install.packages("scatterplot3d")

require("scatterplot3d")

**# read csv files**

data <- read.csv("p1\_b.csv")

data <- data[complete.cases(data),]

headdata <- cbind(data[2],data[3],data[4],data[5],data[6],data[8] ,data[10] ,data[9])

**# 1. visualize the trajectory of the head**

s3d <- scatterplot3d(headdata[6:8], type="l", lwd=2, color="green4", xlim=c(-1.0,1.0), ylim=c(-1.0,1.0), zlim=c(0.0,2.0))

**# 2. calculate the moving distance of the head**

hmt <- 0

taskheaddata <- headdata[,6:8]

lastRow<-nrow(taskheaddata)-5;

for(i in 2:lastRow)

{

distance <- sqrt((taskheaddata[i,1]- taskheaddata[i-1,1])^2 + (taskheaddata[i,2]- taskheaddata[i-1,2])^2 + (taskheaddata[i,3]- taskheaddata[i-1,3])^2)

if(distance <1)

{

hmt <- hmt + distance

}

}

moving distance <- hmt

**# 3. calculate the time to completion**

lastRow <- nrow(data);

ttc <- data[lastRow,6]-data[1,6];

time to completion <- ttc/60000;