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The ambient noise level in the city of Galati and surroundings

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Abstract
The intense and sustained noise to which we are subjected can cause disorders of the auditory system. It affects especially those who suffer from heart problems, but it also has dramatic consequences on the nervous system. It can cause stress, depression, sleep disturbances, cognitive problems and reduced ability to concentrate. The city of Galati is located in the southeastern part of Romania, in the southeastern part of the county with the same name. Galati ranked fifth in terms of noise pollution and unfortunately the local authorities do not run any noise reduction or control program. Through this paper we want to join those who sound the alarm to the authorities to take concrete measures in order to manage and control noise pollution. Data were collected in different areas of the city of Galati and its surroundings. Equivalent noise level was determined with a professional digital acoustic sound level meter with two frequency filters: "A" and "C". The device can record sound values between 30 dB-130 dB in the 31.3 Hz and 8 kHz range. In general, the sound level exceeded the maximum admissible limit or came close to this value.

Keywords: noise level, frequency filters, Galati.

1. INTRODUCTION

The main objective of this paper is to determine the ambient noise level in the city of Galati and surroundings. Galati is located in the southeastern part of Romania.

The excessive and uncontrolled presence of unwanted and disturbing sounds can have negative effects on human health and can disturb the natural balance of the environment etc. [1].

Those who live in the urban environment have gotten used with the noise of the street and the noise from the workplace so that it doesn't even bother them anymore. Even if people have adapted to this environment, does not mean that these excessive and long-term noises do not have an important impact on health. After a long exposure, people will be able to ask themselves why they have insomnia, are tired or end up with sensori-neural hearing loss. Apart from hearing loss, noise pollution can also have other negative effects such as headaches, memory disorders, gastritis, high blood pressure, heart disease, etc.[1, 2, 3]. Therefore, it is vital that every person is aware of this problem and acts to reduce this type of pollution and the authorities take concrete measures in order to manage and control noise pollution. According to World Health Organization (WHO), noise is the second major environmental cause of health problems, after the effect produced by atmospheric pollution [1].

2. EXPERIMENTAL

Equivalent noise level was determined from Monday to Friday with a professional digital acoustic sound level meter with two frequency filters: "A" and "C". An A-weighting filter takes into account the normal tolerance curve of the human ear and ensures a correct estimate of the risk level for human. C-weighting filters were intended for low and high frequency sounds, measure noise peaks which are usually those emitted by car engines, firearms, hammers, compressed air tools, etc. C-filters are used in noisy areas[4]. The sound level meter can record sound values between 30dB-130dB in the 31.3 Hz and 8 KHz range.

Data were collected in different areas of the city of Galati and its surroundings. To fulfil the proposed objective, 18 locations (measurement points) were chosen from the urban area of the city of Galati (Fig.1). In the measurement points there are either streets with intense traffic where various companies, shops, banks have their headquarters and there are apartment buildings, or there are adjacent streets where there are only buildings with apartments. Exceptions are locations 2, 3, 6 and 16, these registration points being located in green areas.

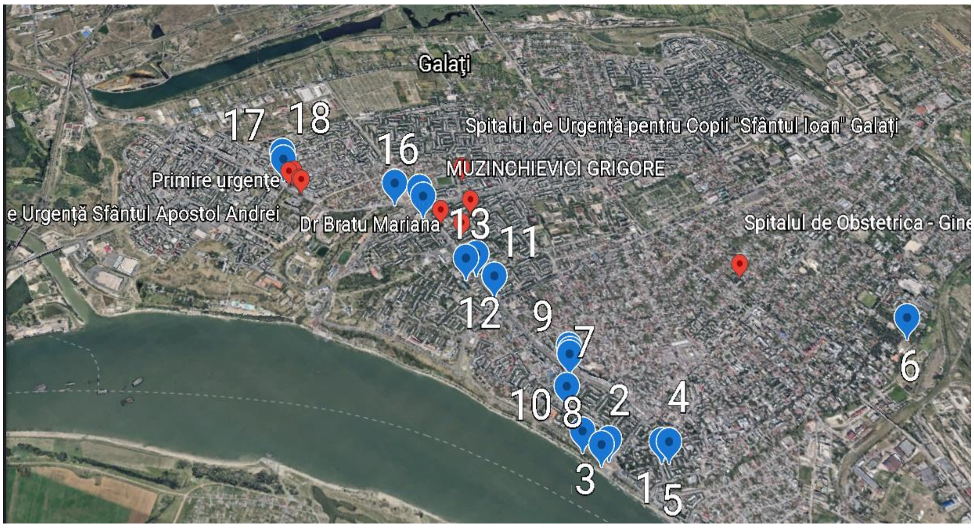

Fig. 1. The measurement points in the city of Galati

Independent samples t-test was run for all data sets. The analysis was done on frequency domains.

Pearson correlation coefficients were calculated to analyse the similarity between the noise series measured in the frequency domain A and C respectively.

The independent t-test and Pearson matrix were run in Excel.

3. RESULTS AND DISCUSSION

In all the monitored areas located on the main arteries, the average values recorded with A-weighting filter are significantly lower than those recorded with C-weighting filter (Fig.2 and Fig.3). These differences appear due to the existence of noise sources from car traffic that includes low-tonnage and high-speed cars. The lowest average values(41-42 dB) were obtained in the Parks and on the Lower Cliff, followed by the measurement points where there are no main arteries but only adjacent streets(46-49 dB). The average values corresponding to the A frequency domain are slightly higher than the average values corresponding to the C frequency domain in the following locations: 1, 2, 3, 4, 5, 10, 16. At the same time, the median values are generally lower than the mean values because the maximum values are much higher than those below the mean. The largest dispersions of data sets were obtained in high-traffic locations.

The lowest population dispersion for both frequency domains corresponding to the A-and C-weighting filters were obtained in areas without traffic (1, 2, 16). As we move away from the road, the sound intensity level drops significantly and the dispersion of the population is smaller. The values obtained for the sound level at the edge of the pavement bordering the carriageway are generally lower or equal to the maximum admissible value of 70dB [5]. The values of the noise level outside the building, measured 2 m from the facade, exceeded the admissible value of 50dB [6].

