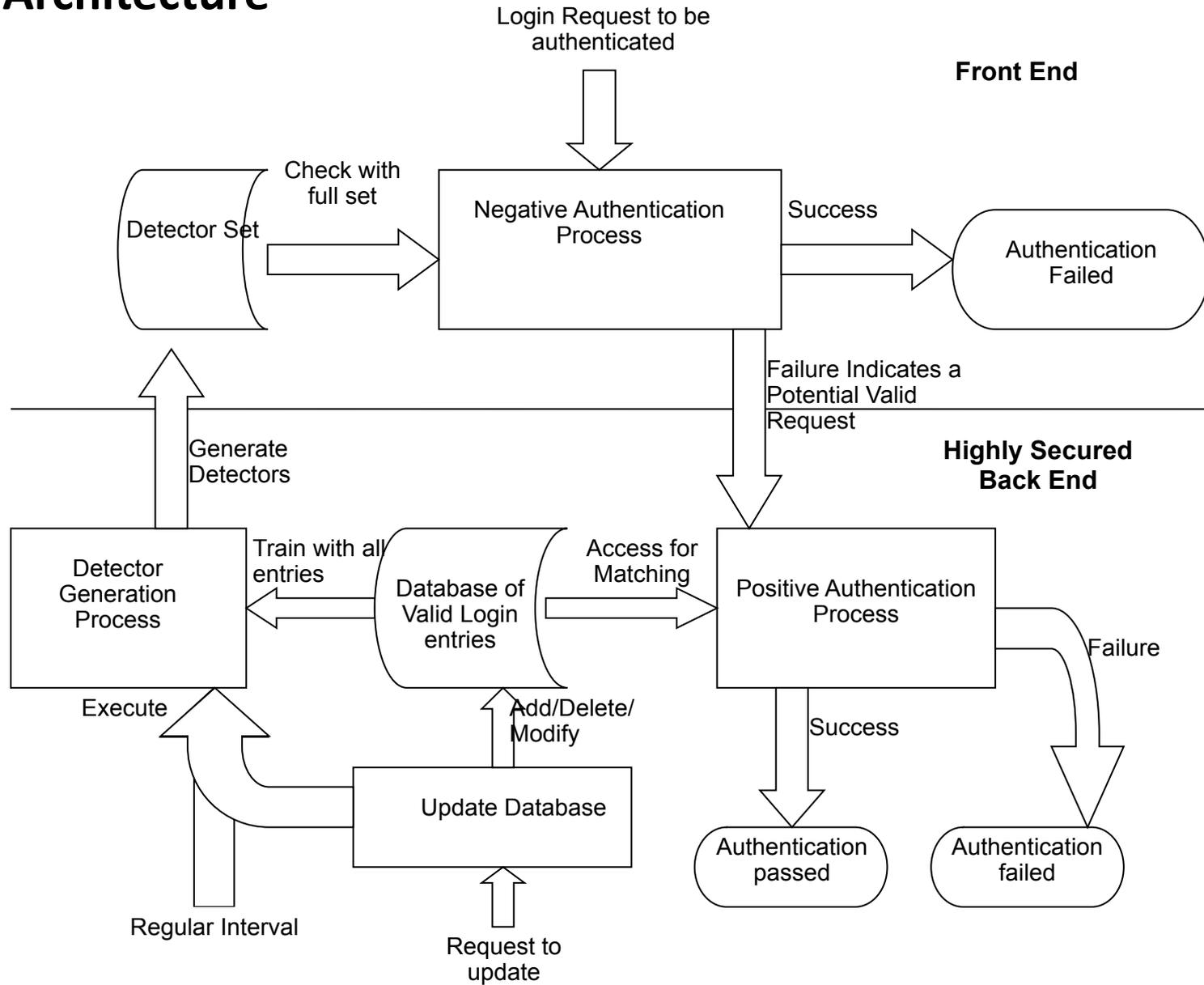


# NAS Prototype "



# NAS Architecture



# Results of Empirical Experiments

		# Passwords = 500		# Passwords = 1000		# Passwords = 5000		# Passwords = 10000		# Passwords = 50000	
AntiP Coverage	Confusion Parameter	# AntiP	DR	# AntiP	DR	# AntiP	DR	# AntiP	DR	# AntiP	DR
0.9	0.001	463.2	0.6053	804.8	0.558061	2980	0.458422	4530	0.366202	14694	0.256098
	0.05	420.7	0.573337	727.65	0.546811	713	0.175171	781	0.118492	201	0.00436
	0.1	210.35	0.417279	185.4	0.219994	130	0.027142	137	0.015214	146	0.003035
0.95	0.001	757.3	0.792968	1344.55	0.758761	5640	0.700707	11681	0.721334	56708	0.703825
	0.05	692.95	0.7772	1121.6	0.730133	2827	0.577756	2108	0.313175	333	0.008116
	0.1	317.35	0.573521	286.05	0.342639	164	0.030095	178	0.016677	512	0.007796
0.99	0.001	1500.4	0.956289	2696.95	0.95195	12819	0.9234	23655	0.935514	88908	0.865814
	0.05	1389.05	0.951816	2281.8	0.940283	9283	0.8345	6794	0.5643	712	0.016624
	0.1	811.2	0.853774	814.4	0.671861	312	0.09422	203	0.02345	505	0.007429

The table summarizes the results of experiments with varying: size of password files, AntiP coverage and Confusion parameters ( $Cp$ ). The shaded results indicate that for a smaller password file, a reasonable size AntiPs and good detection rates are found in around 99% coverage and for small confusion parameters. But, very large password files lead to poor result. for this parameter setting, in which case, clustering of password data and/or changing in dimensionality can alleviate.

