Release Agreement for the Gait Recognition Image and Depth DataSet (GRIDDS)

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1 Introduction

Human gait and its underlying dynamics can reveal relevant information for a manifold of applications. For example, human gait characteristics can reveal a person's health condition, or can be used as an indicator of a person's state of mind, or in a different context of usage, gait can be used as a biometric feature, enabling the identification of individuals, based on their individual walking styles.

The Gait Recognition Image and Depth DataSet (GRIDDS) is meant to aid researchers in developing, testing and evaluating algorithms for gait-based human identification and gender recognition.

2 Environment and Data Acquisition Description

For the development of the GRIDDS dataset we had the collaboration of 35 volunteers, among students, teachers and staff from the Polytechnic Institute of Viana do Castelo (IPVC). The recording sessions occurred in June of 2018, at the IPVC facilities, in a controlled indoor environment, with a static background and with both natural and artificial lighting.

Two trajectories were defined, in a straight line across the room: one starting from the left side of the room straight to the right side, and the other on the opposite direction. The Kinect v2 sensor, supported on a tripod, was fixed at 1.8 meters high, perpendicular to the defined trajectories. Each one of the 35 volunteers completed 5 walking sequences per trajectory, at a self-selected comfortable pace, resulting in a total of 10 sequences per participant.

3 Data Specification and Availability

The dataset is composed by 35 folders (one per participant), each one containing the following collected data: a set of *color*, *depth* and *infrared* images, a set of *depth* data files, a file with the *joints' coordinates* and a file with the corresponding *timestamps* of each captured frame from the previously mentioned streams. Additionally, we included a set of *body silhouettes* images, cropped, facing all to the same side, and normalized in size, with a resolution of 80×120 pixels. Inside of each folder, the available information is in either one of the following formats:

- `vvv_ss_stream_nnn.fmt`, for the *color*, *depth*, *silhouette* and *infrared* streams;
- `vvv_ss_stream.fmt`, for the *timestamp* and *joints' coordinates* streams;

where `vvv` corresponds to the volunteers' id, `ss` to the session number, `stream` to the different available streams, `nnn` to the frame number and `fmt` to the different file formats (PNG or CSV).

For example, the file named `003_09_depth_021.csv` corresponds to the frame number `21` of the `depth` stream of the volunteer with id equals to `003`, captured during the session number `09`, saved in the `CSV` file format.

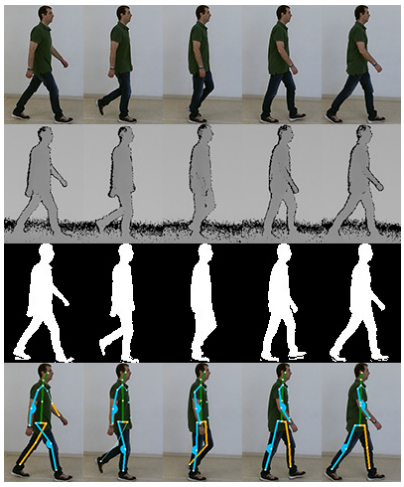

Fig. 1. Examples of normalized and aligned captured streams. First row: color images; second row: depth images; third row: body silhouettes; fourth row: skeleton representation on top of the color images.

All image files are in the Portable Network Graphics (PNG) format, varying only in the bit-depth color information: while the color images are in 24-bit, the depth images, which are in gray-scale, are in 16-bit, the body silhouettes are in 1-bit and the infrared images are in 16-bit.

The depth data files (which are in the Comma-Separated Values (CSV) format) have the same resolution as the depth images, however, in this case, each *cell* contains a numeric value corresponding to the distance (in millimeters) between the Kinect device and the object(s) detected in front of the device.

The coordinate files are also in the CSV format and have a resolution of 7 columns by ($N_{frames} \times N_{joints}$) lines, where each one of the 7 columns corresponds to: the frame number; the 3D coordinates (x,y,z) and the 2D coordinates (x,y) of the tracked joint (both in meters); and finally, the last column corresponds to the tracking state of the corresponding joint (`1` means that the joint data was inferred and confidence in the position data is lower than if it were Tracked; `0` means that the joint data was not tracked and no data is known about this joint; `2` means that the joint data was tracked and the data can be trusted). The number of lines is based on the number of captured frames (N_{frames}) multiplied by the number of tracked joints (25 joints) (N_{joints})

4 Release of the Dataset

To receive a copy of the dataset, the researcher must review and sign this license agreement and send it by mail, email (a scanned signed PDF file), or FAX to the GRIDDS' Principal Investigator (see *Section 5: Contacts*).

4.1 Consent

The researcher agrees to the following restrictions on the GRIDDS dataset:

1. **Redistribution**: without prior written approval from the GRIDDS Principal Investigator, the GRIDDS dataset, in whole or in part, will not be further distributed, published, copied, or disseminated in any way or form whatsoever, whether for profit or not. This includes further distributing, copying or disseminating to a different facility or organizational unit in the requesting institution, organization, or company.
2. **Modification and Commercial Use**: without prior approval from the GRIDDS Principal Investigator, the GRIDDS dataset, in whole or in part, may not be modified or used for commercial purposes.
3. **Requests for the GRIDDS dataset**: all requests for the GRIDDS dataset will be forwarded to the GRIDDS Principal Investigator.
4. **Publication Requirements**: those seeking to include renderings of more than 10 still frames from the GRIDDS dataset in reports, papers, and other documents to be published or released must first obtain approval in writing from GRIDDS Principal Investigator. In no case should the still frames be used in any way that could cause the original subject embarrassment or mental anguish.
5. **Citation/Reference**: all documents and papers that report on research that uses the GRIDDS dataset will acknowledge the use of the dataset by including an appropriate citation to the following:

- *Nunes, J. F., Moreira, P. M. & Tavares, J. M. R. S. (2019). GRIDDS - A Gait Recognition Image and Depth Dataset. In VipIMAGE'2019 and ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing (pp. 343–352). Springer International Publishing.*
- *Nunes, J. F., Moreira, P. M. & Tavares, J. M. R. S. (2019). Benchmark RGB-D Gait Datasets: A Systematic Review. In VipIMAGE'2019 and ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing (pp. 366–372). Springer International Publishing.*

6. **Publications to GRIDDS**: a copy of all reports and papers that are for public or general release that use the GRIDDS dataset should be forwarded immediately upon release or publication to the GRIDDS Principal Investigator.

5 Contacts

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6 Researcher Identification

[NAME OF LEGAL REPRESENTATIVE (in capitals)]

[NAME OF PERSON RECEIVING THE DATA (in capitals)]

[ORGANIZATION/INSTITUTION]

[ADDRESS]

[EMAIL]

[SIGNATURE and DATE (of legal representative)]