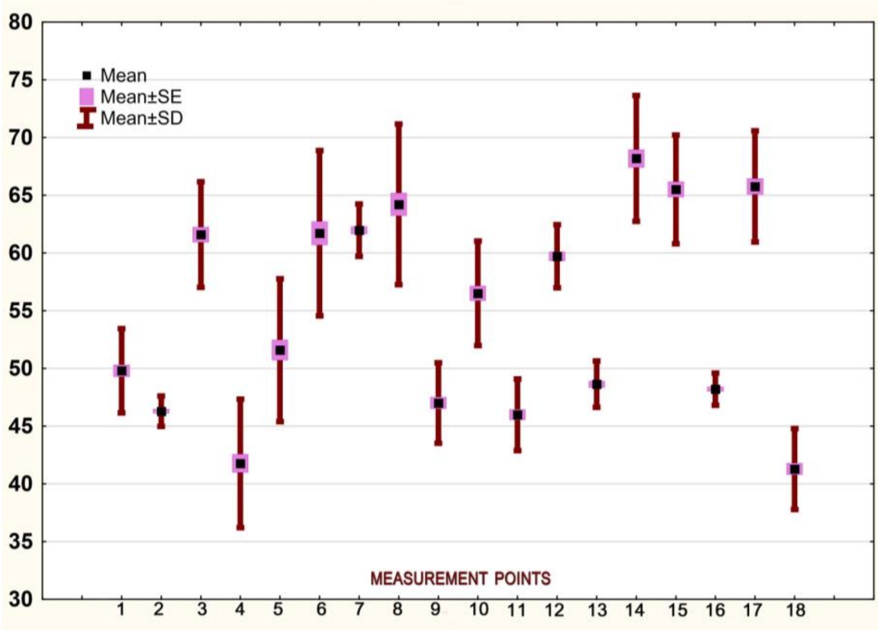

Fig. 2. Sound intensity level values in the A frequency rang

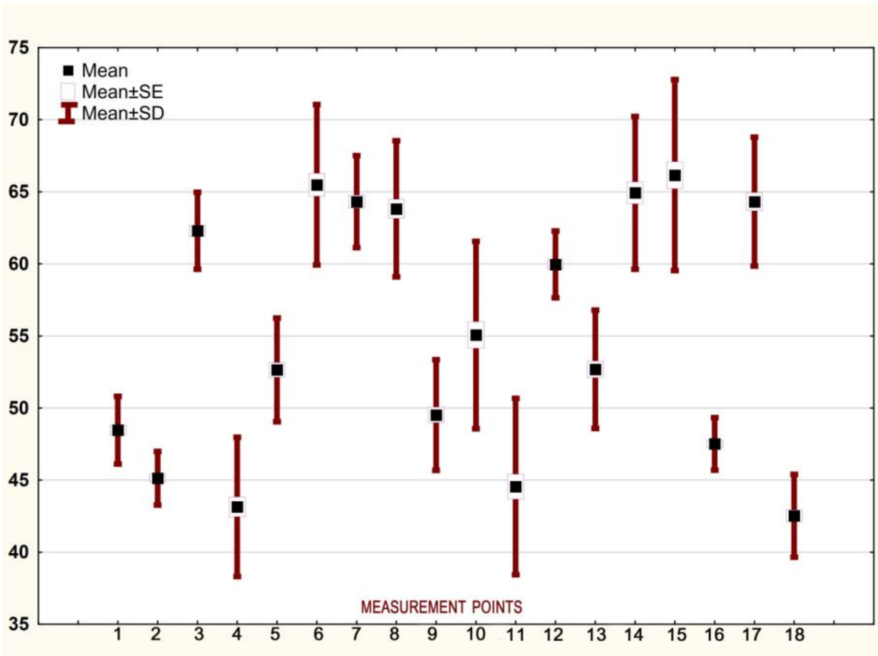

Fig. 3. Sound intensity level values in the C frequency rang

Figures 4, 5 and 6 show Boxplots for the Cliff area (locations 1 and 3), for LMK High School (measurement points 12 and 13) and for Last Lion area (locations 14, 15 and 16).

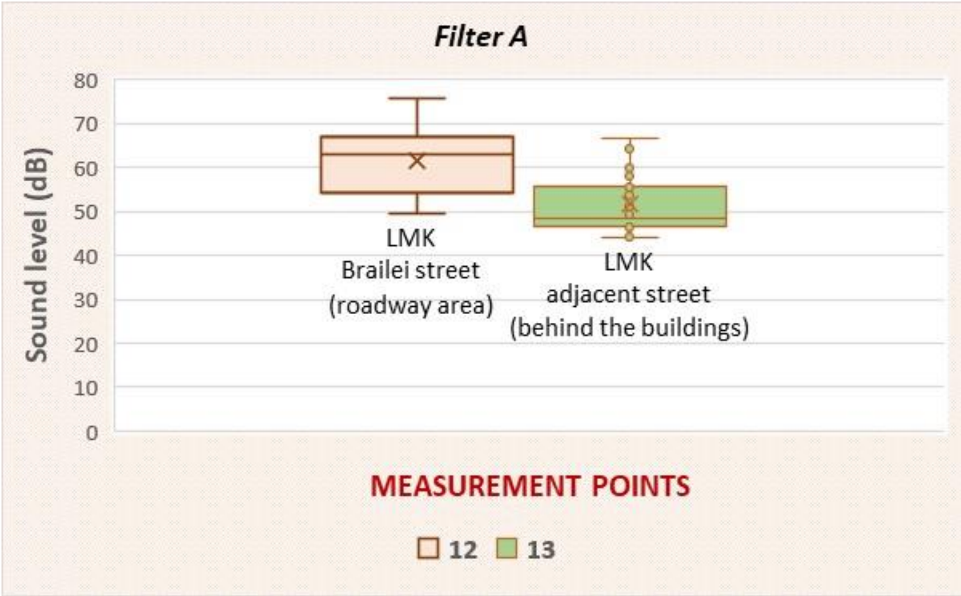

Fig. 4. Comparisons between the values of the sound intensity level in the area of LMK High School

In the LMK High School area (Fig. 4), the average values do not match with the medians. Near the roadway (measurement point 12-Brailei street), the average value of the measurement set is 10 dB higher than the average value corresponding to the data set obtained in front of the high school (on an adjacent street with less intense traffic-measurement point 13). Dispersions are not uniform. The same results were obtained for the domain corresponding to C-weighting filter.

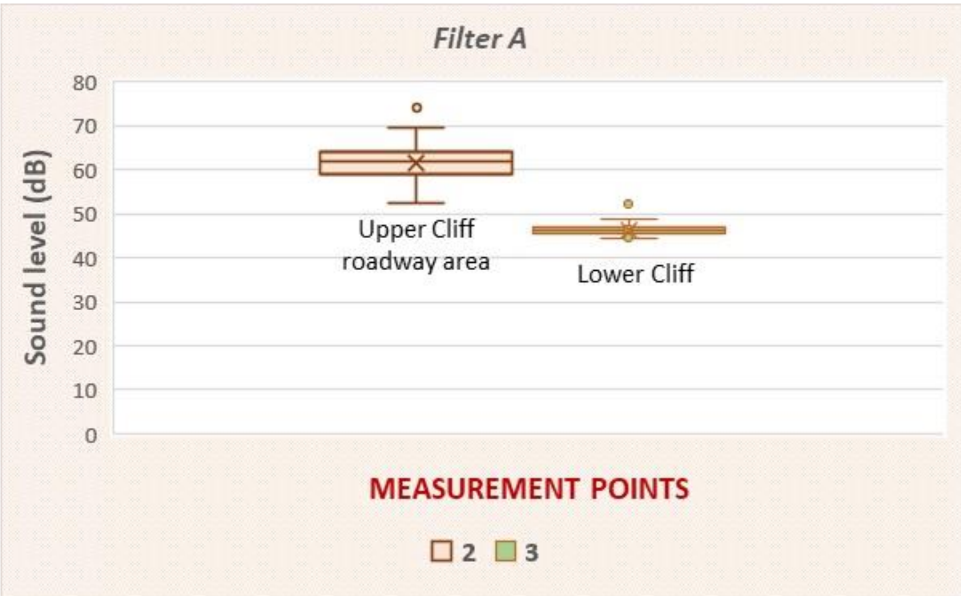

Fig. 5. Comparisons between the values of the sound intensity level in the Cliff area

