Detailed results for all the experiments described in paper:

Experiments with One–Class Classifier as a Predictor of Spectral Discontinuities in Unit Concatenation

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In the following tables, we present the detailed classifications results in form of confusion matrix values, for which we use the abbreviations:

tp – *true positives.* Represents the number of correctly classified target distances

fp – *false positives.* Represents the number of outlier distances incorrectly classified as targets; also called type I error

tn – *true negatives.* Represents the number of correctly classified outlier distances

fn – *false negatives.* Represents the number of target distances incorrectly classified as outliers; also called type II error.

And from those values we computed:

tpr – *sensitivity*, also called the *true positive rate.*

tnr – *specificity*, also called the *true negative rate.*

P – *precision.*

R – *recall.*

F1 – *F1 measure.*

acc – *accuracy.*

mcc – *Matthews correlation coefficient.*

The following table shows the number of targets and outliers as determined by listeners (see section 2.2 in the paper). These are all the target distances (for all the words without artefacts perceived) and the remaining 50% of outlier distances (those not used for cross–validation, see sections 2.3 and 3 in the paper). All the classifiers were tested on this set.

phones	a	e	i	o	u	a:	e:	i:	o:	u:
targets	60	45	30	50	22	17	4	17	0	4
outliers	9	18	10	21	1	52	0	3	0	0

		async 20/20					async 20/20, mid.only				
	phones	a	e	i	o	a:	a	e	i	o	a:
OCSVM	TP	29	37	28	36	17	34	35	24	43	16
	FP	4	12	5	16	12	5	12	2	21	2
	TN	5	6	5	5	40	4	6	8	0	50
	FN	31	8	2	14	0	26	10	6	7	1
	TPR	48.3	82.2	93.3	72.0	100.0	56.7	77.8	80.0	86.0	94.1
	TNR	55.6	33.3	50.0	23.8	0.0	44.4	33.3	80.0	0.0	96.2
	P	87.9	75.5	84.8	69.2	58.6	87.2	74.5	92.3	67.2	88.9
	R	48.3	82.2	93.3	72.0	100.0	56.7	77.8	80.0	86.0	94.1
	F1	62.4	78.7	88.9	70.6	73.9	68.7	76.1	85.7	75.4	91.4
	ACC	49.3	68.3	82.5	57.7	82.6	55.1	65.1	80.0	60.6	95.7
	MCC	0.03	0.17	0.49	-0.04	0.67	0.01	0.12	0.54	-0.21	0.89
MGD	TP	60	43	29	49	17	60	34	29	50	15
	FP	9	18	10	20	11	9	14	9	21	3
	TN	0	0	0	1	41	0	4	1	0	49
	FN	0	2	1	1	0	0	11	1	0	2
	TPR	100.0	95.6	96.7	98.0	100.0	100.0	75.6	96.7	100.0	88.2
	TNR	0.0	0.0	0.0	4.8	78.8	0.0	22.2	10.0	0.0	94.2
	P	87.0	70.5	74.4	71.0	60.7	87.0	70.8	76.3	70.4	83.3
	R	100.0	95.6	96.7	98.0	100.0	100.0	75.6	96.7	100.0	88.2
	F1	93.0	81.1	84.1	82.4	75.6	93.0	73.1	85.3	82.6	85.7
	ACC	87.0	68.3	72.5	70.4	84.1	87.0	60.3	75.0	70.4	92.8
	MCC	0.00	-0.11	-0.09	0.08	0.69	0.00	-0.02	0.13	0.00	0.81
GRT	TP	33	39	25	48	17	38	37	26	47	17
	FP	5	12	6	20	24	6	13	3	21	9
	TN	4	6	4	1	28	3	5	7	0	43
	FN	27	6	5	2	0	22	8	4	3	0
	TPR	55.0	86.7	83.3	96.0	100.0	63.3	82.2	86.7	94.0	100.0
	TNR	44.4	33.3	40.0	4.8	53.8	33.3	27.8	70.0	0.0	82.7
	P	86.8	76.5	80.6	70.6	41.5	86.4	74.0	89.7	69.1	65.4
	R	55.0	86.7	83.3	96.0	100.0	63.3	82.2	86.7	94.0	100.0
	F1	67.3	81.2	82.0	81.4	58.6	73.1	77.9	88.1	79.7	79.1
	ACC	53.6	71.4	72.5	69.0	65.2	59.4	66.7	82.5	66.2	87.0
	MCC	-0.00	0.23	0.24	0.02	0.47	-0.02	0.11	0.55	-0.14	0.74

The table showing the performance of the classifiers trained on async 20/20 parameterization with distances selected from any phone part and for distances selected for phones middle only. Note that the distances in test set were the same for both async 20/20 and async 20/20 mid.only trainings (they must be computed so).

