

KUNNEN WE ACTIEVE BEWEGING METEN?

Een onderzoek naar de mogelijkheden van
Kinect om een fysiotherapeut te ondersteunen
bij het bepalen van painful arcs



Team Pepper



J A !



Bezig geweest met..

- Programmeren: uitvinden werking kinect, doel is data opslaan
- Plannen van opname sessie
- Opnemen van studenten met deze applicatie



Applicatie voor opslaan data

Demo



Team Pepper

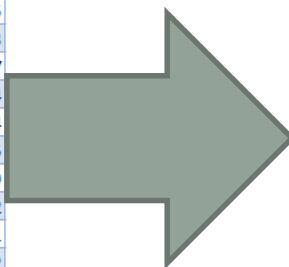


Spelen met eerste data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO	HP	HQ	HR	HS	HT	HU	HV	HW	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH	II	IJ	IK	IL	IM	IN	IO	IP	IQ	IR	IS	IT	IU	IV	IW	IX	IY	IZ	JA	JB	JC	JD	JE	JF	JG	JH	JI	IJ	JK	KL	KM	KN	KO	KP	KQ	KR	KS	KT	KU	KV	KW	KX	KY	KZ	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	LM	LN	LO	LP	LQ	LR	LS	LT	LU	LV	LW	LX	LY	LZ	MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	MP	MQ	MR	MS	MT	MU	MV	MW	MX	MY	MZ	NA	NB	NC	ND	NE	NF	NG	NH	NI	NJ	NK	NL	NM	NN	NO	NP	NQ	NR	NS	NT	NU	NV	NW	NX	NY	NZ	OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM	ON	OO	OP	OQ	OR	OS	OT	OU	OV	OW	OX	OY	OZ	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PQ	PR	PS	PT	PU	PV	PW	PX	PY	PZ	QA	QB	QC	QD	QE	QF	QG	QH	QI	QJ	QK	QL	QM	QN	QO	QP	QQ	QR	QS	QT	QU	QV	QW	QX	QY	QZ	RA	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RU	RV	RW	RX	RY	RZ	SA	SB	SC	SD	SE	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO	SP	SQ	SR	SS	ST	SU	SV	SW	SX	SY	SZ	TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	TK	TL	TM	TN	TO	TP	TQ	TR	TS	TT	TU	TV	TW	TX	TY	TZ	UA	UB	UC	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM	UN	UO	UP	UQ	UR	US	UT	UU	UV	UW	UX	UY	UZ	VA	VB	VC	VD	VE	VF	VG	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VQ	VR	VS	VT	VU	VV	VW	VX	VY	VZ	WA	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK	WL	WM	WN	WO	WP	WQ	WR	WS	WT	WU	WV	WW	WX	WY	WZ	XA	XB	XC	XD	XE	XF	YG	YH	YI	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS	YT	YU	YV	YW	YX	YY	YZ	ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW	ZX	ZY	ZZ
1	0.036237	0.93904	-0.02091	0.90947	OVAAAR	2.058E+06	SpineRidge	0.0352058	-0.004152	2.215709	0.9234745	0.9399054	-0.027282	-0.0391	0.0624499	0.0031705	Not Tracked	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown	Low	Unknown																																																																																																																																																																																																																																																																																													