# Finding the optimal range ( $C_p$ )

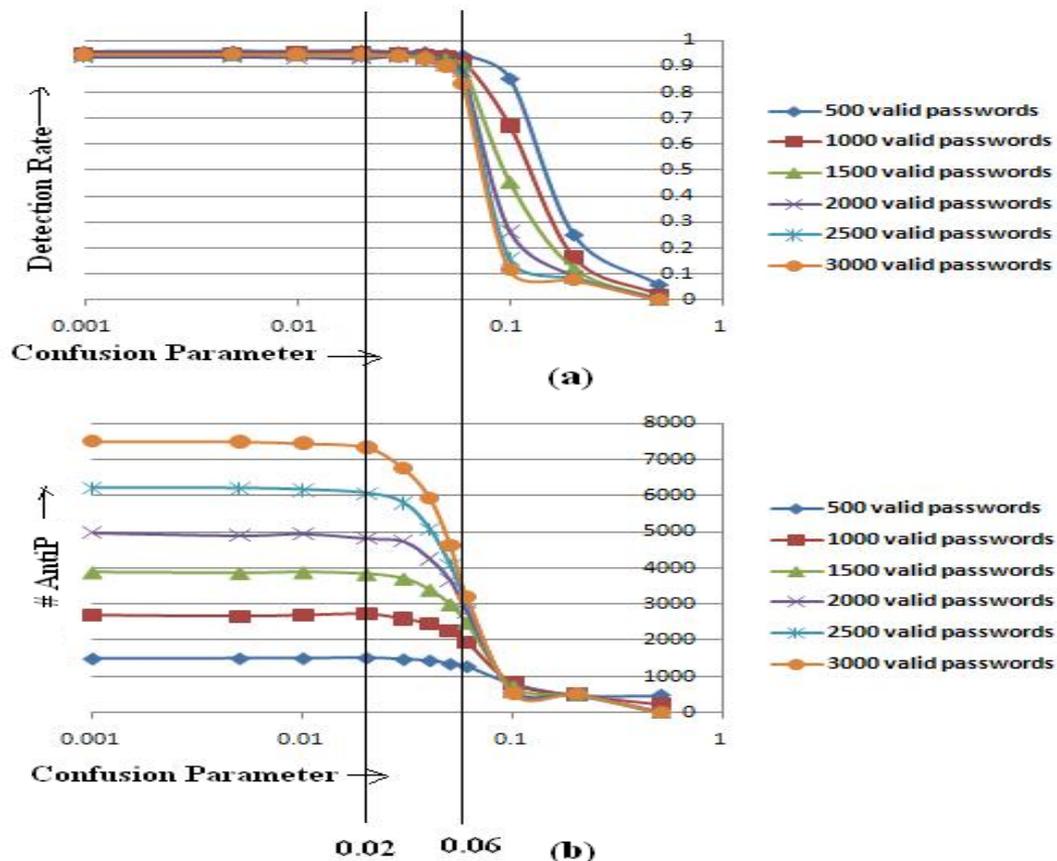