In the area of the cliff (Fig. 5) there is a difference of 20 dB between the average value of the sound intensity level of the Upper Cliff (measurement point 2) and the Lower Cliff (measurement point 3). This difference is due to traffic. There is no road traffic on the Lower Cliff. The dispersion of the population corresponding to the Lower Cliff is much smaller than that corresponding to the Upper Cliff. The mean values coincide with the medians. The dispersion around the median is symmetrical. The same results were obtained for the domain corresponding to C-weighting filter.

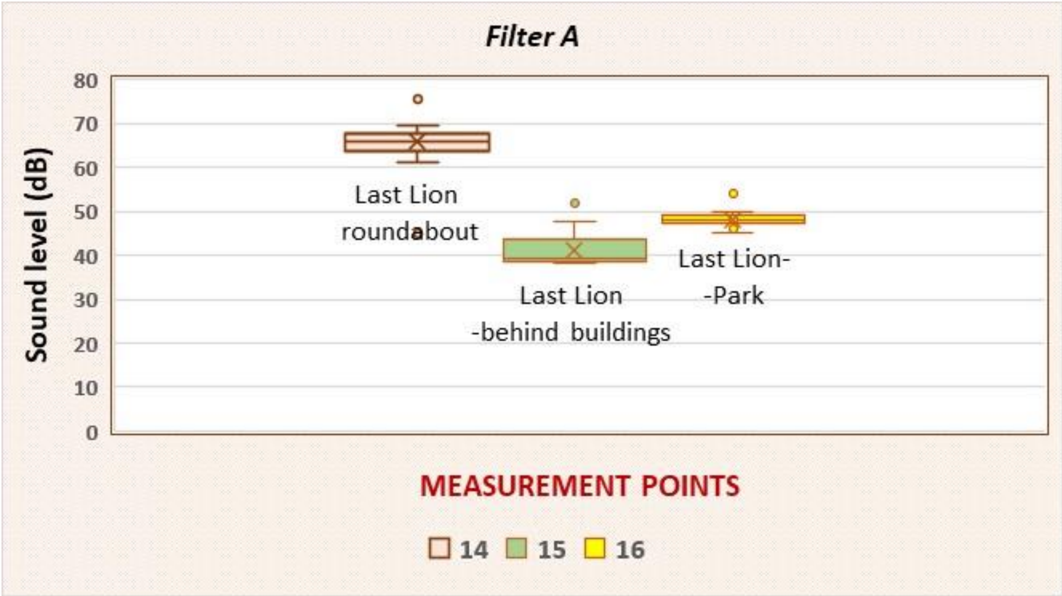

Fig. 6. Comparisons between the values of the sound intensity level in the Last Lion area

If we compare the values of the sound intensity level in the area of the Last Lion intersection (Fig. 6), significant differences in the average value are observed as we move away from the traffic area. The lowest data dispersion was obtained in the Park(16), the lowest mean value and the lowest median value were obtained behind the buildings(15). For points 14 and 16 the dispersions are symmetrical around the median value, while for point 15 the dispersion is smaller between quartile 1 and the median value.

In conclusion, we can say that the main source of noise pollution in the urban area is car traffic. In general, the sound level exceeded the maximum admissible limit or came close to this value. For frequency domains corresponding to the A-and C-weighting filters the t-test for independent samples was run (Tables 1 and 2).

If the values of the parameter t are high, then there are significant differences between the two data sets. In the t test, the probability of making an error if we reject the null hypothesis is denoted by p. p-value is also called significance value. When p-value is lower than the chosen significance threshold (α=0.05) then we accept as true the hypothesis H1 and reject the hypothesis H0 [7].

Table 1. Independent samples t-test parameters corresponding to channel A
(selection from the 324 variants)

Group 1 vs. Group 2	t value	p	p 2-sided	p variances
Point 3 vs. Point 2	6.3798	0	0	0
Point 3 vs. Point 1	-14.2347	0	0	0.118783
Point 3 vs. Point 6	8.5224	0	0	0.003883
Point 3 vs. Point 12	-10.4896	0	0	0.000006
Point 3 vs. Point7	-20.0123	0	0	0.001078
Point 3 vs. Point 17	-12.9686	0	0	0.000014
Point 3 vs. Point 18	3.9138	0.000168	0.000168	0.734299
Point 3 vs. Point 4	-8.1626	0	0	0.142689
Point 3 vs. Point 5	5.622	0	0	0.251052
Point 3 vs. Point 9	-15.3545	0	0	0.046244

Point 3 vs. Point 10	-19.8104	0	0	0.005979
Point 3 vs. Point 11	-18.6229	0	0	0.078798
Point 3 vs. Point 16	2.8818	0.004859	0.005403	0
Point 3 vs. Point 14	-18.6757	0	0	0.056355
Point 3 vs. Point 15	11.8853	0	0	0.76727
Point 2 vs. Point 3	-6.3798	0	0	0
Point 2 vs. Point 2	0	1	1	1
Point 2 vs. Point 1	-22.715	0	0	0
Point 2 vs. Point 6	5.5912	0	0.000001	0
Point 2 vs. Point 13	-5.9128	0	0	0
Point 2 vs. Point 12	-14.9903	0	0	0
Point 2 vs. Point 7	-42.3293	0	0	0.000201
Point 2 vs. Point 17	-17.8975	0	0	0
Point 2 vs. Point 4	-15.3546	0	0	0
Point 2 vs. Point 9	-31.2432	0	0	0.000001
Point 2 vs. Point 8	-6.8855	0	0	0.003304
Point 2 vs. Point 10	-27.6069	0	0	0
Point 2 vs. Point 11	-27.7736	0	0	0
Point 2 vs. Point 16	-7.0614	0	0	0.682326
Point 2 vs. Point 14	-27.5856	0	0	0
Point 2 vs. Point 15	9.4625	0	0	0
Point 1 vs. Point 3	14.2347	0	0	0.118783
Point 1 vs. Point 2	22.715	0	0	0
Point 1 vs. Point 1	0	1	1	1
Point 1 vs. Point 6	19.4454	0	0	0.174409
Point 1 vs. Point 13	9.196	0	0	0.037305
Point 1 vs. Point 12	-0.1082	0.914058	0.914097	0.002184
Point 1 vs. Point 7	-0.5261	0.600015	0.600451	0.000002
Point 1 vs. Point 17	-2.2234	0.028485	0.028849	0.004067
Point 1 vs. Point 18	17.9348	0	0	0.058193
Point 1 vs. Point 4	5.5936	0	0	0.92419
Point 1 vs. Point 5	19.9589	0	0	0.007283
Point 1 vs. Point 9	2.4813	0.014794	0.015184	0.000466
Point 1 vs. Point 8	18.3211	0	0	0
Point 1 vs. Point 10	-6.5538	0	0	0.224324
Point 1 vs. Point 11	-4.2114	0.000056	0.000056	0.841019
Point 1 vs. Point 16	19.7851	0	0	0
Point 1 vs. Point 14	-4.4444	0.000023	0.000023	0.723561
Point 1 vs. Point 15	24.9059	0	0	0.064095
Point 6 vs. Point 3	-8.5224	0	0	0.003883
Point 6 vs. Point 2	-5.5912	0	0.000001	0
Point 6 vs. Point 1	-19.4454	0	0	0.174409

