

Hierarchical, multi-feature visual grouping processes for ACT-R

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VEGA - Visicon Entry Grouping Algorithm

- Presented at 2018 ACT-R workshop by John Lindstedt, now at SUNY Oswego
- Motivated by observation of behavioral error associated with certain ballot designs
- Two core concepts:
 - Collision methods
 - Parameterized by a radius value
 - Agglomeration



- How does it work?
 - Code that handles grouping is implemented in python rather than lisp
 - Relies on a set of command monitors which track changes to the visicon and the (proc-display) call
 - :force-visual-commands is necessary

ACT-R	Python
1. Device code modifies visicon	VEGA maintains a record of the visicon
2. Visicon modification results in (proc-display) call	VEGA groups visicon entries before (proc-display) call executes

	Name	Att	Loc	KIND	WIDTH	VALUE	HEIGHT	SIZE	SCREEN-BOTTOM	SCREEN-TOP	SCREEN-RIGHT	SCREEN-LEFT	COLOR	GROUP	TEXT	OVAL	IMAGE
VEINE-LOCATORNE NIL (18 28 000) TEXT 14 ""0" VEINE-LOCATORNE NIL (18 28 000) TEXT 14 "0" VEINE-LOCATORNE NIL (18 26 000) TEXT 14 "0" VEINE-LOCATORNE NIL (18 56 000) TEXT 14 "0" VEINE-LOCATORNE NIL (18 56 000) TEXT 14 "0" VEINE-LOCATORNE NIL (20 76 000) TEXT 14 "0" VEINE-LOCATORNE NIL (20 76 000) TEXT 14 "0" VEINE-LOCATORNE NIL (20 76 000) TEXT 14 "0" VEINE-LOCATORNE NIL (20 76 000) TEXT 14 "0" VEINE-LOCATORNE NIL (20 76 000) TEXT 14 "0" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "0" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 14 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 18 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 18 "10" VEINE-LOCATORNE NIL (21 76 000) TEXT 18 "10" VEINE-LOCATORNE NIL (25 100) TEXT 18	VISUAL-LOCATION57	NIL	(18 234 1080)	TEXT	14	"то"	10	0.39	238	228	24	10	BLACK	G86696	т		
VEINE-LOCATIONES NIL (18 70 100) TAX 14 "14" (10 0.39 374 34 24 10 ELAC 26697 T TAX 1500 (10 0.39 374 34 24 10 ELAC 26697 T TAX 1500 (10 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.	VISUAL-LOCATION69	NIL	(18 258 1080)	TEXT	14	"to"	10	0.39	262	252	24	10	BLACK	G86696	т		
VERIAL-CACTOM 79 NIL (2 0.64) 1000 CAL 20	VISUAL-LOCATION116	NIL	(18 370 1080)	TEXT	14	"If"	10	0.39	374	364	24	10	BLACK	G86697	т		
VIENUA-LOCATION 07 VIENUA-	VISUAL-LOCATION175	NIL	(18 520 1080)	TEXT	14	"of"	10	0.39	524	514	24	10	BLACK	G86698	т		
VERIAL-LOATING VERIA	VISUAL-LOCATION197	NIL	(18 568 1080)	TEXT	14	"on"	10	0.39	572	562	24	10	BLACK	G86698	т	_	
VIEWE_LOCKTONE VIEWE_L	VISUAL-LOCATION202	NIL	(20 641 1080)	OVAL	20	OVAL	10	0.56	646	636	30	10	WHITE	G86700		T	
VIBUR_LOCKTONS VIEW 10 0.59 102 102 102 100 BLACK Geffes T VIEWL-LOCKTONS HII 21 344 100 TTC 11 100 <td>VISUAL-LOCATION203</td> <td>NIL</td> <td>(20 659 1080)</td> <td>OVAL</td> <td>20</td> <td>OVAL</td> <td>10</td> <td>0.56</td> <td>004</td> <td>004</td> <td>30</td> <td>10</td> <td>BLACK</td> <td>G86700</td> <td></td> <td>T</td> <td></td>	VISUAL-LOCATION203	NIL	(20 659 1080)	OVAL	20	OVAL	10	0.56	004	004	30	10	BLACK	G86700		T	
VIENU-LOCATIONS VIENU-LOCA	VISUAL-LOCATION205	NTL	(20 /42 1080)	TEVT	20	"FOP"	10	0.50	102	130	30	10	BLACK	G86702	m	т	
<pre>visual_controls nt (21 294 000) Text 21 "ime" 10 0.59 996 280 280 10 ID REAK 08600 T VISUAL-CONTINUE (23 10 00) Text 28 "ime" 10 0.59 9976 344 23 10 ID REAK 08600 T VISUAL-CONTINUE (25 12 000) Text 28 "ime" 10 0.78999976 346 136 38 10 REAK 08600 T VISUAL-CONTINUE (25 12 000) Text 28 "ime" 10 0.78999976 346 136 38 10 REAK 08600 T VISUAL-CONTINUE (25 12 000) Text 28 "ime" 10 0.78999976 346 250 240 38 10 REAK 08600 T VISUAL-CONTINUE (25 12 000) Text 28 "ime" 10 0.78999976 422 412 38 10 REAK 08600 T VISUAL-CONTINUE (25 430 000) Text 28 "ime" 10 0.78999976 422 412 38 10 REAK 08600 T VISUAL-CONTINUE (25 430 000) Text 28 "ime" 10 0.78999976 422 412 38 10 REAK 08600 T VISUAL-CONTINUE (25 430 000) Text 28 "ime" 10 0.78999976 422 412 38 10 REAK 08600 T VISUAL-CONTINUE (25 430 000) Text 28 "ime" 10 0.7899976 560 550 538 10 REAK 08600 T VISUAL-CONTINUE (25 430 000) TEXT 28 "ime" 10 0.7899976 560 550 538 10 REAK 08600 T VISUAL-CONTINUE (25 400 000) TEXT 28 "ime" 10 0.79999976 430 422 10 0.86 00 T VISUAL-CONTINUE (25 400 000) TEXT 28 "ime" 10 0.79999976 560 550 538 10 REAK 08600 T VISUAL-CONTINUE (25 400 000) TEXT 28 "ime" 10 0.79999976 430 420 10 REAK 08600 T VISUAL-CONTINUE (25 400 000) TEXT 28 "ime" 10 0.79999976 430 420 10 REAK 08600 T VISUAL-CONTINUE (25 40 000) TEXT 28 "ime" 10 0.79999976 430 420 10 REAK 08600 T VISUAL-CONTINUE (25 40 000) TEXT 28 "ime" 10 0.118 00 0.7999997 420 10 REAK 08600 T VISUAL-CONTINUE (25 40 000) TEXT 42 "imeland" 10 0.118 00 10 REAK 08600 T VISUAL-CONTINUE (25 40 000) TEXT 42 "imeland" 10 0.118 00 10 REAK 08600 T VISUAL-CONTINUE (25 45 000) TEXT 42 "imeland" 10 0.118 00 10 REAK 08600 T VISUAL-CONTINUE (15 40 000) TEXT 42 "imeland" 10 0.118 00 REAK 08600 T VISUAL-CONTINUE (15 40 000) TEXT 42 "imeland" 10 0.118 00 REAK 08600 T VISUAL-CONTINUE (15 40 000) TEXT 42 "imeland" 10 0.118 00 REAK 08600 T VISUAL-CONTINUE (15 40 000) TEXT 42 "imeland" 10 0.118 00 REAK 08600 T VISUAL-CONTINUE (15 40 000) TEXT 42 "imeland" 10 0.118 00 REAK 08600 T VISUAL-CONTINUE (15 40 000)</pre>	VISUAL-LOCATIONIS	NTT.	(21 194 1080)	TEXT	21	"the"	10	0.59	198	188	30	10	BLACK	G86695	T		
