one_mobile Experiment Report

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```
## Loading required package: stargazer
##
## Please cite as:
  Hlavac, Marek (2015). stargazer: Well-Formatted Regression and Summary Statistics Tables.
   R package version 5.2. http://CRAN.R-project.org/package=stargazer
This is a summary of the data from the one_mobile experiment.
Shown below is the summary of the error of all robots combined for both x and y coordinates, and also the
error in total distance.
summary(continuous$x_error)
      Min. 1st Qu. Median
                              Mean 3rd Qu.
## -2.8810 0.9434 2.3530 3.8740 8.7800 12.3700
summary(continuous$y_error)
##
       Min. 1st Qu.
                       Median
                                  Mean
                                        3rd Qu.
                                                     Max.
## -6.53500 -2.88700 0.02268
                               0.31930
                                        3.00100 8.19000
summary(continuous$yaw_error)
        Min.
               1st Qu.
                          Median
                                      Mean
                                              3rd Qu.
                                                           Max.
## -3.136000 -1.553000 -0.006657 -0.005929
                                             1.562000
                                                       3.141000
summary(continuous$horizontal_error)
##
               1st Qu.
                          Median
                                              3rd Qu.
                                       Mean
   0.000015
             2.066000
                        4.472000
                                  5.545000
                                            9.208000 13.650000
summary(discrete$x_error)
##
      Min. 1st Qu. Median
                              Mean 3rd Qu.
                                               Max.
## -2.3710 -0.4020 0.3721 0.2891 0.7757
summary(discrete$y_error)
       Min. 1st Qu.
                       Median
                                  Mean 3rd Qu.
## -3.90600 -0.84700 -0.04572 -0.05091 0.58810 4.12000
summary(discrete$yaw_error)
##
      Min. 1st Qu. Median
                              Mean 3rd Qu.
## -3.1410 -1.4350 -0.5793 -0.3351 0.5310 3.1400
summary(discrete$horizontal_error)
       Min. 1st Qu.
                       Median
                                  Mean 3rd Qu.
```

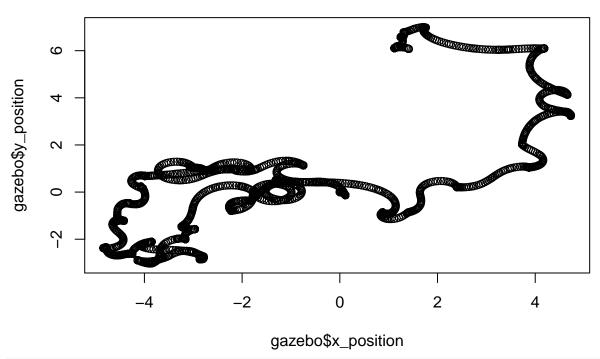
0.000015 0.788700 1.264000 1.480000 2.072000 4.793000

