Nagoya University Extremely Low-resolution FIR Image Action Dataset Version 2018

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2018/09/06

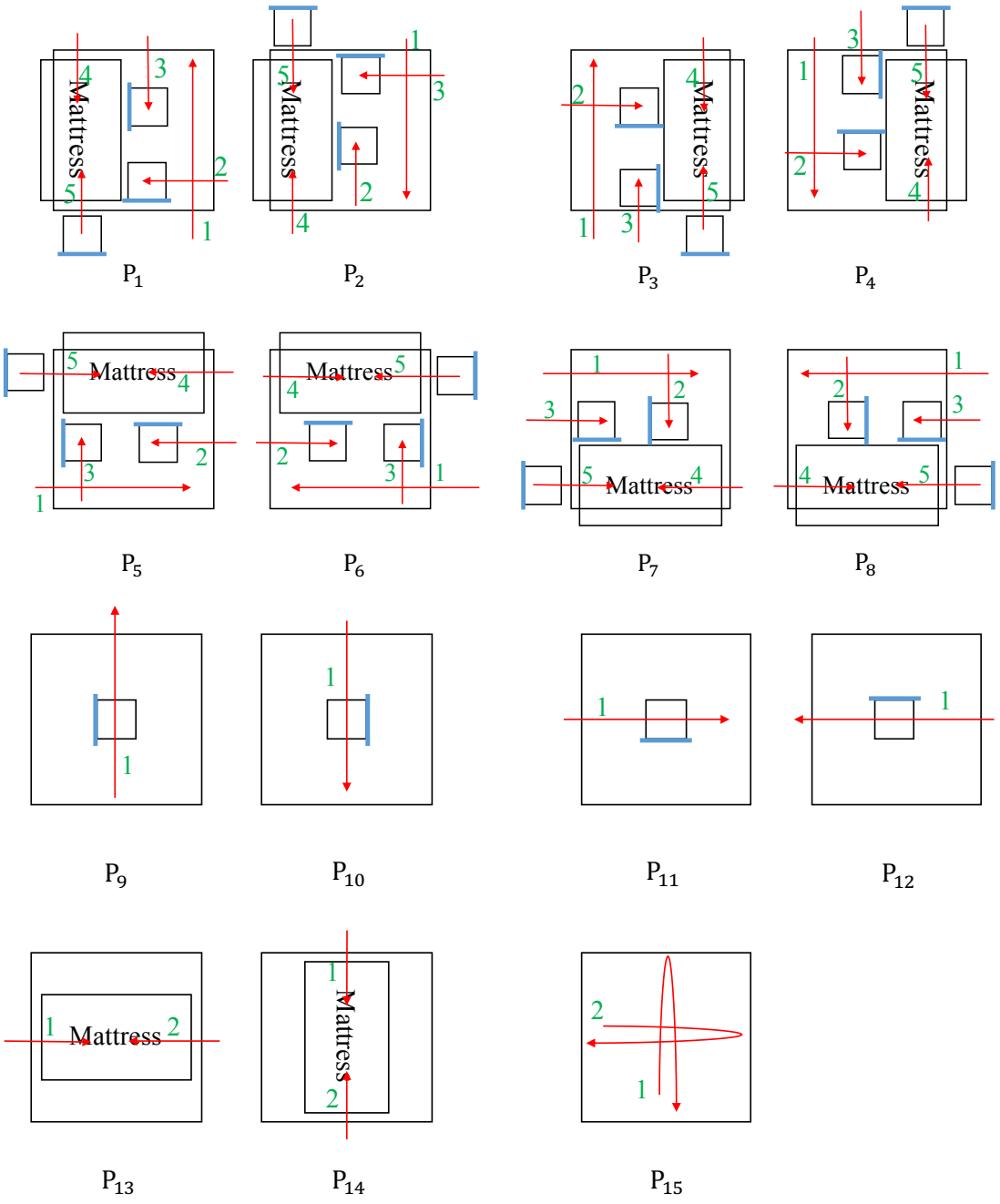
- Sensor
  - OMRON Thermal sensor D6T-1616L
- Environment
  - A mattress and chairs in a room (15 layout patterns)
  - At most one person in the environment
  - No significant heat source other than the person
- Condition

Resolution of the sensor	16×16 pixels
Sensor position	220 cm high from the floor
Observation orientation	Vertically downward
Frame rate	10 fps
Room temperature	19°C

- Dataset
  - About 400 sequences (Each sequence contains at least one action)
  - At the beginning of each sequence, several frames contain no person.
  - Two or three persons are acting in a sequence (No frames contain more than two persons at the same time.)