VISUAL-LOCATIONIIN NIL (21 310 BLACK 0.00 BLACK 0.00000 <	VISUAL-LOCATION90	NTT.	(21 294 1080)	TEXT	21	"the"	10	0.59	298	288	30	10	BLACK	G86696	Ť		
VISUAL-LOCATIONAL NIL (25 134 1000) TEXT 28 "This" 10 0.7899999 138 128 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 270 1080) TEXT 28 "Name" 10 0.7899999 24 24 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 270 1080) TEXT 28 "Name" 10 0.7899999 24 24 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 418 1080) TEXT 28 "Name" 10 0.7899999 24 24 418 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 418 1080) TEXT 28 "Name" 10 0.7899999 24 414 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 418 1080) TEXT 28 "Name" 10 0.7899999 256 556 580 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 55 1080) TEXT 28 "Name" 10 0.7899999 556 556 580 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 55 1080) TEXT 28 "Name" 10 0.7899999 556 556 580 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 55 1080) TEXT 28 "Name" 10 0.7999999 580 586 586 580 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 55 1080) TEXT 28 "Name" 10 0.7999999 580 126 20 50 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 36 1080) TEXT 38 "State" 10 0.1979999 580 126 20 50 38 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (25 36 1080) TEXT 38 "State" 10 0.1979999 58 126 20 10 52 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (23 12 1080) TEXT 42 "BALLOG" 10 1.18 120 10 52 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (23 12 1080) TEXT 42 "BALLOG" 10 1.18 120 10 10 52 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (23 18 1080) TEXT 42 "BALLOG" 10 1.18 120 11 18 220 112 E VISUAL-LOCATIONAL NIL (12 10 1080) TEXT 42 "BALLOG" 10 1.18 120 11 18 220 112 E VISUAL-LOCATIONAL NIL (12 10 1080) TEXT 42 "BALLOG" 10 1.18 120 11 18 220 112 E VISUAL-LOCATIONAL NIL (13 10 1080) TEXT 42 "BLACK 14 "BALLOG" 10 1.579999 14 14 144 66 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (13 10 1080) TEXT 42 "BLACK 14 "BALLOG" 10 1.579999 14 14 144 66 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (13 10 1080) TEXT 42 "BLACK 14 "BALLOG" 10 1.579999 14 14 144 66 10 BLACK 06669 T VISUAL-LOCATIONAL NIL (14 14 164 164 164 164 164 164 164 164 1	VISUAL-LOCATION111	NIL	(21 330 1080)	TEXT	21	"the"	10	0.59	334	324	30	10	BLACK	G86696	Ť		
VISUAL-LOCATION45 NIL 2 15 16 16 16 38 10 BLACK 66655 7 VISUAL-LOCATION45 NIL 2 54 100 0.78999996 230 240 38 10 BLACK 66656 7 VISUAL-LOCATION15 NIL 2 50 100 0.78999996 310 200 38 10 BLACK 66657 7 VISUAL-LOCATION15 NIL 2 400 0.78999996 422 412 38 10 BLACK 66677 7 VISUAL-LOCATION15 NIL 2 400 7 <	VISUAL-LOCATION24	NIL	(25 134 1080)	TEXT	28	"This"	10	0.78999996	138	128	38	10	BLACK	G86695	т		
VISUAL-LOCATIONS MIL 2 2 2 2 2 4 3 10 BLACK 66666 7 VISUAL-LOCATIONS MIL 2 2 10 0.78999996 224 212 38 10 BLACK 6667 7 VISUAL-LOCATIONIS MIL 1 2 5 10 BLACK 6667 7 VISUAL-LOCATIONIS MIL 1 2 5 10 BLACK 6667 7 VISUAL-LOCATIONIS MIL 1 2 5 10 TAT 2 "Mem" 10 0.78999996 536 536 38 10 BLACK 6669 7 VISUAL-LOCATIONS MIL 11 2 52 51 100 TAT 28 "Mem" 10 0.78999996 586 536 38 10 BLACK 6669 7 VISUAL-LOCATIONS MIL 1 1 1 1 1 1 1 1 1 1 1 1	VISUAL-LOCATION45	NIL	(25 182 1080)	TEXT	28	"must"	10	0.78999996	186	176	38	10	BLACK	G86695	т		
VISUAL-LOCATIONT NII (25, 270, 1080) TEXT 28 'name" 10 0.7899996 274 264 38 10 BLACK G86669 T VISUAL-LOCATIONIS NII (25, 430, 1080) TEXT 28 'LEFT" 10 0.7899996 343 424 38 10 BLACK G86667 T VISUAL-LOCATIONIS NII (25, 430, 1080) TEXT 28 'LEFT" 10 0.7899996 543 424 38 10 BLACK G86667 T VISUAL-LOCATIONIS NII (23, 25, 200, 1000) TEXT 28<'td>'Note" 10 0.7999996 560 260 36 10 BLACK G86667 T VISUAL-LOCATIONIS NII (23, 28, 1080) TEXT 35<'td>'ntata'' 10 1.18 20 10 BLACK G866567 T VISUAL-LOCATIONIS NII (32, 12, 1000) TEXT 24'td''Note" 10 1.18 260 100 BLACK <td< td=""><td>VISUAL-LOCATION63</td><td>NIL</td><td>(25 246 1080)</td><td>TEXT</td><td>28</td><td>"your"</td><td>10</td><td>0.78999996</td><td>250</td><td>240</td><td>38</td><td>10</td><td>BLACK</td><td>G86696</td><td>т</td><td></td><td></td></td<>	VISUAL-LOCATION63	NIL	(25 246 1080)	TEXT	28	"your"	10	0.78999996	250	240	38	10	BLACK	G86696	т		
VISUAL-LOCATION® NIL (25) (36) (30) (38) (10) BLACK (36666) T VISUAL-LOCATIONS NIL (25) (36) (VISUAL-LOCATION77	NIL	(25 270 1080)	TEXT	28	"name"	10	0.78999996	274	264	38	10	BLACK	G86696	т		
VISUAL-LOCATIONIS NIL (25 448 1080) TEXT 28 'Los" 10 0.7899996 422 412 38 10 BLACK (2669) T VISUAL-LOCATIONIS NIL (25 432 1080) TEXT 28 "Vota" 10 0.7899996 560 550 38 10 BLACK (2669) T VISUAL-LOCATIONIS NIL (25 356 1080) TEXT 38 "vota" 10 0.7899996 560 200 46 10 BLACK (2669) T VISUAL-LOCATIONIS NIL (25 356 1080) TEXT 38 "vota" 10 0.7999996 286 276 46 10 BLACK (2669) T VISUAL-LOCATIONIS NIL (23 281 1080) TEXT 38 "whose" 10 0.7999996 286 276 46 10 BLACK (2669) T VISUAL-LOCATIONIS NIL (23 281 1080) TEXT 42 "maller" 10 1.18 80 70 52 10 BLACK (2669) T VISUAL-LOCATIONIS NIL (22 241 2080) TEXT 42 "maller" 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.18 10 1.199999 10 10	VISUAL-LOCATION98	NIL	(25 306 1080)	TEXT	28	"name"	10	0.78999996	310	300	38	10	BLACK	G86696	т		
