

Supplementary Materials

Development of the Correction Algorithm to Limit the Deformation of Bacterial Colonies Diffraction Patterns Caused by Misalignment and Its Impact on the Bacteria Identification in the Proposed Optical Biosensor

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		$\Delta r=50.0 \mu m$	$\Delta r=100.0 \mu m$	$\Delta r=200.0 \mu m$	$\Delta r=300.0 \mu m$	$\Delta r=400.0 \mu m$	$\Delta r=500.0 \mu m$
	Feature	p-value	p-value	p-value	p-value	p-value	p-value
10 th zone	sd.10	0.0528	0.0006	0.0117	0.0412	0.0057	0.0081
	skewness.10	0.0480	0.0020	0.0015	0.0088	0.0128	0.0268
	flatness.10	0.1284	0.0021	0.0008	0.0048	0.0035	0.0021
	mean.10	0.0459	0.0498	0.0467	0.0441	0.0080	0.0012
	entropy.10	0.1025	0.0973	0.0495	0.0477	0.9840	0.0348
	uniformity.10	0.4523	0.3841	0.0366	0.0451	0.0258	0.0098
	smoothness.10	0.0421	0.0237	0.3167	0.0394	0.0125	0.0058
9 th zone	sd.9	0.0598	0.0018	0.0001	0.0501	0.0354	0.0981
	skewness.9	0.2680	0.0004	0.0002	0.0006	0.0215	0.0001
	flatness.9	0.6540	0.0006	0.0002	0.0006	0.0004	0.0002
	mean.9	0.0559	0.1549	0.0164	0.7033	0.0958	0.0012
	entropy.9	0.7892	0.6526	0.1736	0.0919	0.0021	0.0005
	uniformity.9	0.0623	0.0632	0.0001	0.0005	0.0002	0.0001
	smoothness.9	0.0521	0.0441	0.0536	0.0454	0.0001	0.0001
8 th zone	sd.8	0.8239	0.0522	0.0001	0.0004	0.0001	0.0001
	skewness.8	0.7865	0.6335	0.0017	0.0003	0.0025	0.0001
	flatness.8	0.0502	0.0128	0.9499	0.0002	0.0002	0.0001
	mean.8	0.8420	0.8012	0.0002	0.6746	0.0001	0.0001
	entropy.8	0.0782	0.0636	0.0004	0.0001	0.0004	0.0001
	uniformity.8	0.3215	0.2654	0.0722	0.0069	0.0026	0.0005
	smoothness.8	0.0789	0.0418	0.0019	0.0003	0.0012	0.0008
7 th zone	sd.7	0.1982	0.1293	0.0322	0.0024	0.0382	0.0268
	skewness.7	0.3948	0.3142	0.0479	0.0064	0.1280	0.0328
	flatness.7	0.2988	0.2542	0.7554	0.0785	0.0482	0.0129
	mean.7	0.9002	0.8832	0.1028	0.0048	0.0026	0.0008
	entropy.7	0.0689	0.0566	0.0016	0.0001	0.0035	0.0009
	uniformity.7	0.2996	0.2435	0.0691	0.0011	0.0002	0.0001
	smoothness.7	0.6998	0.6422	0.7681	0.5550	0.0047	0.0012
6 th zone	sd.6	0.3256	0.2569	0.0165	0.0051	0.0012	0.0006
	skewness.6	0.6580	0.5137	0.1298	0.0582	0.0012	0.0008
	flatness.6	0.0362	0.3139	0.0449	0.0129	0.0090	0.0032