Spelen met eerste data

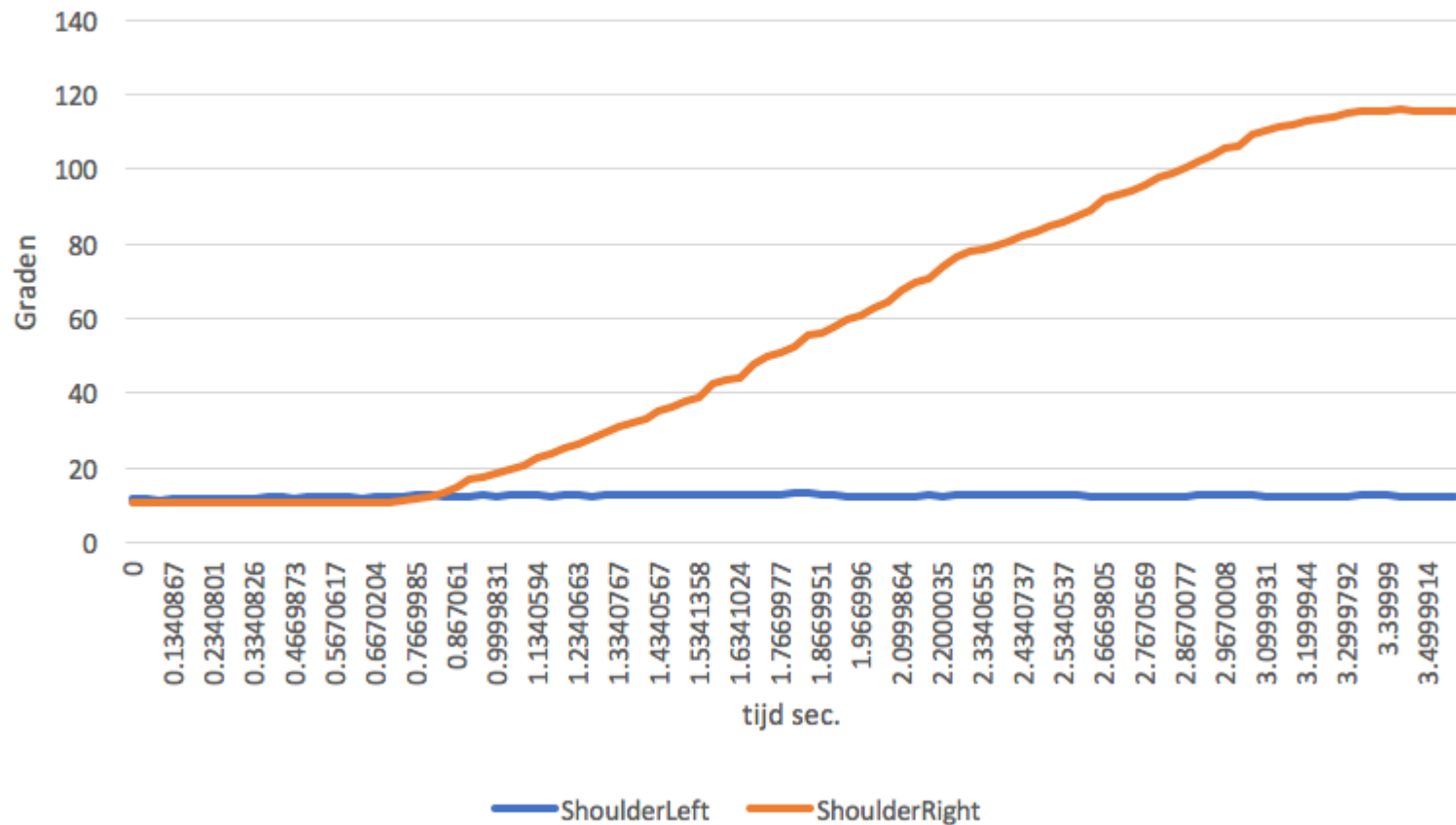
	A	B	C	D	E	F
1	RelativeTimeTicks	RelativeTimeString	JointType	X2	Y3	Z4
2	10406633499596,00	12.01:04:23.3499596	SpineBase	-0,31835	-0,17326	2,122355
3	10406633499596,00	12.01:04:23.3499596	SpineMid	-0,31066	0,155125	2,122335
4	10406633499596,00	12.01:04:23.3499596	Neck	-0,30155	0,471462	2,108573
5	10406633499596,00	12.01:04:23.3499596	Head	-0,29126	0,64086	2,085709
6	10406633499596,00	12.01:04:23.3499596	ShoulderLeft	-0,48903	0,360609	2,108984
7	10406633499596,00	12.01:04:23.3499596	ElbowLeft	-0,5531	0,082354	2,089372
8	10406633499596,00	12.01:04:23.3499596	WristLeft	-0,54888	-0,16898	2,027762
9	10406633499596,00	12.01:04:23.3499596	HandLeft	-0,53447	-0,20071	2,035282
10	10406633499596,00	12.01:04:23.3499596	ShoulderRight	-0,12995	0,343898	2,127415
11	10406633499596,00	12.01:04:23.3499596	ElbowRight	-0,08717	0,074085	2,121636
12	10406633499596,00	12.01:04:23.3499596	WristRight	-0,08237	-0,18611	2,045217
13	10406633499596,00	12.01:04:23.3499596	HandRight	-0,10053	-0,25389	2,036995
14	10406633499596,00	12.01:04:23.3499596	HipLeft	-0,3916	-0,16857	2,077703
15	10406633499596,00	12.01:04:23.3499596	KneeLeft	-0,40659	-0,54875	2,121007
16	10406633499596,00	12.01:04:23.3499596	AnkleLeft	-0,37916	-0,92019	2,166824
17	10406633499596,00	12.01:04:23.3499596	FootLeft	-0,40845	-1,00543	2,083634
18	10406633499596,00	12.01:04:23.3499596	HipRight	-0,23365	-0,17171	2,090715
19	10406633499596,00	12.01:04:23.3499596	KneeRight	-0,22819	-0,5824	2,139929