VISUAL-LOCATIONIA'S NIL (2) 424 38 10 BLACK C8699 T VISUAL-LOCATIONIA'S NIL (2) 52 56 0.00 0.07999996 210 200 46 10 BLACK C86695 T VISUAL-LOCATIONS5 NIL (2) 22 200 10 0.07999996 200 46 10 BLACK C86695 T VISUAL-LOCATIONIS NIL (2) 200 10 0.57999996 206 276 46 10 BLACK C86695 T VISUAL-LOCATIONIZO NIL (2) 23 10 10.07999996 398 388 46 10 BLACK C86695 T VISUAL-LOCATIONZO NIL (2) 12 10 1.18 126 116 52 10 BLACK C86695 T VISUAL-LOCATIONZO NIL (2) 12 10 1.18 326 116 52 10 BLACK C86695 T VISUAL-LOCATIONZO NIL (2) 14 10 1.1	VISUAL-LOCATION138	NIL	(25 418 1080)	TEXT	28	"ices"	10	0.78999996	422	412	38	10	BLACK	G86697	т		
V_HSUL-LOCATIONES VIL ((VISUAL-LOCATION145	NIL	(25 430 1080)	TEXT	28	LEFT	10	0.78999996	434	424	38	10	BLACK	G86697	т		
Visual-LockTionis Mill (L)	VISUAL-LOCATION182	NIL	(25 532 1080)	TEXT	28	When	10	0.78999996	536	526	38	10	BLACK	G86698	T		
VISUAL-LOCATIONE NIL 1 1 1 0	VISUAL-LOCATION192	NIL	(25 556 1080)	TEXT	28	vote"	10	0.78999996	560	550	38	10	BLACK	G86698	т		
VISUAL-LOCATIONI2 NII. 12 59 41000 TEXT 23 * "targe" 10 0.07999999 198 198 16 10 BLACK C86693 T VISUAL-LOCATION2 NII. 13 21 62 1080 TEXT 42 "Ballot" 10 1.18 80 70 52 10 BLACK C86693 T VISUAL-LOCATION2 NII. 13 12 122 1080 TEXT 42 "Ballot" 10 1.18 10 10 52 10 BLACK C86695 T VISUAL-LOCATION2 NII. 13 12 123 108 1000 TEXT 42 "unless" 10 1.18 10 10 1.18 10 1.18 52 10 BLACK C86695 T VISUAL-LOCATIONIS NII. 13 23 18 1000 TEXT 42 "cannot" 10 1.18 458 448 52 10 BLACK C86697 T VISUAL-LOCATIONIS NII. 13 40 1080 TEXT 56 "Shortee" 10 1.5799999 32 22 66 10 BLACK C86697 T VISUAL-LOCATIONS NII. 13 94 01080	VISUAL-LOCATION55	NIL	(29 200 1080)	TEAT	35	"ubago"	10	0.97999996	210	200	40	10	BLACK	G86695	T		
VISUAL-LOCATION2 VIII. 12 2 "Bille" 10 12 10	VISUAL-LOCATION64	NTT	(29 202 1000)	TEAT	35	"atato"	10	0.97999996	200	200	40	10	BLACK	G86697	T m		
VISUAL-LOCATION13 NIL 1	VISUAL-LOCATION128	NTT.	(32 16 1080)	TEXT	42	"Ballot"	10	1 18	20	10	52	10	BLACK	G86693	т Т		
VISUAL-LOCATION20 NIL (3 21 22 1060) TEXT 4.2 "NOTICE" 10 1.18 126 116 52 10 BLACK G86695 T VISUAL-LOCATION129 NIL (3 21 46 1060) TEXT 4.2 "Labes" 10 1.18 322 312 52 10 BLACK G86695 T VISUAL-LOCATION151 NIL (3 24 42 1060) TEXT 4.2 "choice" 10 1.18 436 456 2 10 BLACK G86697 T VISUAL-LOCATION15 NIL (3 2 442 1060) TEXT 4.2 "choice" 10 1.18 458 448 52 10 BLACK G86697 T VISUAL-LOCATIONS NIL (3 9 100) TEXT 56 "November" 10 1.5799999 34 34 66 10 BLACK G86697 T VISUAL-LOCATION10 NIL (3 9 170 1060) TEXT 56 "November" 10 1.5799999 362 352 66 10 BLACK G86697 T	VISUAL-LOCATION13	NTT.	(32 76 1080)	TEXT	42	"Ballot"	10	1.18	80	70	52	10	BLACK	G86694	Ť.		
VISUAL-LOCATION16 NIL 1 46 1080) TEXT 42 "unless" 10 1.18 150 140 52 10 BLACK G86695 T VISUAL-LOCATION15 NIL (3 2 318 1080) TEXT 42 "blace" 10 1.18 446 436 52 10 BLACK G86695 T VISUAL-LOCATION15 NIL (3 2 45 1080) TEXT 42 "choice" 10 1.18 446 436 52 10 BLACK G86697 T VISUAL-LOCATION15 NIL (3 5 25 1080) TEXT 49 "Blacken" 10 1.739999 32 22 66 10 BLACK G86693 T VISUAL-LOCATIONS NIL (3 9 35 1080) TEXT 56 "STRATCHT" 10 1.5799999 362 352 66 10 BLACK G86697 T VISUAL-LOCATION10 NIL (3 9 38 1080) TEXT 56 "STRATCHT" 10 0.579999 362 352 66 10 BLACK G86697 T VISUAL-LOCATION10 NIL (4 2 32	VISUAL-LOCATION20	NIL	(32 122 1080)	TEXT	42	"NOTICE"	10	1.18	126	116	52	10	BLACK	G86695	T		
VISUAL-LOCATIONION NIL (23 421 080) TEXT 42 "blaken" 10 1.18 322 312 52 10 BLACK 86697 T VISUAL-LOCATIONISI NIL (32 442 1080) TEXT 42 "cannot" 10 1.18 446 436 52 10 BLACK 86697 T VISUAL-LOCATIONIS NIL (35 508 1080) TEXT 42 "cannot" 10 1.38 512 502 58 10 BLACK 86697 T VISUAL-LOCATIONIS NIL (39 40 1080) TEXT 56 "Official" 10 1.5799999 32 22 66 10 BLACK 886693 T VISUAL-LOCATIONIS NIL (39 1080) TEXT 56 "absente" 10 1.5799999 32 352 66 10 BLACK 886697 T VISUAL-LOCATIONIA NIL (39 351 0080) TEXT 56 "absentee" 10 1.5799999 362 352 66 10 BLACK 886697 T VISUAL-LOCATIONIA NIL (42 3070) 10001 TEXT 56 "absention" 10 0.599 374 364 52 30 BLACK 886697 T VISUAL-LOCATIONIA NIL (42 3070 1080) TEXT 7 """"""""""""""""""""""""""""""""""""	VISUAL-LOCATION29	NIL	(32 146 1080)	TEXT	42	"unless"	10	1.18	150	140	52	10	BLACK	G86695	т		