Point 6 vs. Point 6	0	1	1	1
Point 6 vs. Point 13	-8.3356	0	0	0.462495
Point 6 vs. Point 12	-15.5568	0	0	0.081536
Point 6 vs. Point 7	-23.7643	0	0	0
Point 6 vs. Point 17	-17.8093	0	0	0.122394
Point 6 vs. Point 18	-5.635	0	0	0.001321
Point 6 vs. Point 4	-14.5343	0	0	0.146398
Point 6 vs. Point 5	-4.6795	0.000009	0.000012	0.000071
Point 6 vs. Point 9	-20.4534	0	0	0.000002
Point 6 vs. Point 8	-8.1974	0	0	0
Point 6 vs. Point 10	-23.9731	0	0	0.885285
Point 6 vs. Point 11	-23.0103	0	0	0.246379
Point 6 vs. Point 16	-7.9269	0	0	0
Point 6 vs. Point 14	-23.051	0	0	0.313968
Point 6 vs. Point 15	0.5204	0.603983	0.604202	0.001524
Point 12 vs. Point 3	10.4896	0	0	0.000006
Point 12 vs. Point 2	14.9903	0	0	0
Point 12 vs. Point 1	0.1082	0.914058	0.914097	0.002184
Point 12 vs. Point 6	15.5568	0	0	0.081536
Point 12 vs. Point 13	7.5777	0	0	0.310732
Point 12 vs. Point 12	0	1	1	1
Point 12 vs. Point 7	-0.2355	0.814338	0.814666	0
Point 12 vs. Point 17	-1.7628	0.081046	0.081049	0.841665
Point 12 vs. Point 18	13.0741	0	0	0.000001
Point 12 vs. Point 4	4.3584	0.000032	0.000037	0.001607
Point 12 vs. Point 5	14.2631	0	0	0
Point 12 vs. Point 9	1.8471	0.067745	0.06942	0
Point 12 vs. Point 8	12.4454	0	0	0
Point 12 vs. Point 10	-5.0832	0.000002	0.000002	0.059602
Point 12 vs. Point 11	-3.121	0.002368	0.002464	0.004078
Point 12 vs. Point 16	13.1077	0	0	0
Point 12 vs. Point 14	-3.3164	0.00128	0.001338	0.006433
Point 12 vs. Point 15	18.1306	0	0	0.000002
Point 18 vs. Point 2	1.3494	0.18031	0.182058	0
Point 18 vs. Point 1	-17.9348	0	0	0.058193
Point 18 vs. Point 6	5.635	0	0	0.001321
Point 18 vs. Point 13	-4.5603	0.000015	0.000019	0.000096
Point 18 vs. Point 12	-13.0741	0	0	0.000001
Point 18 vs. Point 7	-25.4755	0	0	0.003218
Point 18 vs. Point 17	-15.6412	0	0	0.000003
Point 18 vs. Point 18	0	1	1	1
Point 18 vs. Point 4	-11.7822	0	0	0.071747
Point 18 vs. Point 5	1.5414	0.126433	0.126477	0.417942

Point 18 vs. Point 9	-20.2917	0	0	0.097032
Point 18 vs. Point 8	-2.866	0.005088	0.005334	0.000195
Point 18 vs. Point 10	-23.1561	0	0	0.002111
Point 18 vs. Point 11	-22.3294	0	0	0.036544

Table 2. Independent samples t-test parameters corresponding to channel C (selection from the 324 variants)

Group 1 vs. Group 2	t-value	p	p 2-sided	p Variances
Point 3 vs. Point 3	0	1	1	1
Point 3 vs. Point 2	7.8545	0	0	0.109036
Point 3 vs. Point 1	-27.5095	0	0	0.363487
Point 3 vs. Point 6	7.0013	0	0	0.000001
Point 3 vs. Point 13	-6.8841	0	0	0.003205
Point 3 vs. Point 12	-19.951	0	0	0
Point 3 vs. Point 7	-28.3174	0	0	0.033543
Point 3 vs. Point 17	-20.5896	0	0	0.000003
Point 3 vs. Point 18	-1.6629	0.099528	0.100193	0.000761
Point 3 vs. Point 4	-6.7538	0	0	0
Point 3 vs. Point 5	4.2212	0.000054	0.000079	0
Point 3 vs. Point 9	-24.6444	0	0	0.937981
Point 3 vs. Point 8	-6.3067	0	0	0.000136
Point 3 vs. Point 10	-20.0872	0	0	0
Point 3 vs. Point 11	-17.8065	0	0	0
Point 3 vs. Point 16	2.2593	0.02608	0.02622	0.077187
Point 3 vs. Point 14	-22.216	0	0	0.000014
Point 3 vs. Point 15	11.3371	0	0	0.163829
Point 2 vs. Point 3	-7.8545	0	0	0.109036
Point 2 vs. Point 2	0	1	1	1
Point 2 vs. Point 1	-37.2543	0	0	0.012665
Point 2 vs. Point 6	2.7186	0.007754	0.00845	0
Point 2 vs. Point 13	-13.096	0	0	0.000009
Point 2 vs. Point 12	-24.5431	0	0	0
Point 2 vs. Point 7	-36.725	0	0	0.000246
Point 2 vs. Point 17	-26.0188	0	0	0
Point 2 vs. Point 18	-7.2656	0	0	0.000001
Point 2 vs. Point 4	-10.3786	0	0	0
Point 2 vs. Point 5	0.6479	0.518594	0.519636	0
Point 2 vs. Point 9	-35.2425	0	0	0.127085
Point 2 vs. Point 8	-11.825	0	0	0
Point 2 vs. Point 10	-24.9112	0	0	0
Point 2 vs. Point 11	-21.6028	0	0	0
Point 2 vs. Point 16	-6.4638	0	0	0.867291