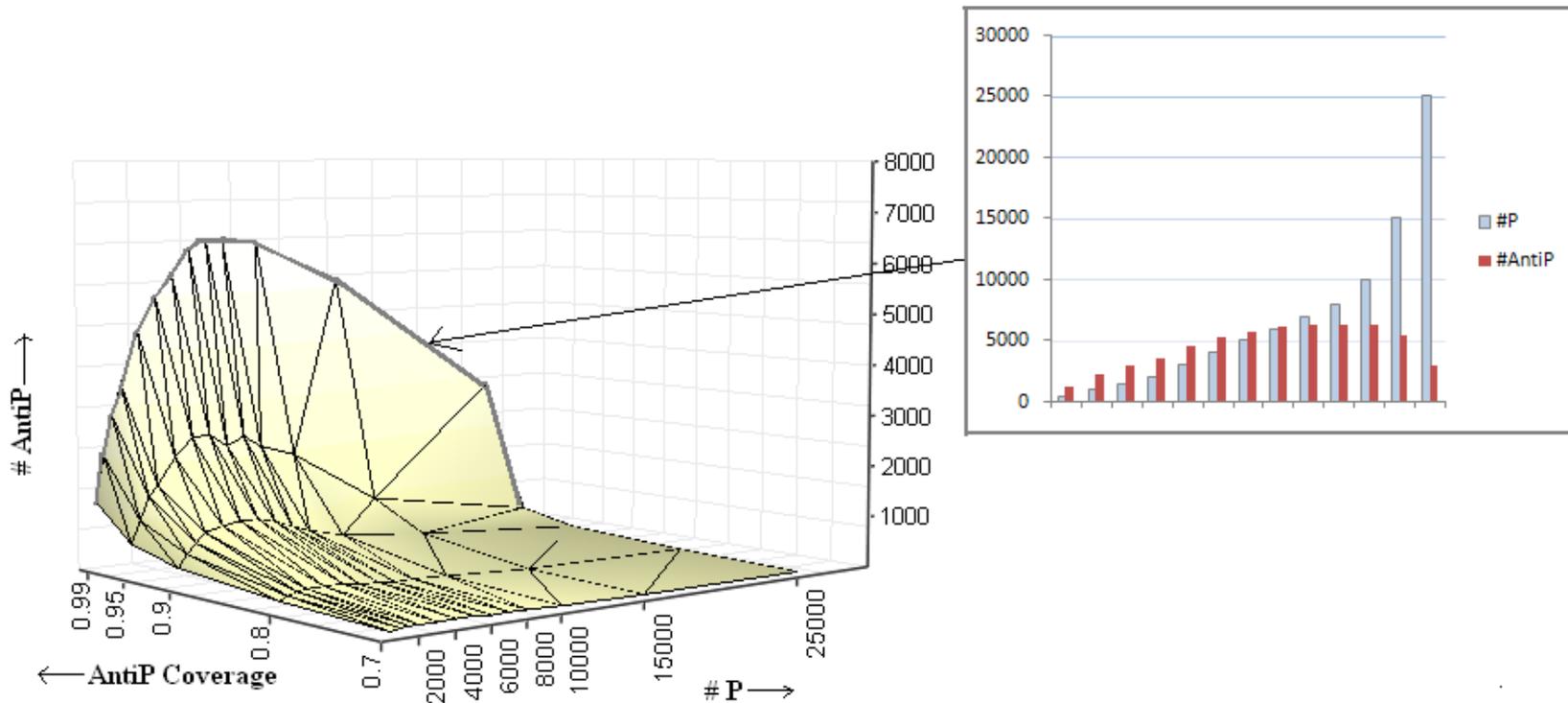