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VISUAL-LOCATIONIS NIL (32 454 1080) TEXT 42 "cannot" 10 1.18 458 448 52 10 BLACK 66698 T VISUAL-LOCATIONIS NIL (32 5080) TEXT 56 "Official" 10 1.579999 32 22 66 10 BLACK 66698 T VISUAL-LOCATIONS NIL (32 1080) TEXT 56 "Absentee" 10 1.579999 32 22 66 10 BLACK 66693 T VISUAL-LOCATIONS NIL (33 10 1080) TEXT 56 "Absentee" 10 1.579999 32 22 66 10 BLACK 66693 T VISUAL-LOCATIONIA NIL (33 1080) TEXT 56 "Absentee" 10 1.5799999 36 35 6 10 BLACK 66693 T VISUAL-LOCATIONIA NIL (33 35 1080) TEXT 56 "Absentee" 10 1.5799999 36 35 6 35 6 10 BLACK 66697 T VISUAL-LOCATIONIA NIL (33 35 1080) TEXT 56 "Attact" 10 1.5799999 36 35 26 52 62 10 BLACK 66697 T VISUAL-LOCATIONIA NIL (42 50 1080) TEXT 51 "Attact" 10 0.59 524 56 52 62 10 BLACK 66696 T VISUAL-LOCATIONIA NIL (42 50 1080) TEXT 21 "you" 10 0.59 524 514 52 30 BLACK 666666 T VISUAL-LOCATIONI76 NIL (42 50 1080) TEXT 7 "." VISUAL-LOCATIONI76 NIL (43 418 1080) TEXT 7 "." VISUAL-LOCATIONI76 NIL (45 10 1080) TEXT 7 "." VISUAL-LOCATIONI50 NIL (45 1080) TEXT 7 "." VISUAL-LOCATIONI50 NIL (45 10 1080) TEXT 7 "." VISUAL-LOCATIONI50 NIL (45 1080) TEXT 7 "." VISUAL-LOCATIONI50 NIL (45 1080) TEXT 7 "." VISUAL-LOCAT	VISUAL-LOCATION151	NIL	(32 442 1080)	TEXT	42	"choice"	10	1.18	446	436	52	10	BLACK	G86697	т		
VISUAL-LOCATIONS NL (35 508 1080) TEXT 49 "Blacken" 10 1.38 512 502 58 10 BLACK (86693 T) VISUAL-LOCATIONS NL (39 40 1080) TEXT 56 "November" 10 1.579999 32 22 66 10 BLACK (86693 T) VISUAL-LOCATIONS NL (39 170 1080) TEXT 56 "STRAIGHT" 10 1.579999 44 34 66 10 BLACK (86693 T) VISUAL-LOCATIONIAL NIL (39 170 1080) TEXT 56 "STRAIGHT" 10 1.579999 174 164 66 10 BLACK (86697 T) VISUAL-LOCATIONIAL NIL (39 32 1080) TEXT 55 "STRAIGHT" 10 1.579999 362 352 66 10 BLACK (86697 T) VISUAL-LOCATIONIAL NIL (4 23 10 1080) TEXT 55 "STRAIGHT" 10 1.579999 362 352 66 10 BLACK (86697 T) VISUAL-LOCATIONIAL NIL (4 258 1080) TEXT 21 "you" 10 0.55 246 52 30 BLACK (86697 T) VISUAL-LOCATIONIAL NIL (4 250 1080) TEXT 21 "you" 10 0.55 374 364 52 30 BLACK (86696 T) VISUAL-LOCATIONIAL NIL (4 250 1080) TEXT 7 "." 10 0.1599999 422 414 51 45 30 BLACK (86696 T) VISUAL-LOCATIONIA NIL (4 250 1080) TEXT 7 "." 10 0.1599999 422 412 46 33 BLACK (86696 T) VISUAL-LOCATIONIA NIL (4 24 18 1080) TEXT 7 "." 10 0.1999999 422 412 46 33 BLACK (86696 T) VISUAL-LOCATIONIA NIL (4 44 18 1080) TEXT 7 "." 10 0.1999999 422 412 46 33 BLACK (86695 T) VISUAL-LOCATIONIA NIL (4 4 18 1080) TEXT 7 "." 10 0.1999999 422 412 46 33 BLACK (86695 T) VISUAL-LOCATIONIA NIL (4 6 151 1080) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIA NIL (4 6 151 1080) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIS NIL (4 6 46 1080) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIS NIL (4 6 46 1080) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIS NIL (4 6 151 1080) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIS NIL (4 6 151 1080) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIS NIL (4 5 1408) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIS NIL (4 5 1408) TEXT 70 "INERCENTIN" 10 1.969999 162 152 80 10 BLACK (86695 T) VISUAL-LOCATIONIS NIL (5 3 406 1080) TEXT 70 "INERCENTIN" 10	VISUAL-LOCATION157	NIL	(32 454 1080)	TEXT	42	"cannot"	10	1.18	458	448	52	10	BLACK	G86697	т		
VISUAL-LOCATIONS NIL (39 28 1080) TEXT 56 "Official" 10 1.5799999 32 22 66 10 BLACK G86693 T VISUAL-LOCATIONS NIL (39 170 1080) TEXT 56 "Absentee" 10 1.5799999 34 34 66 10 BLACK G86693 T VISUAL-LOCATIONS NIL (39 382 1080) TEXT 56 "Absentee" 10 1.5799999 174 164 66 10 BLACK G86697 T VISUAL-LOCATIONS NIL (39 382 1080) TEXT 56 "straight" 10 1.5799999 362 352 66 10 BLACK G86697 T VISUAL-LOCATIONS NIL (42 250 1080) TEXT 56 "straight" 10 1.5799999 362 352 66 10 BLACK G86697 T VISUAL-LOCATIONS NIL (42 270 1080) TEXT 21 "the" 10 0.59 74 364 52 30 BLACK G86697 T VISUAL-LOCATIONS NIL (43 270 1080) TEXT 7 "." 10 0.59 74 364 52 30 BLACK G86697 T VISUAL-LOCATIONS NIL (43 270 1080) TEXT 7 "." 10 0.1999999 74 264 46 38 BLACK G86697 T VISUAL-LOCATIONS NIL (43 496 1080) TEXT 7 "." 10 0.1999999 74 264 46 38 BLACK G86697 T VISUAL-LOCATIONS NIL (43 496 1080) TEXT 7 "." 10 0.1999999 74 264 46 38 BLACK G86697 T VISUAL-LOCATIONS NIL (43 496 1080) TEXT 7 "." 10 0.1999999 74 264 46 38 BLACK G86697 T VISUAL-LOCATIONS NIL (43 496 1080) TEXT 7 "." 10 0.1999999 162 152 80 10 BLACK G86695 T VISUAL-LOCATIONS NIL (44 1080) TEXT 70 "INFERENNOUM" 10 1.9699999 162 152 80 10 BLACK G86695 T VISUAL-LOCATIONS NIL (46 158 1080) TEXT 70 "INFERENNOUM" 10 1.9699999 162 152 80 10 BLACK G86695 T VISUAL-LOCATIONS NIL (46 158 1080) TEXT 70 "INFERENNOUM" 10 1.9699999 162 152 80 10 BLACK G86695 T VISUAL-LOCATIONS NIL (46 164 1080) TEXT 70 "INFERENNOUM" 10 1.9699999 162 152 80 10 BLACK G86695 T VISUAL-LOCATIONS NIL (46 50 1080) TEXT 7 "." 10 0.19999999 210 200 52 46 BLACK G86695 T VISUAL-LOCATIONS NIL (45 206 1080) TEXT 7 "." 10 0.1999999 210 200 52 46 BLACK G86695 T VISUAL-LOCATIONS NIL (45 53 06 1080) TEXT 7 "." 10 0.19999999 100 200 52 46 BLACK G86695 T VISUAL-LOCATIONS NIL (45 53 06 1080) TEXT 7 "." 10 0.19999999 310 300 60 46 BLACK G86695 T VISUAL-LOCATIONS NIL (45 34 06 1080) TEXT 7 "." 10 0.01999999 310 300 60 46 BLACK G86695 T VISUAL-LOCATIONS NIL (45 34 06 1080) TEXT 7 "." 10 0.01999999 314 34 424 60 61 88 BLACK G86695 T VISUAL-LOCATIONS NIL (55 360 1	VISUAL-LOCATION169	NIL	(35 508 1080)	TEXT	49	"Blacken"	10	1.38	512	502	58	10	BLACK	G86698	т		