```
if (params$robot >= 2) {
    summary(external_data_averages)
}
```

Shown below are plots representing the robot's motion and error over time.

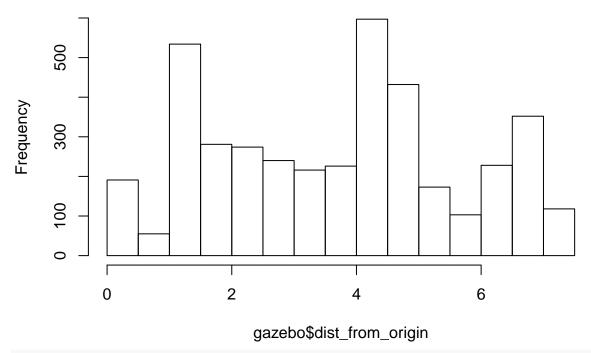
```
plot(gazebo$x_position, gazebo$y_position,
    main = "Ground truth visited locations of robots")
```

Ground truth visited locations of robots



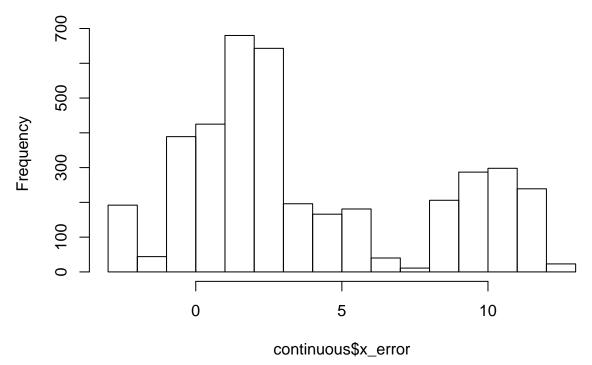
```
hist(gazebo$dist_from_origin,
    main = "Distance from origin vs. time")
```

Distance from origin vs. time



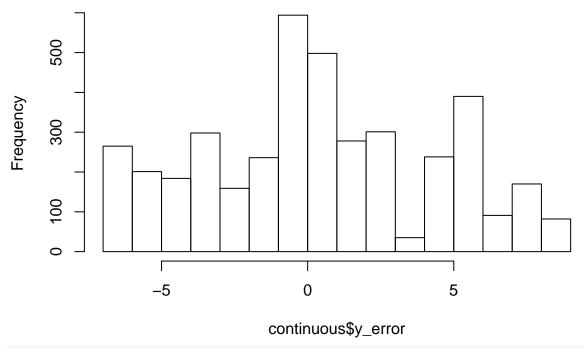
hist(continuous\$x_error,
 main = "Continuous x_error")

Continuous x_error



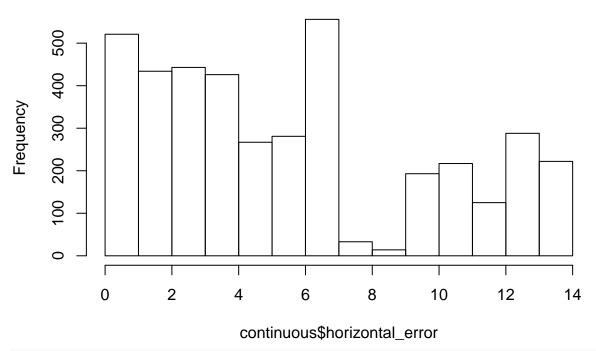
hist(continuous\$y_error,
 main = "Continuous y_error")

Continuous y_error



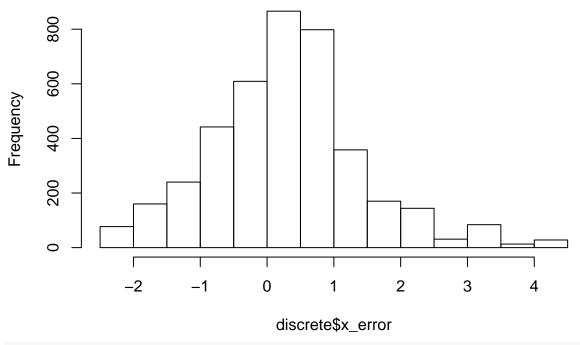
hist(continuous\$horizontal_error,
 main = "Continuous total distance error")

Continuous total distance error



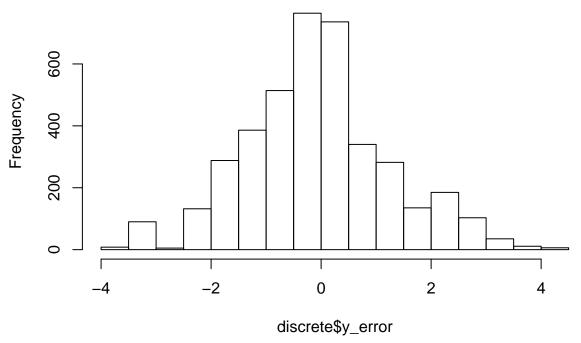
hist(discrete\$x_error,
 main = "Discrete x_error")

Discrete x_error



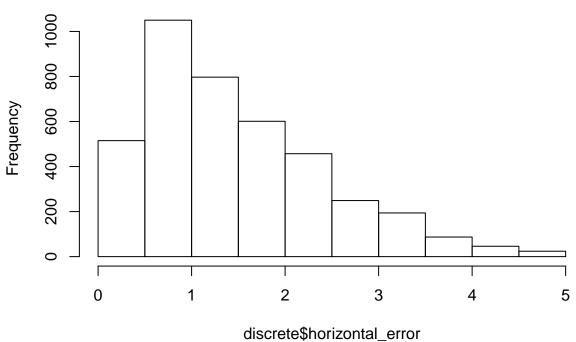
hist(discrete\$y_error,
 main = "Discrete y_error")

Discrete y_error



hist (discrete\$horizontal_error,
 main = "Discrete total distance error")

Discrete total distance error



```
figure_dir <- "/home/matt/thesis/writing/r_figures/"</pre>
filename = paste0(figure_dir, params$experiment, "_continuous_error.pdf")
pdf(filename)
plot(continuous$horizontal_error, main="Continuous Filter Error", sub=pasteO("For ", params$experiment,
dev.off()
## pdf
filename = paste0(figure_dir, params$experiment, "_discrete_error.pdf")
pdf(filename)
plot(discrete$horizontal_error, main="Discrete Filter Error", sub=paste0("For ", params$experiment, " E
dev.off()
## pdf
if (params$experiment == "one_stationary_noiseless") {
    gazebo$horizontal_error <- sqrt(gazebo$x_position ^ 2 + gazebo$y_position ^ 2)</pre>
    pdf(paste0(figure_dir, "gazebo_odom_drift.pdf"))
    plot(gazebo$horizontal_error, main="Gazebo Odometry Drift for Stationary Robot with Noiseless Odome
    dev.off()
}
table_dir <- "/home/matt/thesis/writing/autogenerated_tables/"</pre>
out_file <- paste0(table_dir, params$experiment, "_continuous_summary.tex")</pre>
```

tex_label <- paste0("tab:", params\$experiment, "_continuous_summary")</pre>

stargazer(continuous,