Group	1	2	3	4
Date	20170203	20170206	20170209	20170210
Subjects	A, B	C, D	E, F	G, H, I
# of sequences	100	100	100	100
# of total frames	35,968	35,813	35,384	48,971
Temperature	19.9–20.1°C	19.4–19.5°C	19.4–19.8°C	20.0–20.4°C

- Layout patterns



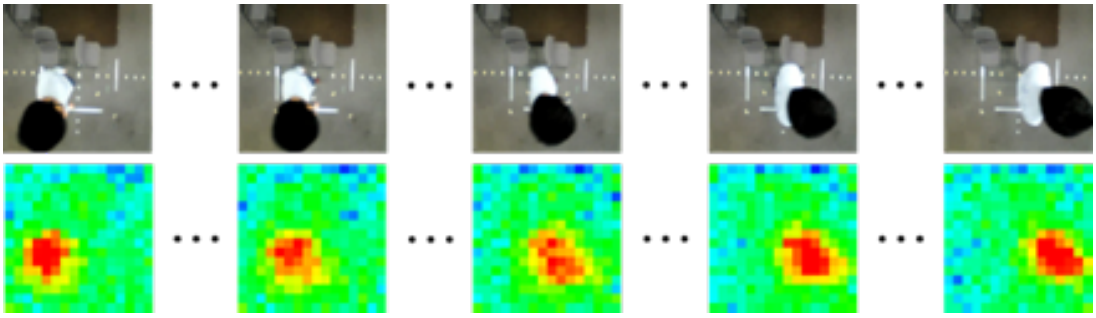
- CSV file format
  - File name format
    - “light” indicates that the data is captured in the daytime (fluorescent lamp is lit)
    - “dark” indicates that the data is captured at night time (no light source)
    - (date)_(layout pattern)_(light/dark)(ScenarioID).csv E.g.: 20170203_p5_light2.csv
  - Data format
    - Line 1 ######
    - Line 2 Column titles (time, average temperature, P000, P001, . . . , P255)
    - Line 3 and later Observations of each frame
      - Please skip the first two lines
      - Please skip the first several frames (about 15 frames), since the value is unstable just after activating the sensor.

- For reference, videos of visible light camera are also provided.
  - The visible light video and FIR sequence are not calibrated and synchronized.
  - Angles of view are different
- Annotations
  - Pairs of the start and the end frame numbers of each Action which are indicated in red font in the following section are annotated manually. Note that some frames of "walk" are not annotated.

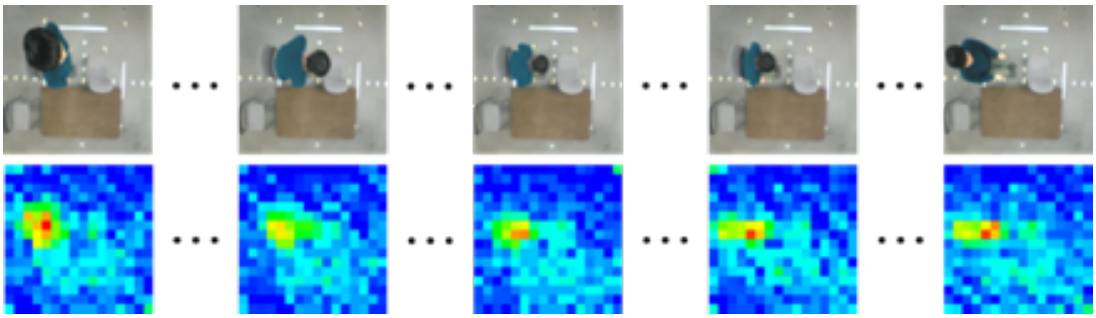
Action name	Tag name	Memo
Walking	walk, walk1, walk2	No difference between walk, walk1, and walk2
Sitting down	sitdown	
Standing up	standup	
Falling down	falling1, falling2	falling1 indicates falling down while walking falling2 indicates falling down while standing up
Stopping	sit, lie, stand	

  - File naming rule
    - Annotation file 1 (annotation_(date).csv)
      Filename, Start1, End1, Action name1, Start2, End2, Action name2, ...
      - A line contains all annotations for a sequence (file) (without PersonID)
    - Annotation file 2 (annotation_(date)_human.csv)
      Filename, Start, End, Action name, PersonID
      - A line contains an Action of a person
- Action scenarios
  - For the layout patterns P1, ..., P8
    - Scenario 1
      Start→walk→Going out
    - Scenario 2
      Start→walk→stopping (stand)→sitdown→stopping (sit)
      →standup→Stopping (stand)→walk→Going out
    - Scenario 3
      Start→walk→stopping (stand)→sitdown→stopping (sit)
      →standup→Stopping (stand)→walk→Going out
    - Scenario 4
      Start→falling1→stopping (lie)→Going out
    - Scenario 5
      Start→falling2→stopping (lie)→Going out
  - For the layout patterns P9, ..., P12
    - Scenario 1
      Start→walk1→stopping (stand)→sitdown→stopping (sit)
      →standup→Stopping (stand)→walk2→Going out
  - For the layout patterns P13, ⋯, 14
    - Scenario 1
      Start→falling1→stopping (lie)→Going out
    - Scenario 2
      Start→falling2→stopping (lie)→Going out
  - For the layout pattern P15
    - Scenario 1
      Start→walk1→Turn back→walk2→Going out
    - Scenario 2
      Start→walk1→Turn back→walk2→Going out