VISUAL-LOCATION9 NIL (39 40 100 BLACK G86593 T VISUAL-LOCATION40 NIL (39 100 100 TXT 56 "absence" 10 1.5799999 362 352 66 10 BLACK G86697 T VISUAL-LOCATIONI2 NIL (39 358 1080 TEXT 56 "straight" 10 1.5799999 362 352 66 10 BLACK G86697 T VISUAL-LOCATIONI70 NIL (42 258 1080 TEXT 21 "the" 10 0.59 374 364 52 30 BLACK G86697 T VISUAL-LOCATIONI76 NIL (42 250 1080 TEXT 7 "you" 10 0.59 374 364 52 30 BLACK G86698 T VISUAL-LOCATION178 NIL (43 1800 TEXT 7<","	VISUAL-LOCATION5	NIL	(39 28 1080)	TEXT	56	"Official"	10	1.5799999	32	22	66	10	BLACK	G86693	Т		
VISUAL-LOCATIONIO NIL (39 1/0 100 12AT 50 absentee 10 1.5/39999 1/4 104 106 05 10 BLACK G66097 T VISUAL-LOCATIONI23 NIL (39 382 1080 TEXT 56 "STRAICHT" 10 1.5/399999 362 376 66 10 BLACK G66697 T VISUAL-LOCATIONI23 NIL (42 230 1080 TEXT 21 "the" 10 0.55 374 364 52 30 BLACK G66696 T VISUAL-LOCATIONI76 NIL (42 200 1080 TEXT 7 "the" 10 0.55 374 364 52 30 BLACK G66696 T VISUAL-LOCATIONI78 NIL (43 1080 TEXT 7 "the" 10 0.19999999 274 264 46 38 BLACK G66697 T VISUAL-LOCATIONI78 NIL (43 466 1080 TEXT 7<"the"	VISUAL-LOCATION9	NIL	(39 40 1080)	TEXT	56	"November"	10	1.5/99999	44	34	66	10	BLACK	G86693	т		
VISUAL-LOCATIONI14 NIL (13) 10 1.5/99999 362 352 66 10 BLACK C86697 1 VISUAL-LOCATIONI70 NIL (14) 258 10 0.5/99999 362 352 66 10 BLACK C86697 T VISUAL-LOCATIONI70 NIL (14) 258 100 15799999 366 376 66 10 BLACK C86697 T VISUAL-LOCATIONI70 NIL (14) 250 100 TEXT 56 "stringht" 10 0.59 262 252 52 30 BLACK C86697 T VISUAL-LOCATION176 NIL (42) 250 10800 TEXT 7 "," 10 0.19999999 222 412 46 38 BLACK C86697 T VISUAL-LOCATION19 NIL (43) 418 10800 TEXT 7<","	VISUAL-LOCATION40	NIL	(39 1/0 1080)	TEXT	56	"absentee"	10	1.5/99999	1/4	164	66	10	BLACK	G86695	T		
YISUAL-LOCATIONIC IT NIL (42 300 000) TEXT 21 "the" 10 1.59999 300 500	VISUAL-LOCATION114	NTL	(39 358 1080)	TEXT	56	"straight"	10	1.5799999	302	376	66	10	BLACK	G86697	T		
VISUAL-LOCATIONI1 NIL (4 2 30 0 000) TEXT 21 "you" 10 0.56 52 22 50 DEACH G8069 T VISUAL-LOCATIONI17 NIL (4 2 52 0 1080) TEXT 21 "the" 10 0.59 524 514 52 30 BLACK G8669 T VISUAL-LOCATION18 NIL (4 3 418 1080) TEXT 7 "," 10 0.19999999 224 412 46 38 BLACK G86697 T VISUAL-LOCATION19 NIL (4 3 496 1080) TEXT 7 "," 10 0.19999999 422 412 46 38 BLACK G86697 T VISUAL-LOCATION19 NIL (4 6 1080) TEXT 70 "REFERENDUM" 10 1.9699999 114 104 80 10 BLACK G86695 T VISUAL-LOCATION18 NIL (4 6 1080) TEXT 70 "REFERENDUM" 10 1.9699999 128 28 60 32 BLACK G86695 T VISUAL-LOCATION187 <td>VISUAL-LOCATION72</td> <td>NTT.</td> <td>(42 258 1080)</td> <td>TEXT</td> <td>21</td> <td>"the"</td> <td>10</td> <td>0.59</td> <td>262</td> <td>252</td> <td>52</td> <td>30</td> <td>BLACK</td> <td>G86696</td> <td>T</td> <td></td> <td></td>	VISUAL-LOCATION72	NTT.	(42 258 1080)	TEXT	21	"the"	10	0.59	262	252	52	30	BLACK	G86696	T		
VISUAL-LOCATIONI76 NIL (42 520 1080) TEXT 21 "the" 10 0.59 524 514 52 30 BLACK C86698 T VISUAL-LOCATIONI76 NIL (43 418 1080) TEXT 7 "." 10 0.19999999 222 412 46 38 BLACK C86696 T VISUAL-LOCATIONI39 NIL (43 410 1080) TEXT 7 "." 10 0.1999999 422 412 46 38 BLACK C86699 T VISUAL-LOCATIONI39 NIL (44 6100 1080) TEXT 70 "REFERENDUM" 10 1.9699999 14 104 80 10 BLACK C86695 T VISUAL-LOCATIONI39 NIL (46 6180 1EXT 70 "REFERENDUM" 10 1.9699999 162 152 80 10 BLACK C86695 T VISUAL-LOCATIONI39 NIL (46 6160 TEXT 70 "candidates" 10 1.96999999	VISUAL-LOCATION117	NTT.	(42 370 1080)	TEXT	21	"YOU"	10	0.59	374	364	52	30	BLACK	G86697	Ť		
VISUAL-LOCATION78 NIL (43 270 1080) TEXT 7 "." 10 0.19999999 274 264 46 38 BLACK G86696 T VISUAL-LOCATION18 NIL (43 18 1080) TEXT 7 "." 10 0.199999999 422 412 46 38 BLACK G86697 T VISUAL-LOCATION19 NIL (43 18 1080) TEXT 70 "REFERENDUM" 10 1.77 500 400 74 10 BLACK G86695 T VISUAL-LOCATION19 NIL (46 158 1080) TEXT 70 "REFERENDUM" 10 1.9699999 114 104 80 10 BLACK G86695 T VISUAL-LOCATION58 NIL (46 66 1080) TEXT 70 "Inspectors" 10 0.78999999 238 228 60 32 BLACK G86695 T VISUAL-LOCATION58 NIL (56 66 1080) TEXT 70 "lieutenant" 10 0.9699999 548 538 80 10 BLACK G86697 T VISUAL-LOCATION57 NIL (50 394 1080) TEXT </td <td>VISUAL-LOCATION176</td> <td>NIL</td> <td>(42 520 1080)</td> <td>TEXT</td> <td>21</td> <td>"the"</td> <td>10</td> <td>0.59</td> <td>524</td> <td>514</td> <td>52</td> <td>30</td> <td>BLACK</td> <td>G86698</td> <td>Ť</td> <td></td> <td></td>	VISUAL-LOCATION176	NIL	(42 520 1080)	TEXT	21	"the"	10	0.59	524	514	52	30	BLACK	G86698	Ť		
VISUAL-LOCATION139 NIL (43 418 1080) TEXT 7 "," 10 0.19999999 422 412 46 38 BLACK G8697 T VISUAL-LOCATION167 NIL (43 496 1080) TEXT 7 "," 10 1.99699999 142 10 140 80 10 BLACK G86695 T VISUAL-LOCATION19 NIL (46 110 1080) TEXT 70 "REFERENDUM" 10 1.96699999 162 152 80 10 BLACK G86695 T VISUAL-LOCATION58 NIL (46 61 1080) TEXT 70 "inspectors" 10 0.7899999 238 228 60 32 BLACK G86695 T VISUAL-LOCATION58 NIL (46 64 1080) TEXT 70 "inductant" 10 1.9669999 548 538 80 10 BLACK G86695 T VISUAL-LOCATION50 NIL (50 466 1080) TEXT 7 "inductant" 10 0.1999999 398 388 52 46 BLACK G86695 T VISUAL-LOCATION129 NIL (53 306 1080	VISUAL-LOCATION78	NIL	(43 270 1080)	TEXT	7	"."	10	0.19999999	274	264	46	38	BLACK	G86696	т		
