer that it's 12.5 to 20,000 Hz the most favorable sound range in an urban park where there is natural sounds. It's 10.9691 dB to 43.0103 dB in range.

And through the recorded sounds each 1 minute sound track is again taken in to the consideration and highlighted the above mentioned favorable sound range in the same graph. So that we can find there are much more unwanted sounds, or else so called noises that disturb the perception, concentration and even in the unbearable range for the membranes of the ear.

Fig. 25 human favorable acoustic landscape sounds in the diyatha uyana

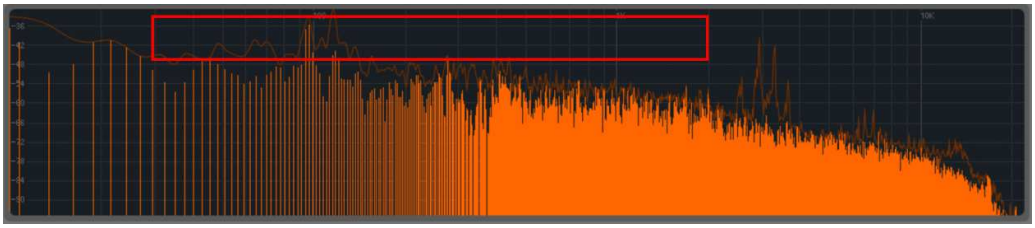

Fig. 26 human favorable acoustic landscape sounds in the viharamahadevi park

Fig. 27 human favorable acoustic landscape sounds in the independence square premises

All above sound graphs are plotted accurately from a formats software and the axis's are numbered as per decibels and frequency measures .

As we can observe graphically with the measures and visually too the above parks which was taken as the case studies does not contain the natural / acoustic sounds that are expected in an urban park but having too much of noises .

Conclusion

The research was done to identify the effect or else for the appreciation of the sense of space through the natural sounds of an acoustic landscape of an urban park and to identify constrains. According to the results the above studied parks does not contain the user friendly and user wanted sounds which can be seen in an urban park. But contain lots of other noises that are not favorable for a urban recreational park and that are not accepted or appreciated by the users.The findings show what are the user expected sounds and the user disliked sounds. so that in the further creation of urban parks or in the modification of the present urban parks those unwanted and unpleasant sound can be reduced, masked of buffered and implement ways to create or enhance the user expected favorable sounds within the park .So I would like to recommend that when designing an urban or else rural public gathering and recreational space the auditory factor should be considered.

According to the research and survey analysis , nearly all the urban parks considered here does not support the human perception and concentration as the soundscape is polluted by the artificial machinery , vehicle and other noises as well as the sound masking or sound buffers does not exist so the human preferences about the urban park too varies . And in every park the acoustic sounds are minored by those unwanted noises as the sonic sonic house of that sounds are strengthen than the others. But still user request for a soothing landscape with the acoustic soundscape that helps their perception and the imagination. There should be a procedure to mask or buffer the unwanted, disturbing of human unfavorable sounds.

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