	phones	async 4/25					async 4/25, mid.only				
		a	e	i	o	a:	a	e	i	o	a:
OCSVM	TP	5	0	0	4	1	4	0	0	1	1
	FP	0	0	0	0	0	0	0	0	0	0
	TN	9	18	10	21	52	9	18	10	21	52
	FN	55	45	30	46	16	56	45	30	49	16
	TPR	8.3	0.0	0.0	8.0	5.9	6.7	0.0	0.0	2.0	5.9
	TNR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	P	100.0			100.0	100.0	100.0			100.0	100.0
	R	8.3	0.0	0.0	8.0	5.9	6.7	0.0	0.0	2.0	5.9
	F1	15.4	n/a	n/a	14.8	11.1	12.5	n/a	n/a	3.9	11.1
	ACC	20.3	28.6	25.0	35.2	76.8	18.8	28.6	25.0	31.0	76.8
	MCC	0.11	0.00	0.00	0.16	0.21	0.10	0.00	0.00	0.08	0.21
MGD	TP	25	20	8	18	10	23	19	9	17	5
	FP	0	2	1	1	0	0	2	1	1	0
	TN	9	16	9	20	52	9	16	9	20	52
	FN	35	25	22	32	7	37	26	21	33	12
	TPR	41.7	44.4	26.7	36.0	58.8	38.3	42.2	30.0	34.0	29.4
	TNR	100.0	88.9	90.0	95.2	100.0	100.0	88.9	90.0	95.2	100.0
	P	100.0	90.9	88.9	94.7	100.0	100.0	90.5	90.0	94.4	100.0
	R	41.7	44.4	26.7	36.0	58.8	38.3	42.2	30.0	34.0	29.4
	F1	58.8	59.7	41.0	52.2	74.1	55.4	57.6	45.0	50.0	45.5
	ACC	49.3	57.1	42.5	53.5	89.9	46.4	55.6	45.0	52.1	82.6
	MCC	0.29	0.32	0.17	0.32	0.72	0.27	0.30	0.20	0.31	0.49
GRT	TP	32	11	19	22	5	28	8	7	19	3
	FP	1	0	0	0	0	1	0	0	0	0
	TN	8	18	10	21	52	8	18	10	21	52
	FN	28	34	11	28	12	32	37	23	31	14
	TPR	53.3	24.4	63.3	44.0	29.4	46.7	17.8	23.3	38.0	17.6
	TNR	88.9	100.0	100.0	100.0	100.0	88.9	100.0	100.0	100.0	100.0
	P	97.0	100.0	100.0	100.0	100.0	96.6	100.0	100.0	100.0	100.0
	R	53.3	24.4	63.3	44.0	29.4	46.7	17.8	23.3	38.0	17.6
	F1	68.8	39.3	77.6	61.1	45.5	62.9	30.2	37.8	55.1	30.0
	ACC	58.0	46.0	72.5	60.6	82.6	52.2	41.3	42.5	56.3	79.7
	MCC	0.28	0.29	0.55	0.43	0.49	0.24	0.24	0.27	0.39	0.37

This table shows the performance of the classifiers trained on async 04/25 parameterization with distances selected from any phone part and for distances selected for phones middle only. Note that the distances in test set were the same for both async 04/25 and async 20/20 mid.only trainings (they must be computed so).

	phones	async 12/25					async 12/25, mid.only				
		a	e	i	o	a:	a	e	i	o	a:
OCSVM	TP	34	20	19	29	17	27	17	15	25	11
	FP	0	5	1	3	0	0	1	0	2	0
	TN	9	13	9	18	52	9	17	10	19	52
	FN	26	25	11	21	0	33	28	15	25	6
	TPR	56.7	44.4	63.3	58.0	100.0	45.0	37.8	50.0	50.0	64.7
	TNR	100.0	72.2	90.0	85.7	100.0	100.0	94.4	100.0	90.5	100.0
	P	100.0	80.0	95.0	90.6	100.0	100.0	94.4	100.0	92.6	100.0
	R	56.7	44.4	63.3	58.0	100.0	45.0	37.8	50.0	50.0	64.7
	F1	72.3	57.1	76.0	70.7	100.0	62.1	54.0	66.7	64.9	78.6
	ACC	62.3	52.4	70.0	66.2	100.0	52.2	54.0	62.5	62.0	91.3
	MCC	0.38	0.15	0.46	0.40	1.00	0.31	0.32	0.45	0.38	0.76
MGD	TP	28	23	21	27	17	33	20	20	22	10
	FP	0	5	5	7	8	4	2	2	2	4
	TN	9	13	5	14	44	5	16	8	19	48
	FN	32	22	9	23	0	27	25	10	28	7
	TPR	46.7	51.1	70.0	54.0	100.0	55.0	44.4	66.7	44.0	58.8
	TNR	100.0	72.2	50.0	66.7	84.6	55.6	88.9	80.0	90.5	92.3
	P	100.0	82.1	80.8	79.4	68.0	89.2	90.9	90.9	91.7	71.4
	R	46.7	51.1	70.0	54.0	100.0	55.0	44.4	66.7	44.0	58.8
	F1	63.6	63.0	75.0	64.3	81.0	68.0	59.7	76.9	59.5	64.5
	ACC	53.6	57.1	65.0	57.7	88.4	55.1	57.1	70.0	57.7	84.1
	MCC	0.32	0.21	0.18	0.19	0.76	0.07	0.32	0.41	0.33	0.55
GRT	TP	39	23	22	33	17	41	21	17	36	15
	FP	1	7	3	7	5	5	4	0	9	0
	TN	8	11	7	14	47	4	14	10	12	52
	FN	21	22	8	17	0	19	24	13	14	2
	TPR	65.0	51.1	73.3	66.0	100.0	68.3	46.7	56.7	72.0	88.2
	TNR	88.9	61.1	70.0	66.7	90.4	44.4	77.8	100.0	57.1	100.0
	P	97.5	76.7	88.0	82.5	77.3	89.1	84.0	100.0	80.0	100.0
	R	65.0	51.1	73.3	66.0	100.0	68.3	46.7	56.7	72.0	88.2
	F1	78.0	61.3	80.0	73.3	87.2	77.4	60.0	72.3	75.8	93.8
	ACC	68.1	54.0	72.5	66.2	92.8	65.2	55.6	67.5	67.6	97.1
	MCC	0.37	0.11	0.39	0.30	0.84	0.09	0.23	0.50	0.28	0.92

This table shows the performance of the classifiers trained and evaluated on async 12/25 parameterization. All the other info remains the same as in the previous tables.

	phones	async 12/25					async 12/25, mid.only				
		a	e	i	o	a:	a	e	i	o	a:
OCSVM	TP	23	17	13	23	10	18	10	12	15	2
	FP	0	2	0	2	0	0	2	1	0	0
	TN	9	16	10	19	52	9	16	9	21	52
	FN	37	28	17	27	7	42	35	18	35	15
	TPR	38.3	37.8	43.3	46.0	58.8	30.0	22.2	40.0	30.0	11.8
	TNR	100.0	88.9	100.0	90.5	100.0	100.0	88.9	90.0	100.0	100.0
	P	100.0	89.5	100.0	92.0	100.0	100.0	83.3	92.3	100.0	100.0
	R	38.3	37.8	43.3	46.0	58.8	30.0	22.2	40.0	30.0	11.8
	F1	55.4	53.1	60.5	61.3	74.1	46.2	35.1	55.8	46.2	21.1
	ACC	46.4	52.4	57.5	59.2	89.9	39.1	41.3	52.5	50.7	78.3
	MCC	0.27	0.26	0.40	0.35	0.72	0.23	0.13	0.28	0.34	0.30
MGD	TP	39	12	8	25	13	27	15	14	24	8
	FP	4	2	2	1	4	0	2	4	2	2
	TN	5	16	8	20	48	9	16	6	19	50
	FN	21	33	22	25	4	33	30	16	26	9
	TPR	65.0	26.7	26.7	50.0	76.5	45.0	33.3	46.7	48.0	47.1
	TNR	55.6	88.9	80.0	95.2	92.3	100.0	88.9	60.0	90.5	96.2
	P	90.7	85.7	80.0	96.2	76.5	100.0	88.2	77.8	92.3	80.0
	R	65.0	26.7	26.7	50.0	76.5	45.0	33.3	46.7	48.0	47.1
	F1	75.7	40.7	40.0	65.8	76.5	62.1	48.4	58.3	63.2	59.3
	ACC	63.8	44.4	40.0	63.4	88.4	52.2	49.2	50.0	60.6	84.1
	MCC	0.14	0.17	0.07	0.43	0.69	0.31	0.23	0.06	0.36	0.53
GRT	TP	32	22	21	26	17	38	16	19	28	17
	FP	0	3	1	4	0	0	2	1	3	0
	TN	9	15	9	17	52	9	16	9	18	52
	FN	28	23	9	24	0	22	29	11	22	0
	TPR	53.3	48.9	70.0	52.0	100.0	63.3	35.6	63.3	56.0	100.0
	TNR	100.0	83.3	90.0	81.0	100.0	100.0	88.9	90.0	85.7	100.0
	P	100.0	88.0	95.5	86.7	100.0	100.0	88.9	95.0	90.3	100.0
	R	53.3	48.9	70.0	52.0	100.0	63.3	35.6	63.3	56.0	100.0
	F1	69.6	62.9	80.8	65.0	100.0	77.6	50.8	76.0	69.1	100.0
	ACC	59.4	58.7	75.0	60.6	100.0	68.1	50.8	70.0	64.8	100.0
	MCC	0.36	0.30	0.52	0.30	1.00	0.43	0.24	0.46	0.38	1.00

This table shows the performance of the classifiers trained and evaluated on pitch–synchronous psync pm/25 parameterization. All the other info remains the same as in the previous tables.