VISUAL-LOCATION167 NIL (43 496 1080) TEXT 63 "IMPORTANT" 10 1.77 500 490 74 10 BLACK 68698 T VISUAL-LOCATION167 NIL (45 110 1080) TEXT 70 "REFERENDUM" 10 1.9659999 162 152 80 10 BLACK 686695 T VISUAL-LOCATION34 NIL (46 458 1080) TEXT 70 "inspectors" 10 0.7899999 162 152 80 10 BLACK 686695 T VISUAL-LOCATION162 NIL (46 466 1080) TEXT 70 "candidates" 10 0.7899999 470 460 80 10 BLACK 686697 T VISUAL-LOCATION167 NIL (46 544 1080) TEXT 70 "lautenant" 10 0.19699999 548 538 80 10 BLACK 686697 T VISUAL-LOCATION167 NIL (50 394 1080) TEXT 7 "," 10 0.1999999 334 324 66 BLACK 686697 T VISUAL-LOCATION197 NIL (53 306 1080) TEXT	VISUAL-LOCATION139	NIL	(43 418 1080)	TEXT	7	","	10	0.19999999	422	412	46	38	BLACK	G86697	т		
VISUAL-LOCATION19 NIL (46 110 1080) TEXT 70 "REFERENDUM" 10 1,9699999 114 104 80 10 BLACK G86695 T VISUAL-LOCATION19 NIL (46 158 1080) TEXT 70 "IRSPECtors" 10 1,96999999 162 152 80 10 BLACK G86695 T VISUAL-LOCATION58 NIL (46 64 1080) TEXT 70 "candidates" 10 1,9699999 238 228 60 32 BLACK G86695 T VISUAL-LOCATION187 NIL (46 64 1080) TEXT 70 "liqutenant" 10 1,9699999 548 538 80 10 BLACK G86695 T VISUAL-LOCATION187 NIL (50 341 1080) TEXT 70 "liqutenant" 10 0.1999999 388 52 46 BLACK G86697 T VISUAL-LOCATION129 NIL (50 340 1080) TEXT 7 "," 10 0.1999999 334 324 66 38 BLACK G86696 T VISUAL-LOCATION112 NIL (53 300 1080) TEXT <td>VISUAL-LOCATION167</td> <td>NIL</td> <td>(43 496 1080)</td> <td>TEXT</td> <td>63</td> <td>"IMPORTANT"</td> <td>10</td> <td>1.77</td> <td>500</td> <td>490</td> <td>74</td> <td>10</td> <td>BLACK</td> <td>G86698</td> <td>т</td> <td></td> <td></td>	VISUAL-LOCATION167	NIL	(43 496 1080)	TEXT	63	"IMPORTANT"	10	1.77	500	490	74	10	BLACK	G86698	т		
VISUAL-LOCATION34 NIL (46 158 1080) TEXT 70 "inspectors" 10 1.9699999 162 152 80 10 BLACK G86695 T VISUAL-LOCATION54 NIL (46 234 1080) TEXT 8 "vote" 10 1.9699999 470 460 80 10 BLACK G86697 T VISUAL-LOCATION52 NIL (46 466 1080) TEXT 70 "candidates" 10 1.9699999 548 538 80 10 BLACK G86697 T VISUAL-LOCATION56 NIL (50 206 1080) TEXT 7 "." 10 0.19999999 210 200 52 46 BLACK G86695 T VISUAL-LOCATION56 NIL (50 306 1080) TEXT 7 "." 10 0.19999999 310 300 60 46 BLACK G86697 T VISUAL-LOCATION97 NIL (53 306 1080) TEXT 28 "line" 10 0.39 310 300 60 46 BLACK G86697 T VISUAL-LOCATION12 NIL (53 300 1080) TEXT <	VISUAL-LOCATION19	NIL	(46 110 1080)	TEXT	70	"REFERENDUM"	10	1.9699999	114	104	80	10	BLACK	G86695	т		
VISUAL-LOCATION58 NIL (46 234 1080) TEXT 70 "ote" 10 0.78999996 238 228 60 32 BLACK G86696 T VISUAL-LOCATION158 NIL (46 66 1080) TEXT 70 "candidates" 10 1.9699999 470 460 80 10 BLACK G86697 T VISUAL-LOCATION157 NIL (50 260 1080) TEXT 70 "lieutenant" 10 1.9699999 548 538 80 10 BLACK G86697 T VISUAL-LOCATION158 NIL (50 394 1080) TEXT 7 "," 10 0.19999999 398 388 52 46 BLACK G86697 T VISUAL-LOCATION128 NIL (53 306 1080) TEXT 7 "," 10 0.1999999 330 300 60 46 BLACK G86697 T VISUAL-LOCATION12 NIL (53 300 1080) TEXT 28 "line" 10 0.39 334 324 66 38 BLACK G86697 T VISUAL-LOCATION124 NIL (53 430 1080) TEXT	VISUAL-LOCATION34	NIL	(46 158 1080)	TEXT	70	"inspectors"	10	1.9699999	162	152	80	10	BLACK	G86695	T		
VISUAL-LOCATION162 NLL (46 466 1080) TEXT 70 "Licutenant" 10 1.9699999 470 460 80 10 BLACK 68669 T VISUAL-LOCATION152 NLL (50 206 1080) TEXT 7 "." 10 0.19999999 548 538 80 10 BLACK 686695 T VISUAL-LOCATION56 NLL (50 206 1080) TEXT 7 "." 10 0.19999999 548 538 80 10 BLACK 686697 T VISUAL-LOCATION99 NIL (53 306 1080) TEXT 7 "." 10 0.19999999 548 538 85 2 46 BLACK 686697 T VISUAL-LOCATION99 NIL (53 306 1080) TEXT 14 "on" 10 0.39 310 300 60 46 BLACK 686696 T VISUAL-LOCATION12 NIL (53 306 1080) TEXT 28 "line" 10 0.78999996 334 324 66 38 BLACK 686697 T VISUAL-LOCATION12 NIL (53 406 1080) TEXT 4 "legistative" 10 2.36 410 400 94 10 BLACK 686697 T VISUAL-LOCATION146 NIL (53 430 1080) TEXT 4 "of" 10 0.39 434 424 60 46 BLACK 686697 T VISUAL-LOCATION146 NIL (53 430 1080) TEXT 4 "of" 10 1.18 572 562 74 32 BLACK 686697 T VISUAL-LOCATION152 NIL (57 442 1080) TEXT 7 "." 10 0.19999999 446 436 60 52 BLACK 686697 T VISUAL-LOCATION152 NIL (57 442 1080) TEXT 7 "." 10 0.39 327 652 74 456 BLACK 686697 T VISUAL-LOCATION152 NIL (57 742 1080) TEXT 4 "of" 10 0.39 434 424 60 456 60 52 BLACK 686697 T VISUAL-LOCATION152 NIL (57 742 1080) TEXT 7 "." 10 0.19999999 446 436 60 52 BLACK 686697 T VISUAL-LOCATION152 NIL (57 742 1080) TEXT 7 "." 10 0.39 9399 446 436 60 52 BLACK 686697 T VISUAL-LOCATION152 NIL (57 742 1080) TEXT 7 "." 10 0.39 9399 446 436 60 52 BLACK 686697 T	VISUAL-LOCATION58	NIL	(46 234 1080)	TEXT	28	"vote"	10	0.78999996	238	228	60	32	BLACK	G86696	т		
VISUAL-LOCATIONIS NIL (40 544 1080) TEXT 7 "." 10 1.999999 248 538 60 10 BLACK 68695 T VISUAL-LOCATIONIS NIL (50 206 1080) TEXT 7 "." 10 0.1999999 240 200 52 46 BLACK 686695 T VISUAL-LOCATIONI29 NIL (50 394 1080) TEXT 1 4 "on" 10 0.1999999 388 388 52 46 BLACK 686695 T VISUAL-LOCATIONI29 NIL (53 306 1080) TEXT 1 4 "on" 10 0.78999995 334 324 66 38 BLACK 686695 T VISUAL-LOCATIONI12 NIL (53 306 1080) TEXT 28 "line" 10 0.78999995 334 324 66 38 BLACK 686695 T VISUAL-LOCATIONI12 NIL (53 406 1080) TEXT 4 "of" 10 0.39 434 424 60 46 BLACK 686697 T VISUAL-LOCATIONI46 NIL (53 430 1080) TEXT 14 "of" 10 1.18 572 562 74 32 BLACK 686697 T VISUAL-LOCATIONI52 NIL (53 442 1080) TEXT 7 "." 10 0.19999999 446 436 60 52 BLACK 686697 T VISUAL-LOCATIONI52 NIL (53 442 1080) TEXT 28 "bear" 10 0.78999999 446 436 60 52 BLACK 686697 T VISUAL-LOCATIONI52 NIL (57 442 1080) TEXT 28 "bear" 10 0.78999996 486 176 74 46 BLACK 686697 T	VISUAL-LOCATION162	NIL	(46 466 1080)	TEXT	70	Candidates	10	1.96999999	470	460	80	10	BLACK	G86697	T		
