# User guide

Thank you for choosing our walking symmetry detector, our detector can help you to identify the symmetry of your walking movement, balance of your body and detector foot or leg injury. please read the following instructions carefully to get a accurate result.

Preparation:

- You need to have two phones and install the “Physics Toolbox Sensor Suite” app (Android user: find in google play store, Ios user: find in App store).
- Find a track field or a straight walk path with no slope and obstacles.
- Two sports band for phones to bind the phones around each ankle (as the picture shown below)
- Have python 3 with following libraries installed: sys, pyspark.sql, matplotlib, scipy, pandas, numpy

Data collecting:

- Start with standing position on the straight path, open your “Physics Toolbox Sensor Suite” app for both phone and put each phone inside the sports band
- Bind the phone around each ankle with phones face out, portrait and perpendicular to ground. Make sure two phone are bind at same level and fasten enough so it will not drop as you move (as the picture shown below)

- Tap on the plus button to start the record for both phone (make sure you tap the two buttons one by one within 5 seconds), and then stand up.
- Start the walking with normal walk speed and try to keep the speed constant during walking. (start the walk within 8 seconds after you tap on the first start button)
- Walk for at least 60 seconds, longer walk is preferred
- When finishing the walking, stop walking and tap the plus button to stop record (stop the record within 8 seconds after stop walking)
- Save the record with left and right side labeled, upload the left and right data to the computer

- If you wish to have more accurate data, repeat the steps above to collect more data, make sure you label each pair of data to help you pair up the data later (For example: L_1, R_1, L_2, R_2, L_3, R_3, …)

Data analysis:

- Rename each pair of walking data as the following pattern:
    - Left foot data: L_sensor_01 (if you only collect data once), L_sensor_02, L_sensor_03, … (if you have collected more data, maximum 99 sets)
    - Right foot data: R_sensor_01 (if you only collect data once), R_sensor_02, R_sensor_03, … (if you have collected more data, maximum 99 sets)
- Move all your data to one folder (name the folder as "data")
- Use the following command line to generate the analysis for your walking movement:

  Python3 walking_symmetry_detector.py data
- You will get the graph and analysis report for your walking data.

Caution:

- The preference of phones to record data are two phones with similar specifications (two Android phones or two Ios phones), otherwise that may influence the accuracy of the result.
- The walking data must contain at least 60 seconds of walk data. Otherwise the accuracy of result may be affected.
- When collecting walking data, make sure you are constantly walking at the same speed. There can be some differences in speed between the left and right feet, however, the overall speed should be constant.