20	10406633499596,00	12.01:04:23.3499596	AnkleRight	-0,27367	-0,92933	2,171662
21	10406633499596,00	12.01:04:23.3499596	FootRight	-0,26281	-1,00128	2,105361
22	10406633499596,00	12.01:04:23.3499596	SpineShoulder	-0,3041	0,394033	2,114382
23	10406633499596,00	12.01:04:23.3499596	HandTipLeft	-0,53329	-0,29673	2,034047
24	10406633499596,00	12.01:04:23.3499596	ThumbLeft	-0,5741	-0,19454	2,022182
25	10406633499596,00	12.01:04:23.3499596	HandTipRight	-0,11198	-0,33972	2,038708
26	10406633499596,00	12.01:04:23.3499596	ThumbRight	-0,13821	-0,23907	1,994195
27	10406633840208,00	12.01:04:23.3840208	SpineBase	-0,31927	-0,17334	2,122523
28	10406633840208,00	12.01:04:23.3840208	SpineMid	-0,31123	0,155096	2,122357
29	10406633840208,00	12.01:04:23.3840208	Neck	-0,30182	0,47147	2,108493
30	10406633840208,00	12.01:04:23.3840208	Head	-0,29165	0,640743	2,085769
31	10406633840208,00	12.01:04:23.3840208	ShoulderLeft	-0,48925	0,360576	2,108988
32	10406633840208,00	12.01:04:23.3840208	ElbowLeft	-0,55322	0,082266	2,089477
33	10406633840208,00	12.01:04:23.3840208	WristLeft	-0,54906	-0,16907	2,027881
34	10406633840208,00	12.01:04:23.3840208	HandLeft	-0,53392	-0,19944	2,035592
35	10406633840208,00	12.01:04:23.3840208	ShoulderRight	-0,13017	0,343922	2,127611
36	10406633840208,00	12.01:04:23.3840208	ElbowRight	-0,08763	0,073667	2,121859
37	10406633840208,00	12.01:04:23.3840208	WristRight	-0,08244	-0,1778	2,048144
38	10406633840208,00	12.01:04:23.3840208	HandRight	-0,09638	-0,23199	2,037615



