ALGORITHM TRAINING TESTING

	ALGORITHM			TRA	AINING				TESTING	
	DESCRIPTION	RULES TESTED	DATA	PREDICTIONS	CONFUSION MATRIX	PERFORMANCE	DATA	PREDICTIONS	CONFUSION MATRIX	PERFORMANCE
BASELINE	Assume all pixels are not fingers.	2	Images 3	Y K K	PREDICTED Finger Not Finger O 495 Not Finger 0 7372	$\frac{7372+0}{7372+495} = 0.94$	Images 2	W K	PREDICTED Finger Not Finger Not Finger 0 341 Not Finger 0 4533	$\frac{4533+0}{4533+341} = 0.93$
			Finger Pixels 495 Not Finger 7272			$\frac{1}{495+0} = 0.0$	Finger Pixels 341 Not Finger 4522			$\frac{1}{3} = 0.0$
			Pixels 7372 Total Pixels 7867	- 100 F		0 = DNE	Pixels 4533 Total Pixels 4874			0 = DNE
ט	Search for this pattern:		Images 3			0+0 7372+9 = 0.94	Images 2		PREDICTED	0+0 4533+0 = 0.93
E ENGINEERIN	Search for these patterns:	0	Finger Pixels 495		Finger Not Finger Not Finger 7372	¥ 7867	Finger Pixels 341		Finger Not Finger Not Finger 0 341 4533	4874 0 = 0.0
			Not Finger Pixels 7372			9+486 = 0.02	Not Finger Pixels 4533			0+341 8 0
			Total Pixels 7867			$\frac{1}{0+9} = 1.00$	Total Pixels 4874			0+0 = DNE $4532+0$ 0.03
KNOWLEDGI		0	Images 3 Finger Pixels 495	₹ ¥	Finger Not Finger Not Finger 7365	7867	Images 2 Finger Pixels 341		Finger Not Finger Not Finger Vot Finger Not Finger Not Finger Not Finger Not Finger Not Finger Not Finger	5301 = 0.93
			Not Finger 7372			48 = 0.10 = 0.10	Not Finger Pixels 4533			$\frac{1}{0}$ = 0.00
			Total Pixels 7867			48 = 0.87 = 0.87	Total Pixels 4874			$\frac{0}{0+1} = 0.00$
MEMORIZATION	Search for matches to 413 unique patterns in training data:	0	Images 3	¥ ¥	Finger Not Finger Not Finger 7356	$\frac{7356+495}{7867} = 1.00$	Images 2	"	PREDICTED Finger Not Finger Not Finger 21 4512	$\frac{4512+11}{4874} = 0.93$
			Finger Pixels 495 Not Finger 7272			495 = 1.00	Finger Pixels 341 Not Finger 4522			$\frac{11}{11+330} = 0.03$
			Pixels 7372 Total Pixels 7867			495 495 = 0.97	Pixels 4533 Total Pixels 4874			11 = 0.34
	Search for matches to 2160 unique patterns in training data: I I I I I I I I I I I I I I I I I I I	0	Images 30		PREDICTED Finger Not Finger Not Finger 884 71956	495+16 71956+3095 = 0.99	Images 2	4	PREDICTED Finger Not Finger 47 294 Not Finger 60 4473	11+21 24473+47 = 0.93
			Finger Pixels 3095			75935 3095	Finger Pixels 341			¥ 4874 47
			Not Finger Pixels 72840			$\frac{3095+0}{3095+0} = 1.00$	Not Finger Pixels 4533			47+294 = 0.14
			Total Pixels 75935			3095+884 = 0.78 \$\frac{3}{4} \frac{479+5574}{4}	Total Pixels 4874			47+60 = 0.44
	makes fewest errors on the training set:	162	Images 3 Finger Pixels 495	1 1/ 1//	PREDICTED Finger Not Finger 479 16 1798 5574	7867 = 0.77	Images 2 Finger Pixels 341	%	Finger Not Finger Not Finger Not Finger 327 14 980 3553	$\frac{327 + 3553}{4874} = 0.80$
			Not Finger 7372			479 479+16 = 0.97	Not Finger Pixels 4533			$\frac{327}{327+14} = 0.96$
			Total Pixels 7867			479 479+1798 = 0.21	Total Pixels 4874			$\frac{327}{327 + 980} = 0.25$
BRUTE FORCE	Search for best 2 pixel rule that makes fewest errors on the training set:	12,960	Images 3	& W	PREDICTED Finger Not Finger Not Finger 362 133 Not Finger 345 7027	$\frac{362+7027}{7867} = 0.94$	Images 2	V, V	PREDICTED Finger Not Finger Not Finger 254 87 Not Finger 287 4296	$\frac{254+4296}{4874} = 0.93$
			Finger Pixels 495 Not Finger 7272			$\frac{1}{3} = \frac{362}{362 + 133} = 0.73$	Finger Pixels 341 Not Finger 4532			$\frac{1}{254} = 0.75$
			Pixels 7867			362 = 0.51	Pixels 4533 Total Pixels 4874			254 = 0.52
	Search for best 3 pixel rule that makes fewest errors on the training set: Grow depth 3 tree using	682,560	Images 3	W	PREDICTED Finger Not Finger Not Finger 73 7299	362+345 327+7299 = 0.97	Images 2	W V	PREDICTED Finger Not Finger Vot Finger Not Finger 102 4431	254+237 226+4431 = 0.96
			Finger Pixels 495			7867 1182 327 = 0.66	Finger Pixels 341			4874 = 0.66
			Not Finger Pixels 7372			≅ 327+168 8 327	Not Finger Pixels 4533			226+115 8 226
			Total Pixels 7867			327+73 = 0.82	Total Pixels 4874			226+102 = 0.69
DECISION TREE	information gain heuristic	576	Images 3 Finger Pixels 495	1 1/ 1//	Finger Not Finger Not Finger 7293	$\frac{330+7293}{7867} = 0.96$	Images 2 Finger Pixels 341		Finger Not Finger Not Finger Not Finger 4428	$\frac{238+4428}{4874} = 0.96$
			Not Finger 7372	20 1		$\frac{330}{330+165} = 0.70$	Not Finger Pixels 4533			$\frac{7}{238} = 0.70$
			Total Pixels 7867			$\frac{330}{330+79} = 0.81$	Total Pixels 4874			$\frac{238}{238+105} = 0.70$
	Grow depth 4 tree using information gain heuristic	1215	Images 30		PREDICTED Finger Not Finger Not Finger 2135 960 1535 72305	$\frac{72305+2135}{75935} = 0.98$	Images 2	M M	Finger Not Finger Not Finger 180 161 4470	$\frac{180+4470}{4874} = 0.95$
			Finger Pixels 3095 Not Finger 73840			$\frac{1}{2135} = 0.69$	Finger Pixels 341 Not Finger			$\frac{180}{180+161} = 0.53$
			Pixels 72840 Total Pixels 75935			2135 = 0.80	Pixels 4533 Total Pixels 4874			180 = 0.74
			, 5533			₹ 2135+535				置 180+63