

# PSI3542 2023

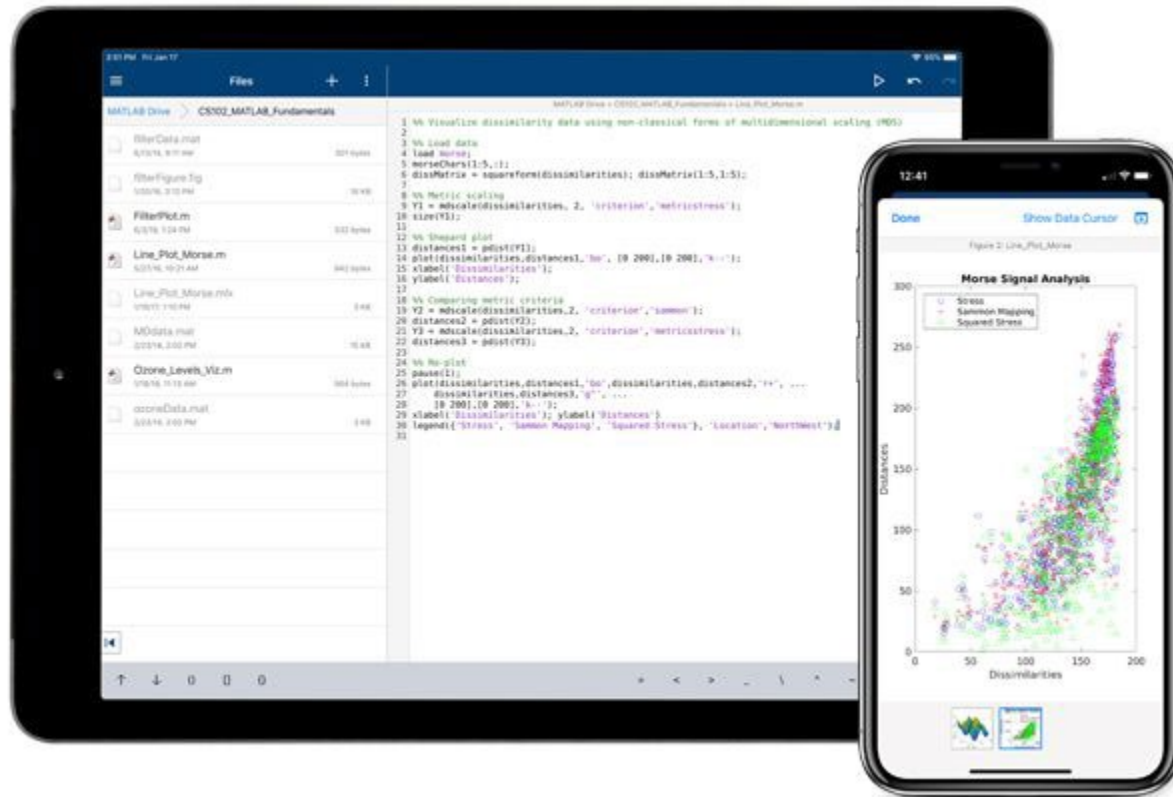
## SISTEMAS EMBARCADOS PARA IOT

AULA 3 –SMARTPHONE COMO SENSOR, MATLAB MOBILE.

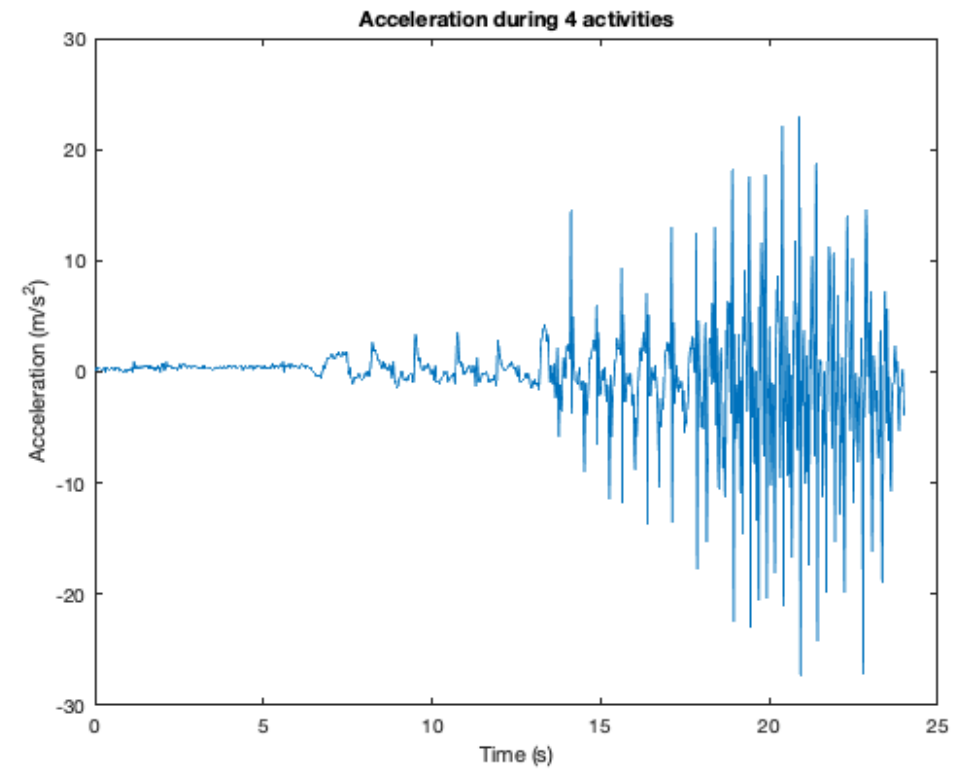
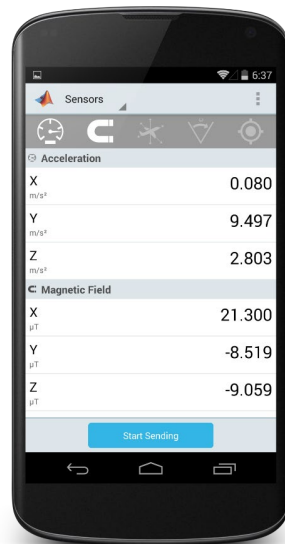
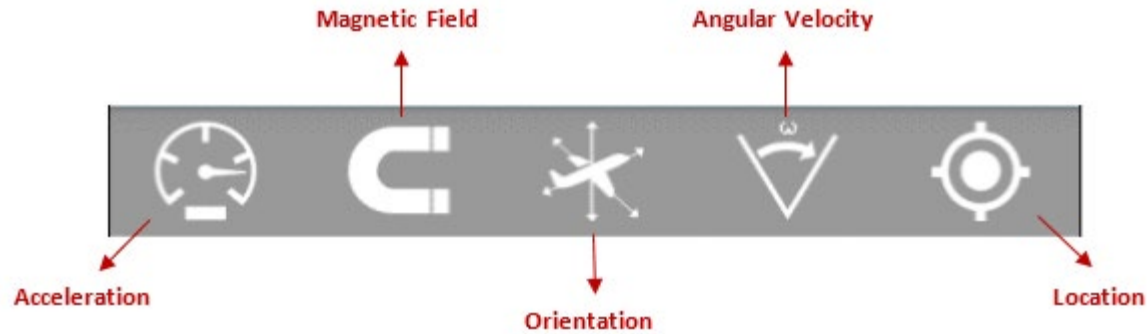
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# Smartphone como Sensor



# Aquisição Sensores Android -> Processamento Matlab

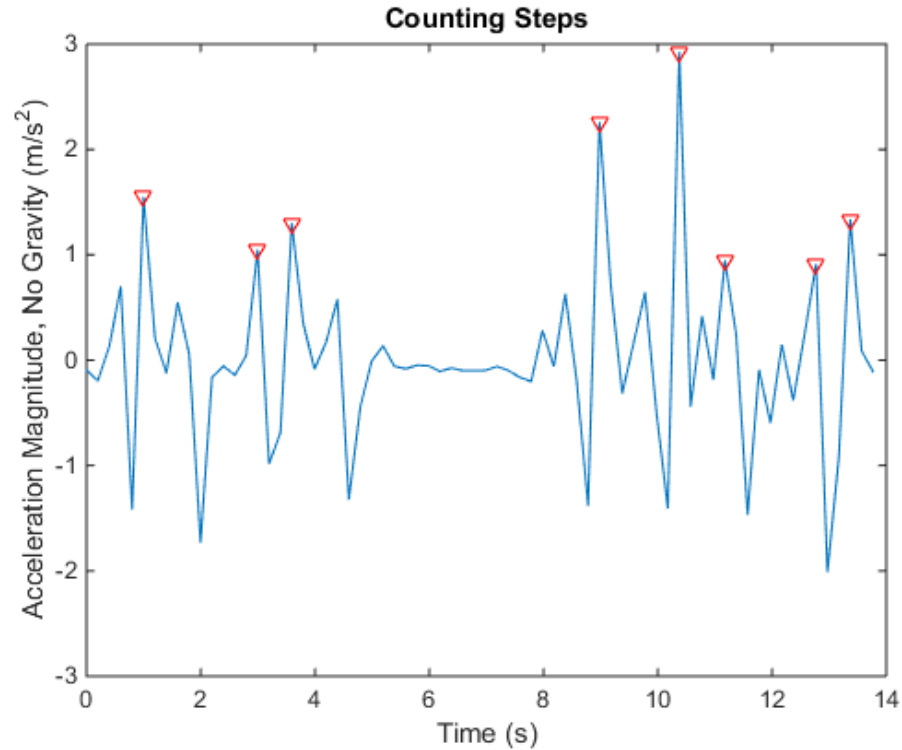


# Exemplos de Aplicação

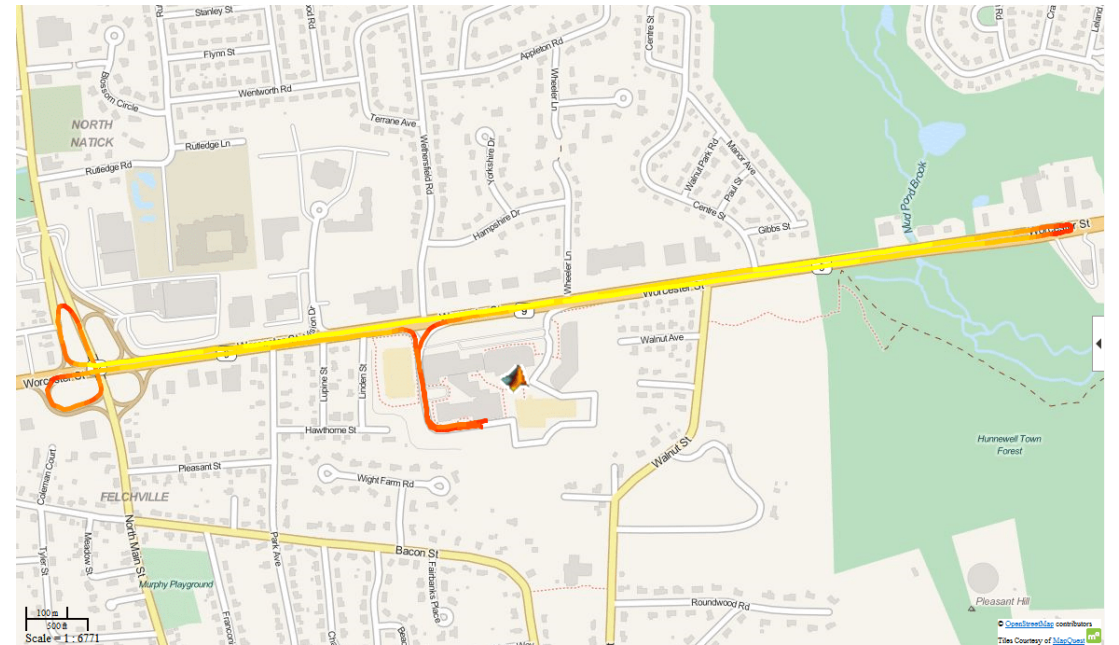
- Contador de Passos
  - <https://www.mathworks.com/help/matlabmobile/ug/counting-steps-by-capturing-acceleration-data.html>
- Mapeamento de Caminhada
  - <https://www.mathworks.com/help/matlabmobile/ug/acquire-gps-data-and-plot-your-location-and-speed-on-a-map.html>
- Detecção de Queda de Idosos

# Exemplos de Aplicação

## Contador de Passos



## Mapeamento GPS



# Matlab Mobile



The image shows the MATLAB Mobile website landing page. The header includes the MathWorks logo and navigation links: Products, Solutions, Academia, Support, Community, Events. A search bar is present with the text "Search MathWorks.com". The main content area features a large image of a hand holding a smartphone displaying a MATLAB interface. Below this, the text "MATLAB Mobile" is followed by "Connect to MATLAB from your iPhone, iPad, or Android device". There are two buttons: "GET IT ON Google Play" and "Download on the App Store". To the right, there is a video player titled "What is MATLAB Mobile?" with a 2:00 duration. Below the main content, there are four columns of features, each with an icon and a "Learn more" link:

- Connect to MATLAB Mobile**: Connect to a MATLAB session running on MathWorks Cloud. [» Learn more](#)
- Acquire Sensor Data**: Acquire data from device sensors – like the accelerometer and GPS – and analyze the data in MATLAB. [» Learn more](#)
- Capture Images, Video, and Audio**: Take pictures and record video and audio for further processing and analysis. [» Learn more](#)
- Learn and Teach**: Learn and teach math, engineering, and other subjects right from your mobile device. [» Learn more](#)

# Instalação no Dispositivo

- Matlab Mobile
  - <https://www.mathworks.com/help/matlabmobile/>
- Instalação do MATLAB MOBILE  
<https://www.mathworks.com/help/matlabmobile/ug/install-matlab-mobile-on-your-device.html>

# Instalação do Matlab Mobile

- Instalar o aplicativo
- Fazer o login na conta do Matlab
- Selecionar opção envio de dados para o Matlab (online)
- Criar um objeto mobiledev no Matlab pela linha de comandos
  - `m= mobiledev`
- Selecionar e habilitar envio de dados de sensors
  - Pode ser feito diretamente no Matlab pela linha de comandos



# Configuração do Matlab Mobile

- Stream to
  - MATLAB (in the Cloud) or Log.
- Sensor Logs
  - View logs on MATLAB Drive — Displays a list of sensor logs uploaded to your MATLAB Drive™
  - Configure (also available via Sensors > More)
    - Sensor Access— Controls MATLAB access to the sensors. The access needs to remain on to control the sensors and data streaming from MATLAB.
    - Camera — Controls MATLAB access to the cameras. This option is available when Sensor Access is enabled, and needs to remain on to control camera input from MATLAB.
    - Acquire Data in Background (Android) — This setting is off by default, but you can turn it on to continue to send sensor data when the application goes into the background on the device.
    - Send Position Data in Background (iOS) — This setting is off by default, but you can turn it on to continue to send Position data when the application goes into the background on the device. iOS background acquisition is limited to only Position data.
    - Upload Folder — The destination folder for uploading log files. The default folder is MATLAB Drive/MobileSensorData. You can change the upload folder in this setting.
    - Auto Upload — This setting determines how data log files are uploaded to MATLAB Drive.
      - Enabled — If Auto Upload is on, and you have a network connection on your device, log files are automatically uploaded to MATLAB Drive. If Auto Upload is on and you do not currently have a network connection, the files will automatically upload the next time the device detects a network connection (WiFi or cellular, if selected).
      - Disabled — If Auto Upload is off, you must manually upload the file to your MATLAB Drive. See Transfer Sensor Logs.
    - Logs on Your Device — Displays a list of sensor logs on your device. Logs that have already been successfully uploaded to your MATLAB Drive display a successful Cloud icon . When there is a failure uploading a log file, this display shows a failure Cloud icon .
    - Sample rate — Enter the sample rate to apply to the following sensors: acceleration, magnetic field, orientation, and angular velocity.

# Matlab Mobile - Sensores

<https://www.mathworks.com/help/matlabmobile/ug/sensor-data-collection-with-matlab-mobile.html>

- Microphone — Audio data, with sampling rate and recording level.
- Acceleration — Acceleration reading in X, Y, and Z coordinates, in m/s<sup>2</sup> (meters per second squared)
- Magnetic Field — Magnetic field reading in X, Y, and Z coordinates, in microtesla
- Orientation — Position reading in X, Y, and Z coordinates, in degrees, for azimuth, pitch, and roll
- Angular Velocity — Angular velocity reading in X, Y, and Z rotations, in radians per second
- Position — Data points representing latitude, longitude, speed, course, altitude, and horizontal accuracy. Position data is obtained from GPS, Wi-Fi<sup>®</sup>, or the cellular network, using whichever is available.

# No Matlab

- <https://matlab.mathworks.com/>

The screenshot displays the MathWorks account page for Sergio Kofuji. The user's profile is shown on the left with a green 'SK' avatar. The main content area features a message: "You do not have any licenses linked with your MathWorks account. Choose an option below to get started." Below this message are three cards: "Link a License" (with a "Link" button), "Trials" (with a "Try Now" button), and "Buy" (with a "Buy" button). A navigation menu is overlaid on the right side, listing various resources: MATLAB, Help Center, MathWorks, MATLAB Answers, File Exchange, Videos, Online Training, Blogs, Cody, MATLAB Drive, ThingSpeak, Bug Reports, and Community. The footer includes a location selector for "United States", social media icons, and copyright information: "© 1994-2023 The MathWorks, Inc."

# No Matlab: Comandos

- **m = mobiledev** create a mobiledev object, m
- **m.Logging = 1** enable the Logging property
- **M.Logging = 0**
- **m.Acceleration**
- **disp(m)** view the mobiledev object with the disp function
- **[a,t] = accellog(m)** Get the logged acceleration data
- **plot(t, o)**
- **discardlogs(m)**
- **clear m** delete the object.

# Stream Sensor Data

- Sensor Data Streaming
  - <https://www.mathworks.com/help/matlabmobile/ug/sensor-data-streaming-tutorial.html>
- Stream Sensor Data with MATLAB Object Properties
  - <https://www.mathworks.com/help/matlabmobile/ug/stream-sensor-data-with-mobiledev-logging-property.html>

# Process Logged Sensor Data

- <https://www.mathworks.com/help/matlabmobile/ug/use-logged-sensor-data.html>

# Creating 2-D Plots

- <https://www.mathworks.com/help/matlabmobile/ug/creating-2d-plots.html>

# Atividade 3.1

Logging Accelerometer Data



# Adquirir e Visualizar dados de Aceleração

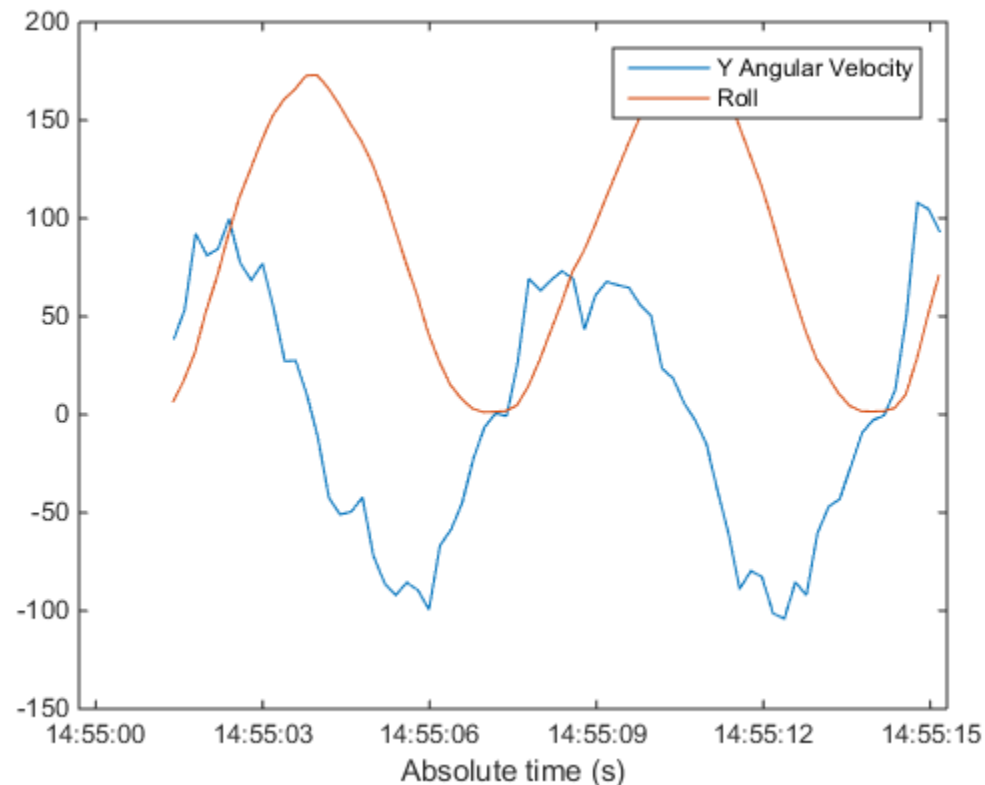
- Logging Accelerometer Data
  - <https://www.mathworks.com/help/matlabmobile/ug/logging-accelerometer-data.html>

# Atividade 3.2

Acquire and Plot Angular Velocity and Orientation Data from Your Mobile Device

# Acquire and Plot Angular Velocity and Orientation Data from Your Mobile Device

- <https://www.mathworks.com/help/matlabmobile/ug/acquire-and-plot-angular-velocity-and-orientation-data.html>

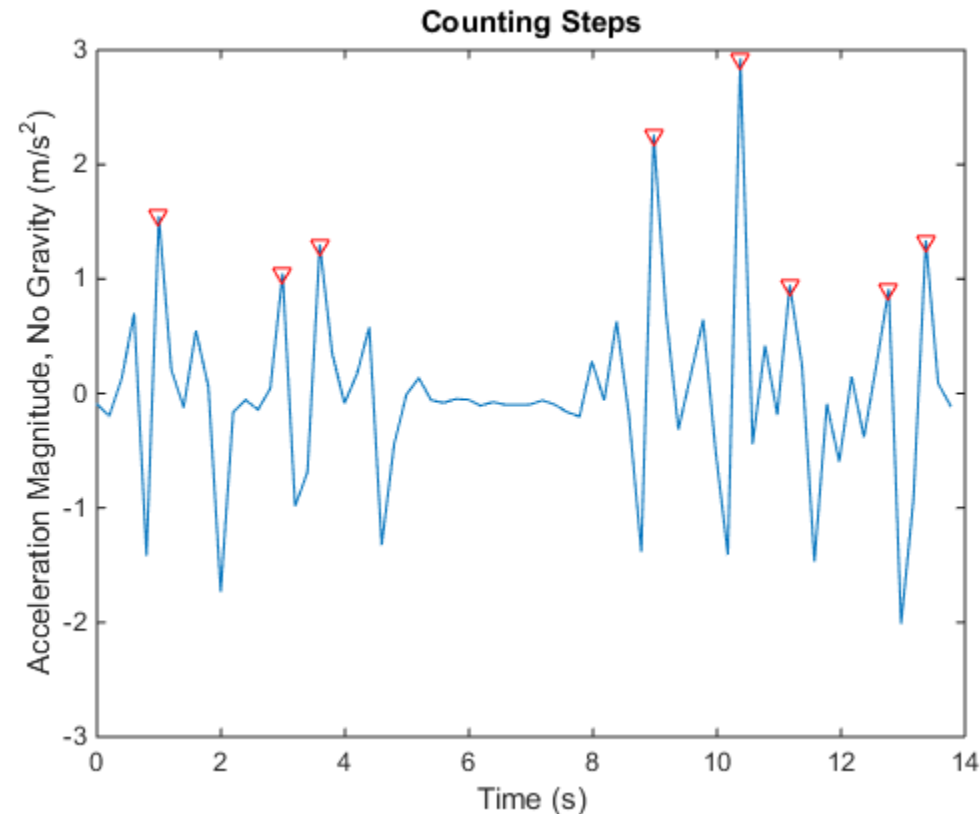


# Atividade 3.3

Counting Steps by Capturing Acceleration Data from Your Mobile Device

# Counting Steps by Capturing Acceleration Data from Your Mobile Device

- <https://www.mathworks.com/help/matlabmobile/ug/counting-steps-by-capturing-acceleration-data.html>



# Outros links

- <https://laptrinhx.com/acquire-data-from-android-device-sensors-with-matlab-mobile-2488882315/>

# Atividade 3.4

Acquire GPS Data from Your Mobile Device and Plot Your Location and Speed on a Map

# Acquire GPS Data from Your Mobile Device and Plot Your Location and Speed on a Map