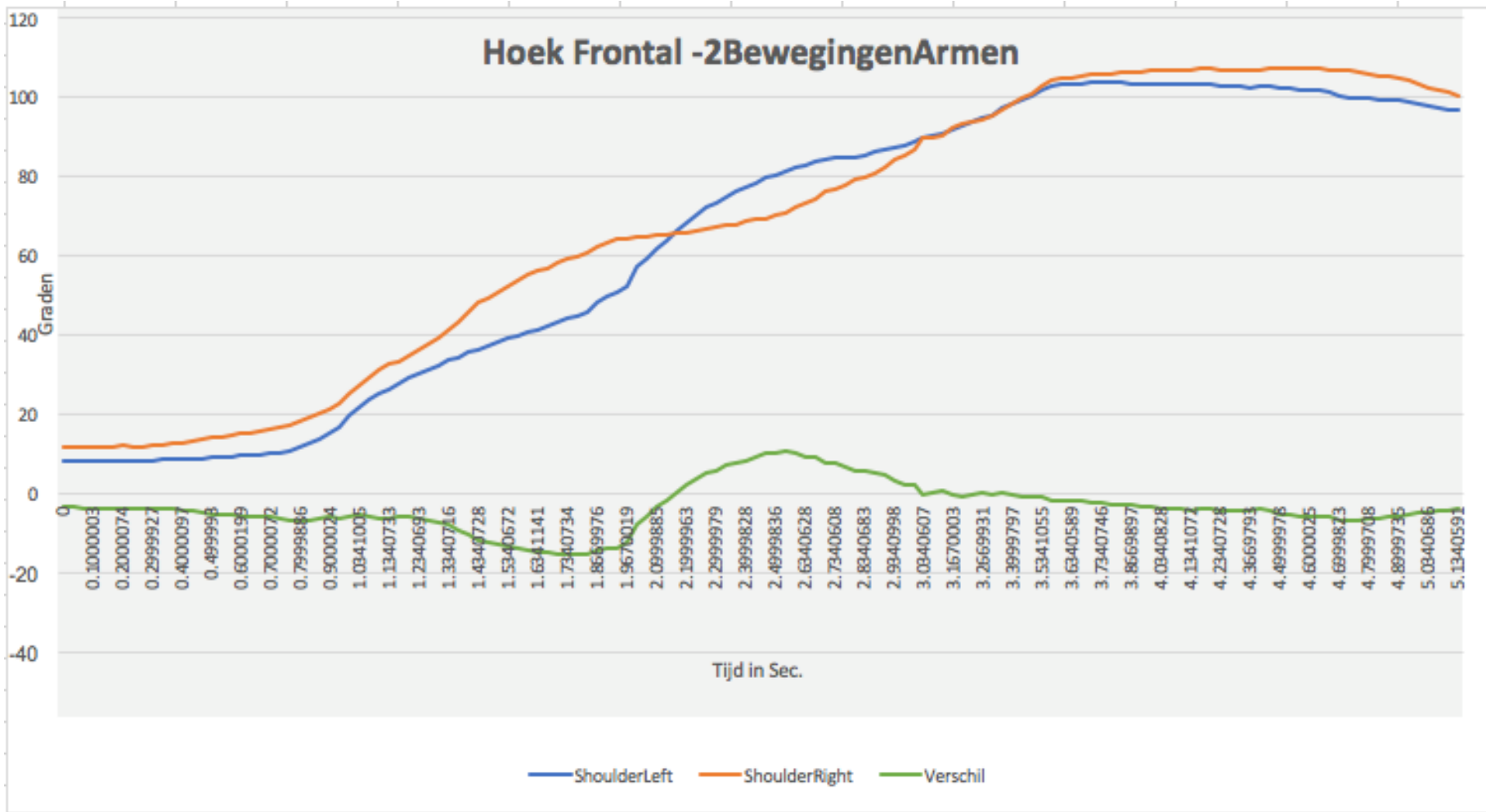
	A	B	C	D
1	RelativeTimeTicks		ShoulderLeft	ShoulderRight
2	49234233082	0	8,410531221	11,76839251
3	49234573953	0,0340871	8,399376212	11,79146677
4	49234903168	0,0670086	8,391707962	11,82213699
5	49235233085	0,1000003	8,365726971	11,87509404
6	49235573981	0,1340899	8,327266179	11,9338361
7	49235903037	0,1669955	8,341391999	12,02792875
8	49236233156	0,2000074	8,35494031	12,15528549
9	49236573802	0,234072	8,372841346	12,05943683
10	49236903001	0,2669919	8,477438166	12,0422537
11	49237233009	0,2999927	8,587716936	12,2313584
12	49237573806	0,3340724	8,610919976	12,39474343
13	49237903171	0,3670089	8,697804602	12,5949267
14	49238233179	0,4000097	8,79409372	12,96213744
15	49238573908	0,4340826	8,931215444	13,31052164
16	49238903052	0,466997	9,029546965	13,7319505
17	49239233012	0,499993	9,165379339	14,14949624
18	49239573833	0,5340751	9,321993015	14,53047852
19	49239903138	0,5670056	9,461201413	14,87452855
20	49240233281	0,6000199	9,613149342	15,23689401
21	49240573856	0,6340774	9,789511501	15,49881007
22	49240903015	0,6669933	10,06433636	15,75608212
23	49241233154	0,7000072	10,30610494	16,19671434
24	49241573895	0,7340813	10,51423414	16,90250589
25	49241903039	0,7669957	10,88856292	17,44164039
26	49242232968	0,7999886	11,59918414	18,19984373
27	49242573986	0,8340904	12,60683852	19,2906511
28	49242903015	0,8669933	14,03405307	20,22275359
29	49243233106	0,9000024	15,40569717	21,2953307
30	49243573768	0,9340686	16,59852771	22,89740497
31	49244232959	0,9999877	19,94563123	25,48498458
32	49244574087	1,0341005	21,93642906	27,18410454
33	49244903038	1,0669956	23,73923944	29,20171816
34	49245232963	1,0999881	25,12834664	31,15173589
35	49245573815	1,1340733	26,58861363	32,62742204

Beweging met 1 arm

Hoek Frontral - 1ArmBeweging



Beweging met 2 armen



Beweging

Team Pepper

Opname sessie Atrium

- Voorbereiding
- Van 60 personen data verzameld



Bezoek LUMC

- Manueel therapeut weer gesproken
- Echte patiënt gezien!
- Medisch Ethische Commissie



Wat gaan we doen?

- Analyse van data
- Nadenken over verbeteren applicatie
- Proberen opnemen patiënten te regelen



Vragen?

