BEAT TRACKING TASK: MIREX 2012 MULTI FEATURE BEAT TRACKER

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ABSTRACT

The Multi-feature Beat tracker uses 5 different onsets detection function to estimates the beats of a musical audio signal using only one beat tracker algorithm, finally the beat tracker output is selected using a committee technique presented in previous works.
The algorithm ZDG2 get the higher value in five of the ten measures in the Mckinney Dataset in 2012 and the higher AMLt and AMLc values in all the years in the Beat tracking task in the same dataset.

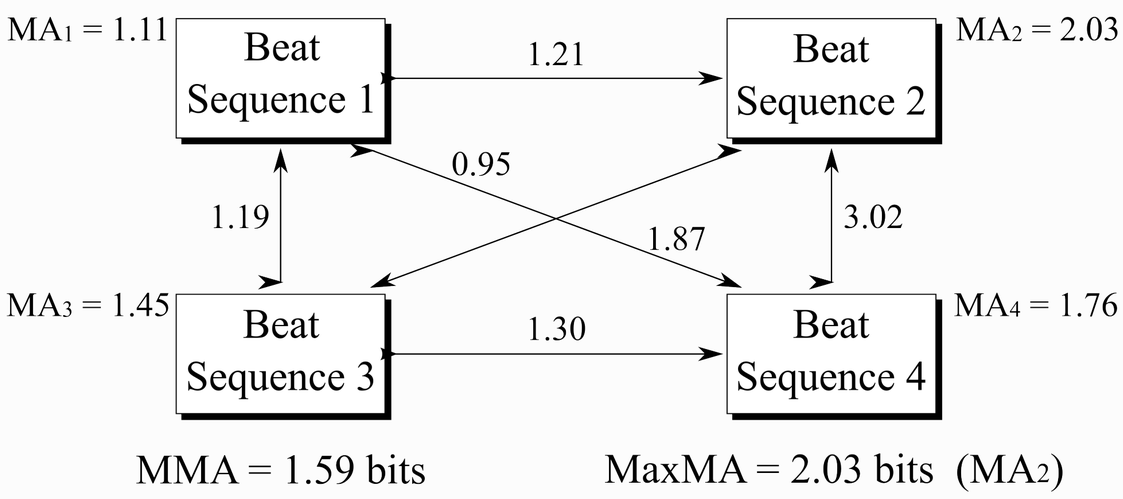
ONSET DETECTION FEATURES

- Complex Spectral Difference
- Mel Auditory Feature
- Spectral Flux
- Sub Bands Harmonic
- Sub Bands Weight

BEAT TRACKER SYSTEMS

1. Onset Detection Features
2. Period Detection (Stark, Davies, 2009)
3. Beat Tracker (Degara et al, 2011)
4. Output: Max Mutual Agreement

MAX MUTUAL AGREEMENT



In order to measure the MA between each pair of estimated beat sequences a beat tracking evaluation criteria was selected.
For **(ZDG1)** a combination of Information Gain measure and AMLt , and the Regularity Function for **(ZDG2)**.

RESULTS IN MCKINNEY DATASET

Algorithm	F-Measure	Cemgil	Goto	P-Score	CMLc	CMLt	AMLc	AMLt	D (bits)	Dg (bits)
ZDG2	53,3908	40,6227	**22,4347**	58,2377	25,0103	33,3751	**51,759**	**66,6591**	**1,8055**	**0,3133**
GP3	50,3246	37,2708	21,1824	56,5626	23,9642	33,691	49,272	66,4488	1,7829	0,2522
ZDG1	51,6075	38,8155	20,9114	57,3818	23,7155	32,3427	49,4494	65,0939	1,7953	0,2639
GP2	50,0944	37,0009	20,2158	56,1765	23,2642	32,3007	48,5807	64,8903	1,783	0,2411
GKC2	50,1021	37,8267	19,0269	55,1619	25,8119	32,9415	51,0431	64,2324	1,686	0,2729
ODGR1	50,5011	38,2091	17,786	55,5026	21,5578	29,9927	49,3793	64,1496	1,6592	0,2568
FK1	56,7275	42,6967	21,389	61,1646	22,2548	35,076	41,4778	63,2658	1,6594	0,3127
ODGR2	50,3833	38,1724	18,7814	55,4386	22,3619	30,3893	47,036	62,7007	1,6095	0,2668
KB1	53,5053	39,584	17,4612	57,712	17,5112	29,9126	35,8856	60,2136	1,6216	0,2286
ODGR3	49,7496	37,718	16,0461	55,0283	21,8343	29,7376	44,2349	59,7396	1,5388	0,2585
FW4	52,1262	39,5043	21,6458	57,6836	23,684	34,5203	42,4399	59,1434	1,643	0,2586
KFRO1	51,1306	38,9734	20,6787	56,0343	25,0057	32,0236	47,0872	58,8376	1,6635	0,2918
ODGR4	47,804	36,1936	14,9805	53,751	19,9762	28,3435	41,3848	58,1546	1,4727	0,2278
SB6	52,946	40,2607	18,8169	56,8074	20,3858	29,3413	40,8115	57,152	1,6018	0,2533
FW3	51,9314	39,226	20,0735	57,8761	22,5415	34,0889	39,1905	56,9639	1,600	0,2486
SB3	52,6909	39,9243	19,7332	57,0825	20,8264	29,9532	37,4468	53,6397	1,5724	0,2044
GP4	49,6137	36,7119	12,6218	55,6275	19,5719	30,3776	35,1656	52,4657	1,5115	0,2228
SB7	52,7201	40,0796	6,6035	55,7986	16,4673	26,4197	27,6062	44,2446	1,4314	0,2521
SB4	51,3173	38,9062	8,9260	55,0298	14,211	24,0246	24,3687	42,1385	1,2514	0,1518
FW5	43,2851	31,6835	3,7358	49,9666	9,3728	18,8435	17,0242	34,7984	1,1285	0,0883

BEST RESULT PER YEAR

Year	Algorithm	AMLt
2012	**ZDG2**	**66,6591**
2011	GP5	66,451
2010	GP6	63,5963
2009	GP1	66,6

Year	Algorithm	AMLc
2012	**ZDG2**	**51,759**
2011	GKC2	51,0453
2010	BES3	51,0786
2009	DRP4	50,8

REFERENCES

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https://sites.google.com/site/tempoandbeattracking/