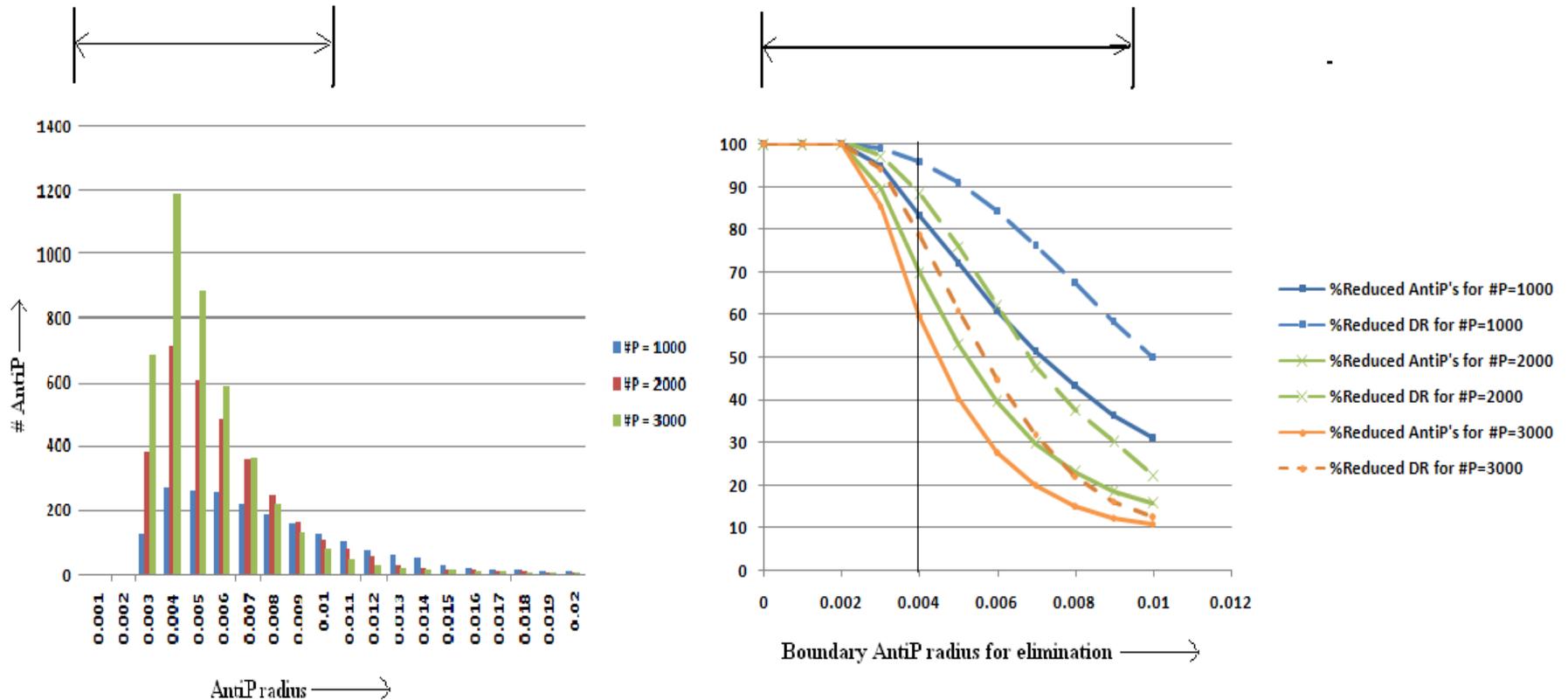
Figure shows the changes of detection rate and the number of AntiPs with variations in confusion parameter. ( $C_p$ ) In particular, figure 4 (a) exhibits detection rate with varying sizes of password files while setting the AntiP coverage to 0.99. It is to be noted that in the interval 0.02-0.06 of confusion parameter ( $C_p$ ) while the detection rate does not change significantly (figure 4(a)), the number of AntiP's decrease rapidly (figure 4(b)). For example, with #P = 3000 and confusion parameter =0.05, detection rate is 0.9 can be achieved with 4625 AntiPs, compared to 0.94 detection rate with 7446 AntiPs as in the case of  $C_p$  of 0.01 .

# Changes in AntiPs with the size of Password file



Variation in number of AntiP's with different settings of AntiP coverage and password file sizes with confusion parameter set to 0.05. AntiP set size varies almost exponentially with change in coverage whereas it does not increase beyond some limit for varying password set size.

# Effects of eliminating smaller AntiPs



Variation of sizes of a pool of AntiP's produced for password file size of 1000, 2000 and 3000. (b) Each pair of same colored lines represents variation of AntiPs and detection rates for a specific password file size. It is clear from the figure that if smaller sized AntiPs are eliminated, then the Detection rate decreases, but # AntiPs decreases faster than Detection rates. For example, if in case of 1000 valid passwords, if the AntiP sizes of 0.04 or smaller are eliminated, then #AntiP counts reduce to 83% of the original number, whereas, detection rate falls only to 95%.