Point 2 vs. Point 14	-28.0202	0	0	0
Point 2 vs. Point 15	5.4041	0	0.000001	0.003057
Point 1 vs. Point 3	27.5095	0	0	0.363487
Point 1 vs. Point 2	37.2543	0	0	0.012665
Point 1 vs. Point 1	0	1	1	1
Point 1 vs. Point 6	24.5315	0	0	0.000061
Point 1 vs. Point 13	15.2054	0	0	0.038811
Point 1 vs. Point 12	-3.6625	0.000405	0.000479	0.000001
Point 1 vs. Point 7	-3.4356	0.000869	0.000878	0.219155
Point 1 vs. Point 17	-1.9854	0.049899	0.050645	0.00011
Point 1 vs. Point 18	19.312	0	0	0.01258
Point 1 vs. Point 4	7.2701	0	0	0
Point 1 vs. Point 5	18.7924	0	0	0
Point 1 vs. Point 9	4.6717	0.00001	0.00001	0.324039
Point 1 vs. Point 8	13.8591	0	0	0.00312
Point 1 vs. Point 10	-3.1351	0.002268	0.002482	0.000004
Point 6 vs. Point 3	-7.0013	0	0	0.000001
Point 6 vs. Point 2	-2.7186	0.007754	0.00845	0
Point 6 vs. Point 1	-24.5315	0	0	0.000061
Point 6 vs. Point 6	0	1	1	1
Point 6 vs. Point 13	-11.15	0	0	0.042865
Point 6 vs. Point 12	-21.4518	0	0	0.326583
Point 6 vs. Point 7	-25.8653	0	0	0.004387
Point 6 vs. Point 17	-21.6381	0	0	0.877869
Point 6 vs. Point 18	-7.3053	0	0	0.111488
Point 6 vs. Point 4	-10.4041	0	0	0.03956
Point 6 vs. Point 5	-1.2735	0.20584	0.206002	0.100897
Point 6 vs. Point 9	-22.1885	0	0	0.000001
Point 6 vs. Point 8	-10.633	0	0	0.263477
Point 6 vs. Point 10	-21.4787	0	0	0.517237
Point 6 vs. Point 11	-19.8489	0	0	0.028995
Point 6 vs. Point 16	-5.9855	0	0	0
Point 6 vs. Point 14	-22.7521	0	0	0.587927
Point 6 vs. Point 15	0.7831	0.435436	0.435868	0.000376
Point 12 vs. Point 4	8.6147	0	0	0.276416
Point 12 vs. Point 5	17.9085	0	0	0.50609
Point 12 vs. Point 9	6.494	0	0	0
Point 12 vs. Point 8	13.0943	0	0	0.036829
Point 12 vs. Point 10	0.5191	0.604871	0.604874	0.738006
Point 12 vs. Point 11	-0.5461	0.58626	0.586297	0.224105
Point 12 vs. Point 16	21.7273	0	0	0
Point 12 vs. Point 14	1.1656	0.246589	0.24672	0.128824

Point 12 vs. Point 15	25.9576	0	0	0.000008
Point 7 vs. Point 3	28.3174	0	0	0.033543
Point 7 vs. Point 2	36.725	0	0	0.000246
Point 7 vs. Point 1	3.4356	0.000869	0.000878	0.219155
Point 7 vs. Point 6	25.8653	0	0	0.004387
Point 7 vs. Point 13	17.146	0	0	0.396275
Point 7 vs. Point 12	-1.2948	0.198433	0.199206	0.000158
Point 7 vs. Point 7	0	1	1	1
Point 7 vs. Point 17	0.6177	0.538174	0.538374	0.006911
Point 7 vs. Point 18	20.9632	0	0	0.198268
Point 7 vs. Point 4	9.0306	0	0	0.000002
Point 7 vs. Point 5	20.2561	0	0	0.000011
Point 7 vs. Point 9	7.8169	0	0	0.0277
Point 7 vs. Point 8	15.8076	0	0	0.078634
Point 7 vs. Point 10	-0.6972	0.487315	0.487676	0.00053
Point 7 vs. Point 11	-1.7714	0.07961	0.080819	0.000001
Point 7 vs. Point 16	32.3654	0	0	0.000132
Point 7 vs. Point 14	0.0026	0.99795	0.99795	0.020076
Point 7 vs. Point 15	35.9346	0	0	0.456669
Point 4 vs. Point 3	6.7538	0	0	0
Point 4 vs. Point 2	10.3786	0	0	0
Point 4 vs. Point 1	-7.2701	0	0	0
Point 4 vs. Point 6	10.4041	0	0	0.03956
Point 4 vs. Point 13	2.2994	0.023607	0.024214	0.000063
Point 4 vs. Point 12	-8.6147	0	0	0.276416
Point 4 vs. Point 7	-9.0306	0	0	0.000002
Point 4 vs. Point 17	-7.7	0	0	0.027212
Point 4 vs. Point 18	5.1922	0.000001	0.000002	0.000328
Point 4 vs. Point 4	0	1	1	1
Point 4 vs. Point 5	8.3267	0	0	0.670808
Point 4 vs. Point 9	-5.0093	0.000002	0.000005	0
Point 4 vs. Point 8	2.1889	0.030982	0.031424	0.001686
Point 4 vs. Point 10	-8.311	0	0	0.15553
Point 4 vs. Point 11	-8.4494	0	0	0.898037
Point 4 vs. Point 16	7.9072	0	0	0
Point 4 vs. Point 14	-8.2888	0	0	0.009718
Point 4 vs. Point 15	12.4771	0	0	0
Point 13 vs. Point 3	6.8841	0	0	0.003205
Point 13 vs. Point 2	13.096	0	0	0.000009
Point 13 vs. Point 1	-15.2054	0	0	0.038811
Point 13 vs. Point 6	11.15	0	0	0.042865
Point 13 vs. Point 13	0	1	1	1
Point 13 vs. Point 12	-13.7047	0	0	0.002915

Point 13 vs. Point 7	-17.146	0	0	0.396275
Point 13 vs. Point 17	-13.2953	0	0	0.06089
Point 13 vs. Point 18	4.2006	0.000059	0.000059	0.659458
Point 13 vs. Point 4	-2.2994	0.023607	0.024214	0.000063
Point 13 vs. Point 5	8.0634	0	0	0.00031
Point 13 vs. Point 9	-12.0614	0	0	0.002513
Point 13 vs. Point 8	-0.0466	0.96296	0.962962	0.358972
Point 13 vs. Point 10	-13.5472	0	0	0.007926
Point 13 vs. Point 11	-12.6687	0	0	0.000038
Point 13 vs. Point 16	8.9948	0	0	0.000004
Point 13 vs. Point 14	-14.3734	0	0	0.135842
Point 13 vs. Point 15	15.5469	0	0	0.112391
Point 12 vs. Point 3	19.951	0	0	0
Point 12 vs. Point 2	24.5431	0	0	0
Point 12 vs. Point 1	3.6625	0.000405	0.000479	0.000001
Point 12 vs. Point 6	21.4518	0	0	0.326583
Point 12 vs. Point 13	13.7047	0	0	0.002915
Point 12 vs. Point 12	0	1	1	1
Point 12 vs. Point 7	1.2948	0.198433	0.199206	0.000158
Point 12 vs. Point 17	1.6202	0.108404	0.108488	0.256871
Point 12 vs. Point 18	16.7121	0	0	0.010694

Both for A frequency range (Table 1.) and C frequency range (Table 2.), the values of the parameter t have significant values (large values) for all data series, with two small exceptions, which indicates that the differences are significant, that is, the analyzed points are different and can be used as fingerprints for identifying places.

