Principle concept analysis paper:

- Software will let you know coverage variability of each PC. Advantage of PCA, reduce dimension of problem, will end up of having four dimension.
- Five data form five machine, limit number of counter because easy to do so
- Factor loadings: first PC has a sum of weight of each original variable ;Coefficient of each combination
- Some area of workload is not covered by benchmark
- Features of equal weight: mean, variance, first set variance is twice of mean, second is half of mean. PCA can't be blindly apply. Choose bench 4&8, distance from origin to B4/B8, because 60>>0.01 60>>5, distance is dominantly decide by 60. To give every equal weight, we need normalize data.
- Unit normal distribution. 3 sigma covers 99.73%, mean is 0, 1 is standard deviation. Everybody gets same weight. Methods: $z=(x-u)/sigma$, where u is mean
- Pick things you want, normalize them so that they have equal weight
- Mahalanobis, M dis = E dis when all axes are scale to unit variance
- SPEC chart: instructions count are huge. 2 benchmark branch percentage are different from others (hmmer,h264ref). Most integer spec benchmark has 20%+ branch. In those two benchmarks, they are loop intensive. In loop intensive program, they unroll loop. One third are loads.
- FP : cactusADM have large block, loop intensive(branch 0.22%).
- Figure1: use PIN profiler, pick procedure/function/subroutine function (gprof could also work). Chart nature: 90-10 rule: 90% time spent in 10% of code. Rise up fast line: very small footprint is enough to cover 100% of runtime, has strong instruction locality. Static foot print covers how many dynamic instructions. A certain size of instruction cache could cover all of runtime.
- SPEC try to increase footprint.
- Table 3: branch is chosen in INT not in FP. DTLB in FP, ITLB in INT. list is discussed by different vendors.
- Kaiser: only PCS with Eigen value higher than 1 are retained.
- Table 5: prove subset of 6 is good enough.
- Figure 4: compare subset of 6/8 and all benchmarks. Weight average(some represent itself, some represent several benchmark in that cluster). Inversion happens when things are too close, have bigger subset will help reduce inversion.
- Such validation help choose to eliminate which benchmark
- Figure 6: some input could cluster together. This analysis helps in choosing training input and test input.
- Figure 8: only with branch analysis. A couple of INT look like FP, a couple of FP look like INT.
- Mcf: unique in memory test.
- SPEC application domain: application-based benchmark, check domain features and choose which computer to buy. Mistake: choose only one benchmark from one application area, because there are more than one unique benchmark in one domain.
- Table 8: