Accelerometer

Contents

Import data from text file

Script for importing data from the following text file:

```
filename: C:\Users\training\Desktop\MBD\sen.xlsx
```

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Set up the Import Options and import the data

```matlab
opts = delimitedTextImportOptions("NumVariables", 31);

% Specify range and delimiter
opts.DataLines = [3, Inf];
opts.Delimiter = ";";

% Specify column names and types
opts.VariableNames = ["ACCELEROMETERXms", "ACCELEROMETERYms", "ACCELEROMETERZms",
"GRAVITYXms", "GRAVITYYms", "GRAVITYZms", "LINEARACCELERATIONXms",
"LINEARACCELERATIONYms", "LINEARACCELERATIONZms", "GYROSCOPEXrads",
"GYROSCOPEYrads", "GYROSCOPEZrads", "LIGHTlux", "MAGNETICFIELDXT",
"MAGNETICFIELDYT", "MAGNETICFIELDZT", "ORIENTATIONZazimuth", "ORIENTATIONXpitch",
"ORIENTATIONYroll", "PROXIMITYi", "SOUNDLEVELdB", "LOCATIONLatitude",
"LOCATIONLongitude", "LOCATIONAltitudeM", "LOCATIONAltitudegoogleM",
"LOCATIONSpeedKmh", "LOCATIONAccuracyM", "LOCATIONORIENTATION",
"SatellitesInRange", "TimeSinceStartInMs", "YYYYMODDHHMISS_SSS"];
opts.VariableTypes = ["double", "double", "double", "double", "double", "double",
"double", "double", "double", "double", "double", "double", "double", "double",
"double", "double", "double", "double", "double", "double", "double", "string",
"string", "string", "double", "string", "string", "string", "categorical",
"double", "string"];

% Specify file level properties
opts.ExtraColumnsRule = "ignore";
opts.EmptyLineRule = "read";
opts.ConsecutiveDelimitersRule = "join";

% Specify variable properties
opts = setvaropts(opts, ["LOCATIONLatitude", "LOCATIONLongitude",
"LOCATIONAltitudeM", "LOCATIONSpeedKmh", "LOCATIONAccuracyM",
"LOCATIONORIENTATION", "YYYYMODDHHMISS_SSS"], "WhitespaceRule", "preserve");
opts = setvaropts(opts, ["LOCATIONLatitude", "LOCATIONLongitude",
"LOCATIONAltitudeM", "LOCATIONSpeedKmh", "LOCATIONAccuracyM",
"LOCATIONORIENTATION", "SatellitesInRange", "YYYYMODDHHMISS_SSS"],
"EmptyFieldRule", "auto");

% Import the data
tbl = readtable("C:\Users\training\Desktop\MBD\sen.xlsx", opts);
```

Error using matlab.io.ImportOptions/readtable (line 655)

Convert to output type

```
ACCELEROMETERXms = tbl.ACCELEROMETERXms;

ACCELEROMETERYms = tbl.ACCELEROMETERYms;

ACCELEROMETERZms = tbl.ACCELEROMETERZms;

GRAVITYXms = tbl.GRAVITYXms;

GRAVITYYms = tbl.GRAVITYYms;

GRAVITYZms = tbl.GRAVITYZms;

LINEARACCELERATIONXms = tbl.LINEARACCELERATIONXms;

LINEARACCELERATIONYms = tbl.LINEARACCELERATIONYms;

LINEARACCELERATIONZms = tbl.LINEARACCELERATIONZms;

GYROSCOPEXrads = tbl.GYROSCOPEXrads;

GYROSCOPEYrads = tbl.GYROSCOPEYrads;

GYROSCOPEZrads = tbl.GYROSCOPEZrads;

LIGHTlux = tbl.LIGHTlux;

MAGNETICFIELDXT = tbl.MAGNETICFIELDXT;

MAGNETICFIELDYT = tbl.MAGNETICFIELDYT;

MAGNETICFIELDZT = tbl.MAGNETICFIELDZT;

ORIENTATIONZazimuth = tbl.ORIENTATIONZazimuth;

ORIENTATIONXpitch = tbl.ORIENTATIONXpitch;

ORIENTATIONYroll = tbl.ORIENTATIONYroll;

PROXIMITYi = tbl.PROXIMITYi;

SOUNDLEVELdB = tbl.SOUNDLEVELdB;

LOCATIONLatitude = tbl.LOCATIONLatitude;
```

```
LOCATIONLongitude = tbl.LOCATIONLongitude;

LOCATIONAltitudeM = tbl.LOCATIONAltitudeM;

LOCATIONAltitudegoogleM = tbl.LOCATIONAltitudegoogleM;

LOCATIONSpeedKmh = tbl.LOCATIONSpeedKmh;

LOCATIONAccuracyM = tbl.LOCATIONAccuracyM;

LOCATIONORIENTATION = tbl.LOCATIONORIENTATION;

SatellitesInRange = tbl.SatellitesInRange;

TimeSinceStartInMs = tbl.TimeSinceStartInMs;

YYYYMODDHHMISS_SSS = tbl.YYYYMODDHHMISS_SSS;
```

Import the data

```
[input0_0] = xlsread('C:\Users\training\Desktop\MBD\sen.xlsx','A122:C160');
[input0_1] = xlsread('C:\Users\training\Desktop\MBD\sen.xlsx','AD122:AD160');
input = [input0_0,input0_1];
```

Create output variable

```
data = input;
```

Create table

```
data1 = table;
```

Allocate imported array to column variable names

```
data1.ACCELEROMETERXms = data(:,1);

data1.ACCELEROMETERYms = data(:,2);

data1.ACCELEROMETERZms = data(:,3);

data1.Timesincestartinms = data(:,4);
```

Clear temporary variables

```
clear opts tb1 input0_0 input0_1 R
% steps_acceleration
% Counts No of Steps from Acceleration Data
ax=data1.ACCELEROMETERXms;
ay=data1.ACCELEROMETERYms;
az=data1.ACCELEROMETERZms;
t=data1.Timesincestartinms;
```

```matlab
stepcount = 0;
% Changes in Acceleration Sensors will indicate steps
disp('Running')
length = sqrt(sum(ax.^2 + ay.^2 + az.^2, 4));
disp(length);
% Plot magnitude
subplot(3,4,6);
stem(t, length);
xlabel('Time (s)');
ylabel('Acceleration (m/s^2)');
title('Magnitude')
% Remove effects of gravity
magNoGrav = length - mean(length);
subplot(3,4,7);
stem(t, magNoGrav);
xlabel('Time (s)');
ylabel('Acceleration (m/s^2)');
title('No Gravity')
% Absolute magnitude
amag = abs(magNoGrav);
subplot(3,4,8);
stem(t, amag);
title('Absolute Magnitude')
xlabel('Time (s)');
ylabel('Acceleration Magnitude, No Gravity (m/s^2)');
% step counting
if(length>=2)
    stepcount = stepcount+2;
    disp('stepcount')
end
```