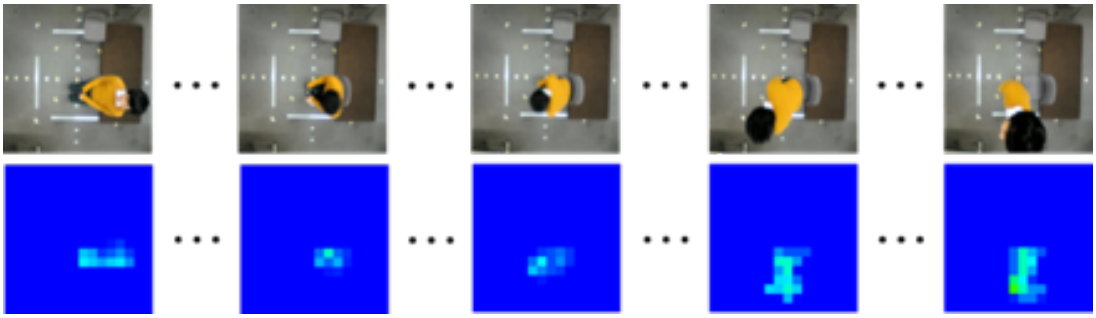
- Visualized examples
  - 20170209_p8_light1.csv (walk)



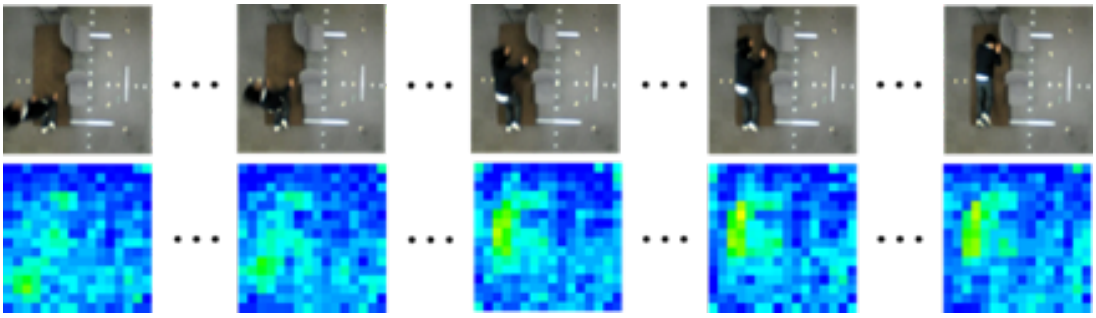
  - 20170206_p6_light3.csv (sitdown)



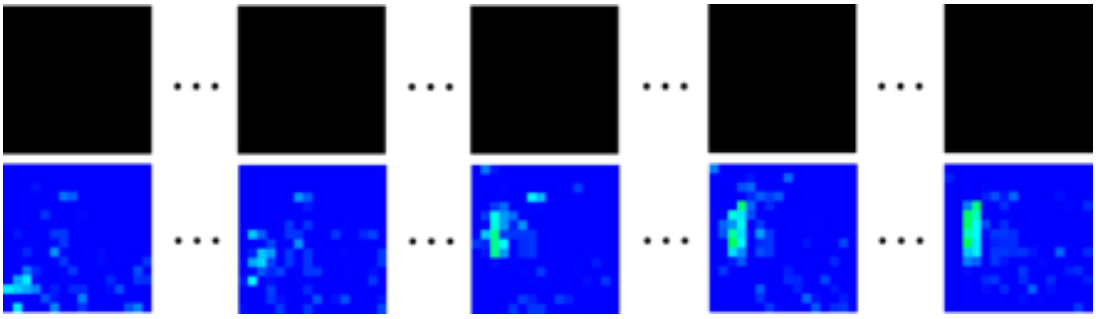
  - 20170203_p1_light3.csv (standup)



  - 20170209_p3_light4.csv (falling1)



  - 20170209_p3_dark4.csv (falling1)



- License

  This dataset is licensed by CC BY-NC-SA 4.0.

  All documents and papers that report on research that uses this dataset should acknowledge the use of the dataset by including an appropriate citation to the following publication:

  Takayuki Kawashima, Yasutomo Kawanishi, Daisuke Deguchi, Ichiro Ide, Hiroshi Murase, Tomoyoshi Aizawa, Masato Kawade
  "Action recognition from extremely low-resolution thermal image sequence"
  Proceedings of the 14th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS), 2017.

  A copy of all reports and papers that are for public or general release that use the dataset are appreciated to be forwarded upon release or publication to the authors.