## Lab 7

Non-Parametric Analysis of the DronesMetrics data.

## Load file 'DronesMetrics'

## > attach(DronesMetrics)

But we only want to work with part of this. So, let's separate the TPT data into a new data frame.

- > DM\_tpt<-data.frame(auto\_tpt,both\_tpt,self\_tpt)
- > DM\_tpt

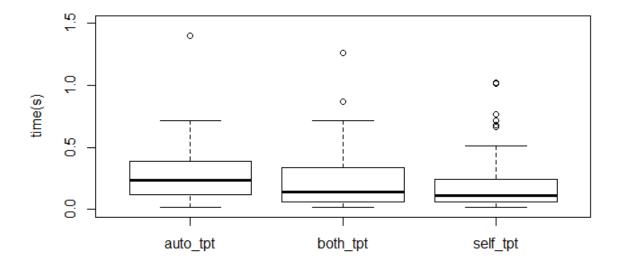
auto\_tpt both\_tpt self\_tpt

- 1 0.520 0.63125000 0.21395833
- 2 0.080 0.04261603 0.07904000
- 3 0.360 0.22681818 0.23209302
- $4 \quad 0.240\ 0.31937500\ 0.41111111$
- $5 \quad 0.380\ 0.36875000\ 0.32941177$
- 6 0.400 0.71063830 0.68000000

(note, I've only include the first 6 rows to save space, you will have 68 rows)

We can explore these data by creating a boxplot (although we will probably want to set the y-axis to exclude some of the outlier values).

> boxplot(DM\_tpt, ylab="time(s)", ylim=c(0, 1.5))



To run a Friedman ANOVA, we need to create a matrix of these data.

 $> TPT matrix < -data.matrix (DM\_tpt) \\$ 

## > friedman.test(TPTmatrix)

Friedman rank sum test

data: TPTmatrix Friedman chi-squared = 8.8529, df = 2, p-value = 0.01196

This tells us that there is a main effect of condition on time per target, but not where any differences lie

We can apply a Wilcoxon Signed Ranks Tests to explore pairwise comparisons.

test<-wilcox.test(auto\_tpt, both\_tpt, paired=TRUE)</pre>

Wilcoxon signed rank test with continuity correction

data: auto\_tpt and both\_tpt V = 1462, p-value = 0.07793

alternative hypothesis: true location shift is not equal to 0

Notice that R produces a value of V, rather than z which we normally use.

> Zstat<-qnorm(testp.value/2)

> Zstat

[1] -1.762837

We can ignore the sign and just report this as z = 1.76.

It is also useful to report power, which can do using:

> abs(Zstat)/sqrt(38) [1] 0.2859699

Note that '38' is the number of pairs in the analysis.

You can calculate Wilcoxon results for the other combinations of TPT.

Now you can do the same with the Beacon and the sensitivity (d.) data.