	mean.6	0.0321	0.0968	0.0097	0.0185	0.0098	0.0042
	entropy.6	0.8623	0.8343	0.0270	0.0080	0.0012	0.0005
	uniformity.6	0.4211	0.3311	0.4394	0.3252	0.0079	0.0028
	smoothness.6	0.3268	0.2302	0.0054	0.0026	0.0018	0.0008
5 th zone	sd.5	0.0512	0.0001	0.0002	0.0001	0.0001	0.0001
	skewness.5	0.0525	0.0080	0.0008	0.0001	0.0001	0.0001
	flatness.5	0.4215	0.0001	0.0001	0.0002	0.0001	0.0001
	mean.5	0.1239	0.0186	0.0002	0.0002	0.0001	0.0001
	entropy.5	0.8532	0.0041	0.0597	0.1608	0.0801	0.0105
	uniformity.5	0.3995	0.0496	0.2578	0.0437	0.0030	0.0009
	smoothness.5	0.0587	0.3537	0.0013	0.0004	0.0002	0.0001
4 th zone	sd.4	0.3981	0.3564	0.0132	0.0053	0.0021	0.0009
	skewness.4	0.0519	0.8119	0.0736	0.0184	0.0099	0.0052
	flatness.4	0.0753	0.0652	0.0566	0.0174	0.0095	0.0005
	mean.4	0.3587	0.3290	0.0133	0.0004	0.0003	0.0001
	entropy.4	0.7025	0.6588	0.0011	0.0001	0.0001	0.0001
	uniformity.4	0.9862	0.9560	0.0142	0.0003	0.0002	0.0001
	smoothness.4	0.6102	0.5918	0.1012	0.0072	0.0038	0.0012
3 th zone	sd.3	0.2188	0.1887	0.0434	0.0515	0.0101	0.0058
	skewness.3	0.3680	0.3068	0.9577	0.0478	0.0328	0.0250
	flatness.3	0.3698	0.3205	0.0388	0.0096	0.0482	0.0112
	mean.3	0.2159	0.1979	0.0563	0.0695	0.0558	0.0021
	entropy.3	0.3287	0.2794	0.0624	0.0017	0.0009	0.0005
	uniformity.3	0.6921	0.6111	0.0519	0.0517	0.0009	0.0002
	smoothness.3	0.8563	0.8367	0.0490	0.0326	0.0107	0.0085
2 nd zone	sd.2	0.4210	0.3620	0.0624	0.0007	0.0005	0.0003
	skewness.2	0.8652	0.8343	0.3258	0.0563	0.0115	0.0098
	flatness.2	0.4215	0.3136	0.0134	0.0264	0.0198	0.0085
	mean.2	0.2153	0.1363	0.0520	0.0578	0.0524	0.0012
	entropy.2	0.2230	0.1257	0.0602	0.0501	0.0001	0.0001
	uniformity.2	0.1205	0.1052	0.0601	0.0002	0.0001	0.0001
	smoothness.2	0.4962	0.4028	0.0020	0.0005	0.0002	0.0001
1 st zone	sd.1	0.4325	0.3448	0.0741	0.0546	0.0529	0.0509
	skewness.1	0.8921	0.8712	0.4104	0.0006	0.0004	0.0002
	flatness.1	0.4023	0.3651	0.0375	0.0001	0.0001	0.0001
	mean.1	0.6538	0.5373	0.1974	0.0603	0.0001	0.0001
	entropy.1	0.9658	0.9517	0.0779	0.0676	0.0601	0.0512
	uniformity.1	0.6801	0.6270	0.1722	0.7631	0.2164	0.1258
	smoothness.1	0.4128	0.3422	0.1658	0.1184	0.0958	0.0524
	radius	0.8024	0.6156	0.4334	0.1853	0.1121	0.0901

Figure S1. The comparability of all classification features determined by p-values: blue color - no variation, yellow color - statistically significant variation (assumed criterion of comparability: P-value $\geq$ 0.05).

		$\Delta r=50.0 \mu m$	$\Delta r=100.0 \mu m$	$\Delta r=200.0 \mu m$	$\Delta r=300.0 \mu m$	$\Delta r=400.0 \mu m$	$\Delta r=500.0 \mu m$
	Feature	p-value	p-value	p-value	p-value	p-value	p-value
10 th zone	sd.10	0.0528	0.0006	0.0117	0.0412	0.0057	0.0081
	mean.10	0.0459	0.0498	0.0487	0.0441	0.0080	0.0012
	entropy.10	0.1025	0.0973	0.0495	0.0477	0.9840	0.0348
	uniformity.10	0.4523	0.3841	0.0366	0.0451	0.0258	0.0098
9 th zone	sd.9	0.0598	0.0018	0.0001	0.0001	0.0354	0.0981
	mean.9	0.0559	0.1549	0.0164	0.7033	0.0958	0.0012
	entropy.9	0.7892	0.6526	0.1736	0.0919	0.0021	0.0005
	uniformity.9	0.0723	0.0632	0.0001	0.0005	0.0002	0.0001
8 th zone	sd.8	0.8239	0.0522	0.0001	0.0004	0.0001	0.0001
	mean.8	0.8420	0.8012	0.0002	0.6746	0.0001	0.0001
	entropy.8	0.0782	0.0636	0.0004	0.0001	0.0004	0.0001
	uniformity.8	0.3215	0.2654	0.0722	0.0069	0.0026	0.0005
7 th zone	sd.7	0.1982	0.1293	0.0322	0.0024	0.0382	0.0268
	mean.7	0.9002	0.8832	0.1028	0.0048	0.0026	0.0008
	entropy.7	0.0689	0.0566	0.0016	0.0001	0.0035	0.0009
	uniformity.7	0.2996	0.2435	0.0691	0.0011	0.0002	0.0001
6 th zone	sd.6	0.3256	0.2569	0.0165	0.0051	0.0012	0.0006
	mean.6	0.0321	0.0968	0.0097	0.0185	0.0098	0.0042
	entropy.6	0.8623	0.8343	0.0270	0.0080	0.0012	0.0005
	uniformity.6	0.4211	0.3311	0.4394	0.3252	0.0079	0.0028
5 th zone	sd.5	0.0512	0.0001	0.0002	0.0001	0.0001	0.0001
	mean.5	0.1239	0.0386	0.0002	0.0002	0.0001	0.0001
	entropy.5	0.8532	0.8119	0.0597	0.1608	0.0801	0.0105
	uniformity.5	0.3995	0.3537	0.2578	0.0437	0.0030	0.0009
4 th zone	sd.4	0.3981	0.3564	0.0132	0.0053	0.0021	0.0009
	mean.4	0.3587	0.3290	0.0133	0.0004	0.0003	0.0001
	entropy.4	0.7025	0.6588	0.0011	0.0001	0.0001	0.0001
	uniformity.4	0.9862	0.9560	0.0142	0.0003	0.0002	0.0001
3 th zone	sd.3	0.2188	0.1887	0.0434	0.0515	0.0101	0.0058
	mean.3	0.2159	0.1979	0.0563	0.0695	0.0558	0.0021
	entropy.3	0.3287	0.2794	0.0624	0.0017	0.0009	0.0005
	uniformity.3	0.6921	0.6111	0.0519	0.0517	0.0009	0.0002
2 nd zone	sd.2	0.4210	0.3620	0.0624	0.0007	0.0005	0.0003
	mean.2	0.2153	0.1363	0.0520	0.0578	0.0524	0.0012
	entropy.2	0.2230	0.1257	0.0602	0.0501	0.0001	0.0001
	uniformity.2	0.1205	0.1052	0.0601	0.0002	0.0001	0.0001
1 st zone	sd.1	0.4325	0.3448	0.0741	0.0546	0.0529	0.0509
	mean.1	0.6538	0.5373	0.1974	0.0603	0.0001	0.0001
	entropy.1	0.9658	0.9517	0.0779	0.0676	0.0601	0.0512
	uniformity.1	0.6801	0.6270	0.1722	0.7631	0.2164	0.1258
	radius	0.8024	0.6156	0.4334	0.1853	0.1121	0.0901

Figure S2. The comparability of selected classification features' subset determined by p-values: blue color - no variation, yellow color - statistically significant variation (assumed criterion of comparability: P- value $\geq$ 0.05).