```
out=out_file,
                  table.placement="h",
                  label=tex label,
                  title=gsub("_", "-", paste0("Continuous Filter Estimate for ", params$experiment, " Experimen
                  digits.extra = 20)
##
## % Table created by stargazer v.5.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harvar
## % Date and time: Mon, Aug 15, 2016 - 04:01:19 PM
## \begin{table}[h] \centering
        \caption{Continuous Filter Estimate for one-mobile Experiment}
##
      \label{tab:one_mobile_continuous_summary}
## \begin{tabular}{@{\extracolsep{5pt}}lccccc}
## \[-1.8ex]\
## \hline \\[-1.8ex]
## Statistic & \multicolumn{1}{c}{N} & \multicolumn{1}{c}{Mean} & \multicolumn{1}{c}{St. Dev.} & \multi
## \hline \\[-1.8ex]
## x\_position & 4,020 & $-$4.998 & 2.493 & $-$9.278 & 1.356 \\
## y\_position & 4,020 & 0.499 & 2.175 & $-$5.683 & 3.520 \\
## yaw & 4,020 & 0.150 & 1.817 & $-$3.138 & 3.138 \\
## x\_variance & 4,020 & 12.354 & 7.101 & 0.076 & 24.605 \\
## y\ variance & 4,020 & 12.185 & 7.035 & 0.076 & 24.379 \\
## yaw\_variance & 4,020 & 14.713 & 8.472 & 0.092 & 29.365 \\
## yaw\_error & 4,020 & $-$0.006 & 1.801 & $-$3.136 & 3.141 \\
## x\_error & 4,020 & 3.874 & 4.169 & $-$2.881 & 12.375 \\
## y\_error & 4,020 & 0.319 & 3.922 & $-$6.535 & 8.190 \\
## horizontal\_error & 4,020 & 5.545 & 4.139 & 0.00001 & 13.650 \\
## \hline \\[-1.8ex]
## \end{tabular}
## \end{table}
out_file <- pasteO(table_dir, params$experiment, "_discrete_summary.tex")
tex_label <- paste0("tab:", params$experiment, "_discrete_summary")</pre>
stargazer(discrete,
                  out=out_file,
                  table.placement="h",
                  label=tex_label,
                  title=gsub("_", "-", paste0("Discrete Filter Estimate for ", params$experiment, " Experiment"
                  digits.extra = 20)
##
## % Table created by stargazer v.5.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harvar
## % Date and time: Mon, Aug 15, 2016 - 04:01:20 PM
## \begin{table}[h] \centering
##
         \caption{Discrete Filter Estimate for one-mobile Experiment}
         \label{tab:one_mobile_discrete_summary}
## \begin{tabular}{@{\extracolsep{5pt}}lccccc}
## \[-1.8ex]\hline
## \hline \\[-1.8ex]
## Statistic & \multicolumn{1}{c}{N} & \multicolumn{1}{c}{St. Dev.} & \multicolumn{1}{c}{St.
## \hline \\[-1.8ex]
## x\_position & 4,020 & $-$1.413 & 2.165 & $-$4.943 & 2.978 \\
## y\_position & 4,020 & 0.869 & 2.528 & $-$4.309 & 7.595 \\
## yaw & 4,020 & 0.030 & 1.831 & $-$3.115 & 3.138 \\
```

```
## x\_variance & 4,020 & 1.407 & 0.246 & 0.076 & 2.432 \\
## y\_variance & 4,020 & 1.418 & 0.264 & 0.076 & 2.951 \\
## yaw\_variance & 4,020 & 0.397 & 0.183 & 0.090 & 1.029 \\
## x\_error & 4,020 & 0.289 & 1.153 & $-$2.371 & 4.173 \\
## y\_error & 4,020 & $-$0.051 & 1.297 & $-$3.906 & 4.120 \\
## horizontal\_error & 4,020 & 1.480 & 0.953 & 0.00001 & 4.793 \\
## yaw\_error & 4,020 & $-$0.335 & 1.579 & $-$3.141 & 3.140 \\
## \hline \\[-1.8ex]
## \end{tabular}
## \end{table}
if (params$experiment == "one_stationary_noiseless") {
    stargazer(gazebo,
              out=pasteO(table_dir, "gazebo_stationary_noiseless_summary.tex"),
              table.placement="h",
              label="tab:gazebo_stationary_noiseless_summary",
              title="Ground Truth Noiseless Odometry for Stationary Robot located at Origin",
              digits.extra = 20)
}
```