Pearson correlations were also performed between all data series corresponding to the A-weighting filter (Table 3) and separately between all data series on C Channel corresponding to the C-weighting filter (Table 4). The closer Pearson coefficient, r, is to 1, the stronger the correlation between the data series [8].

For a correct interpretation, the Pearson correlation coefficient is accompanied by a significance test. In the significance test, p represents the level of confidence factor. The Pearson coefficient has statistical significance only if the value level of confidence factor, p, is smaller than 0.05[8].

In tables 3 and 4, each measurement point has two rows. The first row indicates the values of the Pearson coefficient, r, while the second row represents the values of the of confidence facto, p.

From the values of the Pearson coefficient, r, and the parameter p, it follows that there are no strong correlations between the data series, fact that proves that there are significant differences from one measured series to another and there are no repeating patterns. It can be said that the traffic level is running randomly.

Table 3. Pearson Correlations for sound intensity level values corresponding to the A-weighting filter

Variable	Point 3	Point 2	Point 1	Point 6	Point 13	Point 12	Point 7	Point 17	Point 18	Point 4	Point 5	Point 9	Point 8	Point 10	Point 11	Point 16	Point 14	Point 15
Point 3	1	0.1787	**-0.352**	0.180	0.0452	**-0.354**	-0.031	0.0559	-0.122	0.0793	0.0587	-0.182	0.0829	0.2534	-0.1985	**-0.3135**	0.2236	-0.158
	p= ---	p=.214	**p=.012**	p=.211	p=.755	**p=.012**	p=.832	p=.700	p=.400	p=.584	p=.686	p=.207	p=.567	p=.076	p=.167	**p=.027**	p=.119	p=.275
Point 2	0.179	1	-0.120	-0.046	-0.058	-0.001	0.0534	0.0189	-0.183	0.0002	0.0173	-0.08	0.0892	0.0614	-0.1763	-0.1265	**-0.322**	0.0857
	p=.214	p= ---	p=.405	p=.751	p=.690	p=.996	p=.713	p=.896	p=.205	p=.999	p=.905	p=.582	p=.538	p=.672	p=.221	p=.381	**p=.023**	p=.554
Point 1	**-0.352**	-0.120	1	-0.109	-0.038	**0.608**	-0.184	**-0.379**	0.2226	-0.139	-0.134	**0.3204**	0.2053	0.1687	0.2661	**0.3648**	-0.199	**0.4743**
	p=.012	p=.405	p= ---	p=.451	p=.795	**p=.000**	p=.201	**p=.007**	p=.120	p=.336	p=.354	**p=.023**	p=.153	p=.241	p=.062	**p=.009**	p=.166	**p=.001**
Point 6	0.180	-0.046	-0.109	1	0.0842	-0.225	-0.043	0.1341	0.0803	0.0688	-0.079	-0.117	-0.0845	0.0478	-0.0855	-0.2712	0.1535	0.0504
	p=.211	p=.751	p=.451	p= ---	p=.561	p=.116	p=.768	p=.353	p=.579	p=.635	p=.584	p=.418	p=.560	p=.741	p=.555	p=.057	p=.287	p=.728
Point 13	0.0452	-0.058	-0.038	0.084	1	-0.232	0.0621	0.1109	-0.195	-0.139	0.0736	-0.082	-0.1933	0.1165	0.0333	**0.3069**	0.1896	-0.184
	p=.755	p=.690	p=.795	p=.561	p= ---	p=.105	p=.668	p=.443	p=.176	p=.335	p=.612	p=.571	p=.179	p=.420	p=.819	**p=.030**	p=.187	p=.202
Point 12	**-0.354**	-0.001	**0.608**	-0.225	-0.232	1	**-0.355**	-0.173	0.1513	0.2666	-0.164	**0.322**	**0.3721**	0.1638	**0.4325**	0.1209	**-0.485**	**0.2948**
	p=.012	p=.996	**p=.000**	p=.116	p=.105	p= ---	**p=.012**	p=.229	p=.294	p=.061	p=.256	**p=.023**	**p=.008**	p=.256	**p=.002**	p=.403	**p=.000**	**p=.038**
Point 7	-0.0308	0.0534	-0.184	-0.043	0.0621	**-0.355**	1	0.1941	0.0178	**-0.292**	-0.128	0.0286	-0.1054	-0.13	-0.0917	-0.0038	0.2615	-0.243