VISUAL-LOCATIONI2 NIL (50 394 1080) TEXT 7 "," 10 0.19999999 398 38 22 46 BLACK G8669 T VISUAL-LOCATIONI9 NIL (53 306 1080) TEXT 14 "on" 10 0.39 310 300 60 46 BLACK G86696 T VISUAL-LOCATIONI9 NIL (53 300 1080) TEXT 28 "line" 10 0.39 310 300 60 46 BLACK G86696 T VISUAL-LOCATIONI32 NIL (53 300 1080) TEXT 28 "line" 10 0.39 434 324 66 38 BLACK G86697 T VISUAL-LOCATIONI32 NIL (53 406 1080) TEXT 84 "legistative" 10 2.36 410 400 94 10 BLACK G86697 T VISUAL-LOCATIONI98 NIL (53 508 1080) TEXT 42 "ticket" 10 1.18 572 562 74 32 BLACK G86698 T VISUAL-LOCATIONI98 NIL (53 568 1080) TEXT 42 "ticket" 10 0.19999999 486 436 60 52 BLACK G86697 T VISUAL-LOCATIONI98 NIL (52 70 1080) TEXT 28 "bear" 10 0.78999999 486 176 74 46 BLACK G86698 T VISUAL-LOCATIONI98 NIL (50 182 1080) TEXT 28 "bear" 10 0.78999996 186 176 74 46 BLACK G86695 T	VISUAL-LOCATIONIS/	NTL	(40 544 1080)	TEAT	70	" "	10	1.96999999	210	200	52	10	BLACK	G86698	T		
VISUAL-LOCATION99 NIL (53 306 1080) TEXT 14 "on" 10 0.39 310 300 60 46 BLACK G86696 T VISUAL-LOCATION12 NIL (53 306 1080) TEXT 14 "on" 10 0.78999996 334 324 66 38 BLACK G86696 T VISUAL-LOCATION12 NIL (53 406 1080) TEXT 4 "legistiative" 10 2.36 410 400 94 10 BLACK G86697 T VISUAL-LOCATION146 NIL (53 430 1080) TEXT 14 "of" 10 0.39 434 424 60 46 BLACK G86697 T VISUAL-LOCATION152 NIL (53 568 1080) TEXT 7 "icket" 10 1.18 572 562 74 32 BLACK G86697 T VISUAL-LOCATION152 NIL (57 442 1080) TEXT 7 "icket" 10 0.19999999 446 436 60 52 BLACK G86697 T VISUAL-	VISUAL-LOCATION129	NTT.	(50 394 1080)	TEXT	7		10	0.19999999	398	388	52	46	BLACK	G86697	T T		
VISUAL-LOCATION112 NIL (53 330 1080) TEXT 28 "line" 10 0.78999996 334 324 66 38 BLACK G86996 T VISUAL-LOCATION12 NIL (53 406 1080) TEXT 84 "legistiative" 10 2.36 410 400 94 10 BLACK G86997 T VISUAL-LOCATION146 NIL (53 430 1080) TEXT 14 "of" 10 0.39 434 424 60 46 BLACK G86997 T VISUAL-LOCATION198 NIL (53 568 1080) TEXT 14 "of" 10 1.18 572 562 74 32 BLACK G86997 T VISUAL-LOCATION198 NIL (53 442 1080) TEXT 42 "tlcket" 10 1.18 572 562 74 32 BLACK G86997 T VISUAL-LOCATION152 NIL (54 442 1080) TEXT 7 "." 10 0.19999999 466 436 60 52 BLACK G86997 T VISUAL-LOCATION46 NIL (60 182 1080) TEXT 7 "." 10 0.78999996 186 176 74 46	VISUAL-LOCATION99	NIL	(53 306 1080)	TEXT	14	"on"	10	0.39	310	300	60	46	BLACK	G86696	Ť		
VISUAL-LOCATION132 NIL (53 406 1080) TEXT 84 "legistiative" 10 2.36 410 400 94 10 BLACK G86697 T VISUAL-LOCATION146 NIL (53 430 1080) TEXT 14 "of" 10 0.39 434 424 60 46 BLACK G86697 T VISUAL-LOCATION198 NIL (53 568 1080) TEXT 42 "ticket" 10 1.18 572 562 74 32 BLACK G86698 T VISUAL-LOCATION152 NIL (57 442 1080) TEXT 7 "." 10 0.19999999 446 436 60 52 BLACK G86697 T VISUAL-LOCATION46 NIL (60 182 1080) TEXT 7 "." 10 0.7899999 486 176 74 46 BLACK G86697 T VISUAL-LOCATION46 NIL (60 182 1080) TEXT 14 "TO" 10 0.39 274 264 66 52 BLACK G86696 T	VISUAL-LOCATION112	NIL	(53 330 1080)	TEXT	28	"line"	10	0.78999996	334	324	66	38	BLACK	G86696	Ť		
VISUAL-LOCATION146 NIL (53 430 1080) TEXT 14 "C ^F 10 0.39 434 424 60 46 BLACK G86697 T VISUAL-LOCATION152 NIL (53 568 1080) TEXT 42 "ticket" 10 1.18 572 562 74 32 BLACK G86698 T VISUAL-LOCATION152 NIL (57 442 1080) TEXT 7 "." 10 0.19999999 446 436 60 52 BLACK G86698 T VISUAL-LOCATION46 NIL (60 182 1080) TEXT 28 "bear" 10 0.7899995 186 176 74 46 BLACK G86695 T VISUAL-LOCATION47 NIL (60 770 1080) TEXT 14 "TO" 10 0.39 274 264 66 52 BLACK G86695 T	VISUAL-LOCATION132	NIL	(53 406 1080)	TEXT	84	"legistiative"	10	2.36	410	400	94	10	BLACK	G86697	т		
VISUAL-LOCATION198 NIL (53 568 1080) TEXT 42 "ticket" 10 1.18 572 562 74 32 BLACK 686698 T VISUAL-LOCATION152 NIL (57 442 1080) TEXT 7 "." 10 0.19999999 446 436 60 52 BLACK 686697 T VISUAL-LOCATION79 NIL (60 182 1080) TEXT 2 8 "bear" 10 0.7899996 186 176 74 46 BLACK 686695 T VISUAL-LOCATION79 NIL (60 270 1080) TEXT 14 "To" 10 0.39 274 264 66 52 BLACK 686696 T	VISUAL-LOCATION146	NIL	(53 430 1080)	TEXT	14	"of"	10	0.39	434	424	60	46	BLACK	G86697	т		
VISUAL-LOCATIONI52 NIL (57 442 1080) TEXT 7 "." 10 0.1999999 446 436 60 52 BLACK G86697 T VISUAL-LOCATION46 NIL (60 182 1080) TEXT 28 "bear" 10 0.78999996 186 176 74 46 BLACK G86695 T VISUAL-LOCATION79 NIL (60 270 1080) TEXT 14 "To" 10 0.39 274 264 66 52 BLACK G86696 T	VISUAL-LOCATION198	NIL	(53 568 1080)	TEXT	42	"ticket"	10	1.18	572	562	74	32	BLACK	G86698	т		
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	VISUAL-LOCATION79	NIL	(60 270 1080)	TEXT	14	TO	10	0.39	274	264	66	52	BLACK	G86696	Т		
VISUAL-LOCATION91 NLL (60 294 1080) TEXT 42 DBAILOC 10 1.18 298 288 80 38 BLACK G86696 T	VISUAL-LOCATION91	NIL	(60 294 1080)	TEXT	42	"ballot"	10	1.18	298	288	80	38	BLACK	G86696	T		
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Ballot Style 58 Official Genearl Election Ballot November 6, 2018