	p=.832	p=.713	p=.201	p=.768	p=.668	**p=.012**	p= ---	p=.177	p=.903	**p=.040**	p=.374	p=.844	p=.466	p=.368	p=.526	p=.979	p=.067	p=.089
Point 17	0.0559	0.0189	**-0.379**	0.134	0.1109	-0.173	0.1941	1	-0.232	**0.3451**	-0.207	0.238	-0.0529	0.0164	**0.3017**	**-0.2809**	0.0325	**-0.323**
	p=.700	p=.896	**p=.007**	p=.353	p=.443	p=.229	p=.177	p= ---	p=.105	**p=.014**	p=.149	p=.096	p=.715	p=.910	**p=.033**	**p=.048**	p=.823	**p=.022**
Point 18	-0.1217	-0.1824	0.223	0.080	-0.195	0.1513	0.0178	-0.232	1	-0.2057	0.2162	0.1147	0.2199	-0.042	-0.0877	0.1194	0.0369	**0.4277**
	p=.400	p=.205	p=.120	p=.579	p=.176	p=.294	p=.903	p=.105	p= ---	p=.152	p=.132	p=.428	p=.125	p=.772	p=.545	p=.409	p=.799	**p=.002**
Point 4	0.0793	0.0002	-0.139	0.0688	-0.139	0.2666	**-0.292**	**0.3451**	-0.206	1	-0.171	0.1884	0.2169	**0.2957**	**0.4353**	-0.2454	-0.226	-0.203
	p=.584	p=.999	p=.336	p=.635	p=.335	p=.061	**p=.040**	**p=.014**	p=.152	p= ---	p=.234	p=.190	p=.130	**p=.037**	**p=.002**	p=.086	p=.115	p=.157
Point 5	0.0587	0.0173	-0.134	-0.079	0.0736	-0.164	-0.128	-0.207	0.2162	-0.171	1	-0.157	0.0111	0.0065	**-0.3306**	**0.3886**	0.0175	0.1367
	p=.686	p=.905	p=.354	p=.584	p=.612	p=.256	p=.374	p=.149	p=.132	p=.234	p= ---	p=.276	p=.939	p=.964	**p=.019**	**p=.005**	p=.904	p=.344
Point 9	-0.1816	-0.08	**0.3204**	-0.117	-0.082	**0.322**	0.0286	0.238	0.1147	0.1884	-0.157	1	-0.0044	0.2269	**0.4431**	-0.0592	-0.260	0.2377
	p=.207	p=.582	**p=.023**	p=.418	p=.571	**p=.023**	p=.844	p=.096	p=.428	p=.190	p=.276	p= ---	p=.976	p=.113	**p=.001**	p=.683	p=.068	p=.096
Point 8	0.0829	0.0892	0.2053	-0.085	-0.193	**0.3721**	-0.105	-0.053	0.2199	0.2169	0.0111	-0.004	1	0.0954	-0.0549	-0.0515	-0.257	0.149
	p=.567	p=.538	p=.153	p=.560	p=.179	**p=.008**	p=.466	p=.715	p=.125	p=.130	p=.939	p=.976	p= ---	p=.510	p=.705	p=.722	p=.072	p=.302
Point 10	0.2534	0.0614	0.1687	0.0478	0.1165	0.1638	-0.13	0.0164	-0.042	**0.2957**	0.0065	0.2269	0.0954	1	0.2637	-0.0624	-0.01	-0.024
	p=.076	p=.672	p=.241	p=.741	p=.420	p=.256	p=.368	p=.910	p=.772	**p=.037**	p=.964	p=.113	p=.510	p= ---	p=.064	p=.667	p=.946	p=.867
Point 11	-0.1985	-0.176	0.2661	-0.086	0.0333	**0.4325**	-0.092	**0.3017**	-0.088	**0.4353**	**-0.331**	**0.4431**	-0.0549	0.2637	1	-0.0493	-0.172	0.0953
	p=.167	p=.221	p=.062	p=.555	p=.819	**p=.002**	p=.526	**p=.033**	p=.545	**p=.002**	**p=.019**	**p=.001**	p=.705	p=.064	p= ---	p=.734	p=.232	p=.510
Point 16	**-0.3135**	-0.127	**0.3648**	-0.271	**0.3069**	0.1209	-0.004	**-0.281**	0.1194	-0.245	**0.3886**	-0.059	-0.0515	-0.0624	-0.0493	1	0.0465	0.1351
	p=.027	p=.381	**p=.009**	p=.057	**p=.030**	p=.403	p=.979	**p=.048**	p=.409	p=.086	**p=.005**	p=.683	p=.722	p=.667	p=.734	p= ---	p=.749	p=.349
Point 14	0.2236	**-0.322**	-0.199	0.1535	0.1896	**-0.485**	0.2615	0.0325	0.0369	-0.226	0.0175	-0.260	-0.2565	-0.0098	-0.1722	0.0465	1	-0.082
	p=.119	**p=.023**	p=.166	p=.287	p=.187	**p=.000**	p=.067	p=.823	p=.799	p=.115	p=.904	p=.068	p=.072	p=.946	p=.232	p=.749	p= ---	p=.570
Point 15	-0.1575	0.0857	**0.4743**	0.0504	-0.184	**0.2948**	-0.243	**-0.323**	**0.4277**	-0.203	0.1367	0.2377	0.149	-0.0243	0.0953	0.1351	-0.0822	1
	p=.275	p=.554	**p=.001**	p=.728	p=.202	**p=.038**	p=.089	**p=.022**	**p=.002**	p=.157	p=.344	p=.096	p=.302	p=.867	p=.510	p=.349	p=.570	p= ---

Table 4. Pearson Correlations for sound intensity level values corresponding to the C-weighting filter

Variable	Point 3	Point 2	Point 1	Point 6	Point 13	Point 12	Point 7	Point 17	Point 18	Point 4	Point 5	Point 9	Point 8	Point 10	Point 11	Point 16	Point 14	Point 15
Point 3	1	-0.03	0.0784	0.1292	-0.103	-0.1603	**-0.291**	-0.1559	0.0857	0.076	-0.017	-0.16	-0.031	-0.018	0.1984	0.129	0.243	0.1544
	p= ---	p=.838	p=.588	p=.371	p=.477	p=.266	**p=.040**	p=.280	p=.554	p=.600	p=.905	p=.260	p=.832	p=.902	p=.167	p=.372	p=.089	p=.284
Point 2	-0.03	1	-0.232	-0.054	0.0041	0.1771	-0.05	0.0421	-0.0183	-0.205	0.2358	0.198	-0.118	0.034	-0.1271	0.0561	0.18	0.173
	p=.838	p= ---	p=.105	p=.711	p=.977	p=.218	p=.732	p=.772	p=.900	p=.154	p=.099	p=.168	p=.413	p=.814	p=.379	p=.699	p=.212	p=.230
Point 1	0.0784	-0.232	1	0.0018	-0.044	0.1901	0.04	0.1008	0.0717	0.164	-0.198	-0.21	0.1833	-0.046	0.2276	0.0451	0.183	-0.0014
	p=.588	p=.105	p= ---	p=.990	p=.760	p=.186	p=.781	p=.486	p=.621	p=.255	p=.168	p=.147	p=.203	p=.752	p=.112	p=.756	p=.203	p=.992
Point 6	0.1292	-0.054	0.0018	1	**-0.357**	0.1492	-0.111	-0.073	-0.0122	-0.191	0.1448	0.132	0.0225	-0.208	0.2405	-0.0707	**0.34**	0.2279
	p=.371	p=.711	p=.990	p= ---	**p=.011**	p=.301	p=.442	p=.615	p=.933	p=.184	p=.316	p=.360	p=.877	p=.147	p=.092	p=.626	**p=.016**	p=.111
Point 13	-0.103	0.0041	-0.044	**-0.357**	1	-0.0972	0.232	0.2258	-0.0948	0.05	0.2395	-0.11	0.0362	**0.293**	-0.2531	0.2052	**-0.512**	-0.1208
	p=.477	p=.977	p=.760	**p=.011**	p= ---	p=.502	p=.105	p=.115	p=.512	p=.730	p=.094	p=.460	p=.803	**p=.039**	p=.076	p=.153	**p=.000**	p=.403
Point 12	-0.161	0.1771	0.1901	0.1492	-0.097	1	-0.193	0.0152	0.2597	**-0.607**	**0.2806**	**0.384**	0.2245	0.047	**-0.3596**	**0.3256**	**0.323**	**0.3082**
	p=.266	p=.218	p=.186	p=.301	p=.502	p= ---	p=.178	p=.917	p=.069	**p=.000**	**p=.048**	**p=.006**	p=.117	p=.746	**p=.010**	**p=.021**	**p=.022**	**p=.029**
Point 7	**-0.291**	-0.05	0.0404	-0.111	0.2318	-0.1934	1	0.1326	-0.2757	**0.46**	-0.075	0.091	-0.044	**-0.289**	0.1021	**-0.5433**	**-0.378**	**-0.3959**
	p=.040	p=.732	p=.781	p=.442	p=.105	p=.178	p= ---	p=.359	p=.053	**p=.001**	p=.604	p=.530	p=.760	**p=.042**	p=.481	**p=.000**	**p=.007**	**p=.004**
Point 17	-0.156	0.0421	0.1008	-0.073	0.2258	0.0152	0.133	1	-0.1017	0.019	0.1443	-0.26	0.2614	0.06	-0.1985	0.046	**-0.368**	-0.1223
	p=.280	p=.772	p=.486	p=.615	p=.115	p=.917	p=.359	p= ---	p=.482	p=.894	p=.317	p=.074	p=.067	p=.681	p=.167	p=.751	**p=.008**	p=.397
Point 18	0.0857	-0.018	0.0717	-0.012	-0.095	0.2597	-0.276	-0.1017	1	-0.249	-0.008	0.178	0.2657	0.116	0.0874	0.0958	**0.29**	0.2373
	p=.554	p=.900	p=.621	p=.933	p=.512	p=.069	p=.053	p=.482	p= ---	p=.082	p=.957	p=.218	p=.062	p=.421	p=.546	p=.508	**p=.041**	p=.097
Point 4	0.076	-0.205	0.1641	-0.191	0.05	**-0.6072**	**0.46**	0.0193	-0.2487	1	-0.215	-0.18	**-0.283**	-0.179	**0.3573**	**-0.5211**	**-0.306**	**-0.4047**
	p=.600	p=.154	p=.255	p=.184	p=.730	**p=.000**	**p=.001**	p=.894	p=.082	p= ---	p=.134	p=.213	**p=.046**	p=.214	**p=.011**	**p=.000**	**p=.031**	**p=.004**
Point 5	-0.0174	0.2358	-0.198	0.1448	0.2395	**0.2806**	-0.075	0.1443	-0.0077	-0.215	1	0.195	0.1523	0.185	-0.0982	0.1724	-0.009	-0.0572
	p=.905	p=.099	p=.168	p=.316	p=.094	**p=.048**	p=.604	p=.317	p=.957	p=.134	p= ---	p=.174	p=.291	p=.198	p=.498	p=.231	p=.949	p=.693
Point 9	-0.162	0.1979	-0.208	0.1323	-0.107	**0.3837**	0.091	-0.255	0.1775	-0.179	0.1952	1	0.1073	-0.26	-0.2045	-0.1349	0.175	0.0419
	p=.260	p=.168	p=.147	p=.360	p=.460	**p=.006**	p=.530	p=.074	p=.218	p=.213	p=.174	p= ---	p=.458	p=.068	p=.154	p=.350	p=.226	p=.773
Point 8	-0.031	-0.118	0.1833	0.0225	0.0362	0.2245	-0.044	0.2614	0.2657	**-0.283**	0.1523	0.107	1	0.044	-0.0501	0.2375	-0.058	0.1979
	p=.832	p=.413	p=.203	p=.877	p=.803	p=.117	p=.760	p=.067	p=.062	**p=.046**	p=.291	p=.458	p= ---	p=.763	p=.730	p=.097	p=.688	p=.168
Point 10	-0.018	0.0341	-0.046	-0.208	**0.2932**	0.047	**-0.289**	0.0595	0.1163	-0.179	0.185	-0.26	0.0437	1	-0.2088	**0.3007**	-0.05	-0.1301
	p=.902	p=.814	p=.752	p=.147	**p=.039**	p=.746	**p=.042**	p=.681	p=.421	p=.214	p=.198	p=.068	p=.763	p= ---	p=.146	**p=.034**	p=.728	p=.368
Point 11	0.1984	-0.127	0.2276	0.2405	-0.253	**-0.3596**	0.102	-0.1985	0.0874	**0.357**	-0.098	-0.2	-0.05	-0.209	1	**-0.471**	**0.307**	-0.0727
	p=.167	p=.379	p=.112	p=.092	p=.076	**p=.010**	p=.481	p=.167	p=.546	**p=.011**	p=.498	p=.154	p=.730	p=.146	p= ---	**p=.001**	**p=.030**	p=.616
Point 16	0.129	0.0561	0.0451	-0.0707	0.2052	**0.3256**	**-0.543**	0.046	0.0958	**-0.521**	0.1724	-0.13	0.2375	**0.301**	**-0.471**	1	0.079	**0.4126**
	p=.372	p=.699	p=.756	p=.626	p=.153	**p=.021**	**p=.000**	p=.751	p=.508	**p=.000**	p=.231	p=.350	p=.097	**p=.034**	**p=.001**	p= ---	p=.584	**p=.003**
Point 14	0.2432	0.1798	0.1831	**0.34**	**-0.512**	**0.3227**	**-0.378**	**-0.3684**	**0.2903**	**-0.306**	-0.009	0.175	-0.058	-0.05	**0.3069**	0.0793	1	0.1919
	p=.089	p=.212	p=.203	**p=.016**	**p=.000**	**p=.022**	**p=.007**	**p=.008**	**p=.041**	**p=.031**	p=.949	p=.226	p=.688	p=.728	**p=.030**	p=.584	p= ---	p=.182
Point 15	0.1544	0.173	-0.0014	0.2279	-0.121	**0.3082**	**-0.396**	-0.1223	0.2373	**-0.405**	-0.057	0.042	0.1979	-0.13	-0.0727	**0.4126**	0.192	1
	p=.284	p=.230	p=.992	p=.111	p=.403	**p=.029**	**p=.004**	p=.397	p=.097	**p=.004**	p=.693	p=.773	p=.168	p=.368	p=.616	**p=.003**	p=.182	p= ---

4. CONCLUSIONS

In this article, the level of noise pollution in the city of Galati was determined. For this purpose, the sound level was measured in 18 points in the city of Galati with the help of a professional digital acoustic sound level meter with two frequency weighting filters: "A" and "C". The values obtained for the sound level at the edge of the pavement bordering the carriageway are generally lower or equal to the maximum admissible value of 70dB. The values of the noise level outside the building, measured 2 m from the facade, exceeded the value of 50dB.

From the calculated Pearson matrices it emerges that that there are no repeating patterns. It can be said that the traffic level is running randomly.

Also the t-test for independent samples indicates that the differences are significant, that means the analyzed points are different and can be used as fingerprints for identifying places.

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