Ballot Boleta Oficial De La Eleccion

DEM

REP

WIS

IND

DEM

REP

GovernorLieutenantGovernor

General

____ JimDoyle

____ JimYoung

_____ TyABollerud

PedroBrouse

EdThompson

AttornevGeneral

TimSpeight

RickOrgan

GregConverse

CommissionerofAgriculture

ScottMcCallum

Offisyel Jeneral Eleksyon Bilten

REP

DEM

StateSenator

____ RicardoNig

WesleyMillette

Ballot Instructions

FOR PARTISAN OFFICE AND REFERENDUM NOTICE TO ELECTORS: This ballot may be invalid unless initialed by 2 election inspectors. In Cast as an absentee ballot. the ballot must bear the initials of the manucipal clerk or deputy clerk.

To vote for the candidate of your choice, blacken the oval to the left of the candidate's name. To vote for a person whose name does not appear on the ballot, write the person's name on the line provided and blaken the oval to the left of the line.

STRAIGHT PARTY

If you desire to vote for a straight party ticket for all state, congressional, legistiative, and county offices, blacken the oval to the LEFT of the party of your choice. A straight party vote cannot be cast for independent candidates of your choice.

TMPORTANT:

Blacken the oval to the LEFT of the name of the candidate. When voting for governor and lieutenant governor, you may vote only for the candidate on ticket jointly.

____ PollyRylander CountyJudge RobertoAron DEM UnitedStatesSenator ElaineTucker RailroadCommissioner LuisKim RickScott REP BillNelson DEM JillianBalas REP DEM ____ ZacharyMinick RepresentativeInCongress TiffanyPerry AlceeLHastings DEM



CityController TimGrasty DEM REP DEM CommissionerofGeneralLandOffice



- VEGA 2023 does everything that the 2018 version did
 - Plus bug fixes!
- How has it been extended?
 - Hierarchical grouping
 - Iterative Radii

Radius value	# Groups
1	10
2	10
3	7
4	7
5	3
6	1

- What does it do?
 - Everything that the 2018 version did
 - Hierarchical grouping
 - Iterative Radii
 - "Top-down"/"bottom-up"
 - Naturally identify number of levels of hierarchy
 - Difficult to tell what belongs to what
 - Manual setting of radius values
 - Relatively computationally intensive

Radius value	# Groups	
1	10	
2	10	
3	7	
4	7	
5	3	
6	1	

- What does it do?
 - Everything that the 2018 version did
 - Hierarchical grouping
 - Iterative Radii
 - Add Group Features



- What does it do?
 - Everything that the 2018 version did
 - Hierarchical grouping
 - Iterative Radii
 - Add Group Features
 - "Bottom-up" only
 - Naturally identify number of levels of hierarchy
 - More straightforward to interpret groups
 - Radius driven by object/group positioning
 - Less computationally intense



- What does it do?
 - Everything that the 2018 version did
 - Hierarchical grouping
 - Iterative Radii
 - Add Group Features
 - New collision method





- What does it do?
 - Everything that the 2018 version did
 - Hierarchical grouping
 - Iterative Radii
 - Add Group Features
 - New collision method
 - Consideration of multiple attributes of visual objects
 - Proximity
 - Alignment
 - Centroids on vertical/horizontal axes
 - Edges
 - Difference in area
 - "Identity"







Experiments

- So far, have performed a set of three experiments to test and validate the implemented grouping theory.
 - Experiment 1
 - Participants given a set of visual scenes, and asked to indicate perceived groups by hand. Instructions prompt participants to signify hierarchy in group perception.
 - Experiment 2:
 - Participants are show a series of visual scenes. For each scene, they are first asked to consider their perception of any potential visual groups, and then select from a set of four different groupings of that scene.
 - Experiment 3:
 - A refinement of experiment 2, where the stimuli are varied more consistently, and the response set is limited to three options.

Experiments



Frequency of choice selection for each row-spread stimulus, across participants

selected_choice

cols rows zroco



Looking forward

- Refinement of hierarchical grouping processes and multi-feature collision
 - Interaction between the two? (expt 1)
- Temporal inheritance of grouping information
- Self-contained module as an addon to ACT-R
- Not just visual grouping, but perceptual grouping
 - Grouping in other senses
 - Audicon
 - Cross-modal grouping
 - Co-occurring stimuli
 - Visuo-auditory temporal delay
 - Integration of ACT-R modules

Thanks!

- Mike Byrne
- Xianni Wang, Fabrizio Chavez, Teddy Taffese, Charlie Weeks
- Linda Mao, Ariana Zhu, Emily Wu
- CHIL Lab!







- Introduced at 2018 ACT-R workshop
 - John Lindstedt, now at SUNY Oswego
- Motivated by observation of behavioral error associated with certain ballot designs

OFFICIAL GENERAL ELECTION BALLOT SARASOTA CURINTY, FLORIDA INDUMBER 7, 2006 CONGRESS I ONAL UNITED STATES SENATOR (Vote for One)		U.S. REPRESENTATIVE IN CONG 13TH CONGRESSIONAL DISTRI (Vote for One) Uern Buchanan Christine Jennings	IRESS ICT REP DEM
atherine Harris	REP	STATE	
		GOVERNOR AND LIEUTENANT GOVE	RNOR
lill Nelson	DEM	(Vote for Une)	
Loud Pau Pragion	NPA	Charlie Crist	REP
loga nag rrazier		Jeff Kottkamp	
lelinda Noah	NPA	Jim Davis Davil I. Jence	DEM
		Max Linn	RFF
brian Moore	NPA	Tom Macklin	
ou Tamer	NPA	Richard Paul Dembinsky	NPA
		Dr. Joe Smith	
hrite-In		John Wayne Smith	NPA
21		- Karl C.C. Behm	NPA
//7		Carol Castagnero	
<i>⊾</i> ∕		Write-In	
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- How did it work?
 - Two core concepts:
 - Collision methods





- How did it work?
 - Two core concepts:
 - Collision methods
 - Parameterized by a radius value





• How did it work?

- Two core concepts:
 - Collision methods
 - Parameterized by a radius value
 - Agglomeration





• What could it do?

•	Untitled Dialog	
STEP 1	PresidentoftheUni	itedStates
Read Instructions	To make your choice, click on the candidate name. A green checkmark will appear next tr your choice, just click on a different candica	's name or on the box next to his/her o your choice. If you want to change te or box.
You are now on STEP 2 Make your choices	Presidentofth	eUnitedStates
	GordonBearce	REP
	VernonStanleyAlbury	DEM
	JanetteFroman	LIB
STEP 3 Review your choi		
STEP 4 Record your vote		
	Click to go back	Click to go forw
	PreviousPage	NextPage



• What could it do?

Reau Instructions		
	To make your choice, click on the candidate' name. A green checkmark will appear next to your choice, just click on a different candicat	s name or on the box next to his/her your choice. If you want to change e or box.
You are now on STEP 2 Make your choices	Presidentofthe	eUnitedStates
	GordonBearce	REP
	VernonStanleyAlbury	DEM
	JanetteFroman	LIB
STEP 3 Review your choi		
STEP 4	Click to go back	Click to go forw
Record your vote		



• What could it do?

STEP 1	residentortheomte	M M M M M M M
Read Instructions		
	To make your choice, click on the candidate's in name! A green checkmark will appear in to yo your choice, just click on a different candicate of	ame or on the box next to his/her our choice. If you want to change or box.
You are now on STEP 2 Make your choices	PresidentoftheUr	nitedStates
	GordonBearce	REP
	VernonStanleyAlbury	DEM
	JanetteFroman	LIB
STEP 3 Review your choi		
STEP 4 Record your vote	Click to go back	Click to go forw
	Resvices Frage	NextPage



• What couldn't it do?

••		Untitled Dialog PresidentoftheUnitedSta	tes	
STEP 1 Read Instructions		residentorineointeasta		
	To make you name. A gre your choice,	IT choice, click on the candidate's name en checkmark will appear i to your cf just click on a different candicate or boy	or on the box next to his/ noice. If you want to chang x.	her ge
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		VernonStanleyAlbury	DEM	
		JanetteFroman	LIB	
STEP 3 Review your choi				
STEP 4 Record your vote	Click to go back		t	Slick to go forw.
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- What couldn't it do?
 - Clear distinctions between objects in close proximity
 - Just select "best" radius value

STEP 1	Untitled Dialog PresidentoftheUnitedSt	ates
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STEP 3 Review your choi		
STEP 4 Record your vote	Click to go back	Click to go forw
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- What couldn't it do?
 - Clear distinctions between objects in close proximity
 - Just select "best" radius value
 - Hierarchical groups

STEP 1 Read Instructions	Untitled Dialog PresidentoftheUnitedStat	tes
	To make your choice, click on the candidate's name of name! A green checkmark will appear in the to your ch your choice, just click on a different candicate or box	ir on the box next to his/her orce. If you want to change
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	JanetteFroman	LIB
STEP 3 Review your choi		
STEP 4 Record your vote	Click to go back	Click to go forw
	Manufacture Finance	NextPage
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- What couldn't it do?
 - Clear distinctions between objects in close proximity
 - Just select "best" radius value
 - Hierarchical groups
 - ...work!



- How did it break?
 - Implemented as an around method for (build-vis-locs-for), which was deprecated with the API changes to support the RPC interface (version 7.11?)

