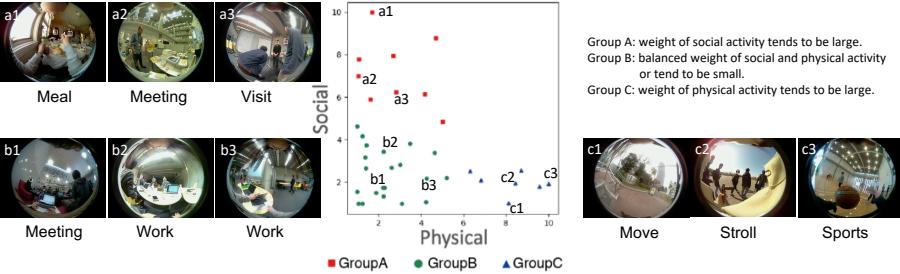


## Lifelog Visualization Based on Social and Physical Activities

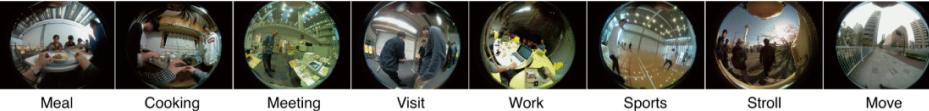
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- Visualize the amount of social and physical activity by measuring activities such as meetings, work and sports
- ① Daily activities were classified into three groups by combining the amount of social activity and the amount of physical activity
- ② The daily activities were mapped according to the engagement level of the person in the activity
- ③ The proposed method measured different activity levels of people in the same space-time
- ④ We examined how the one student's activity changes of half-day can be visualized

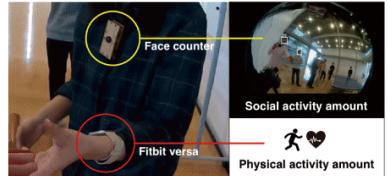


### Data on daily life at university was used

From the first-person view video, daily activities were extracted for 10 minutes each



### Measure the amount of social and physical activity



### Physical Activity Amount

The physical activity was measured using calorie consumption estimated from heart rate during exercise. Fitbit versa [1] was used. This calorie consumption is estimated according to the BMR (basal metabolic rate) calculated using height, weight, age, and gender information, and includes calories consumed at rest.

The amount of physical activity • • • integrated value of calorie consumption

### Social Activity Amount

The social activity was measured by calculating the number, proximity, and continuity of faces [2]. It is measured by detecting the face of the partner when the camera wearer performs an active behavior, without measuring the utterance or the gesture itself.

The amount of social activity...Integrated the engagement level with people



$$S = \sum_{t=1}^m \sum_{i=1}^n T_i(t) \cdot D_i(t) \quad (1)$$

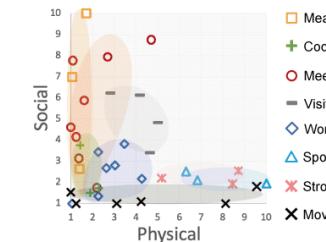
$i$ : The identification number of the detected face,  
 $T_i(t)$ : Continuity (same face detection frame, starts from 1).  
 $D_i(t)$ : Proximity (the area of the face occupying the whole).  
 $m$ : The number of measurement frames (elapsed time) up to the time  $t$ ,  
 $n$ : The cumulative number of people (number of faces) up to the time  $t$ .

$$D_i = \frac{w_i \cdot h_i}{R} \cdot 100 \quad (2)$$

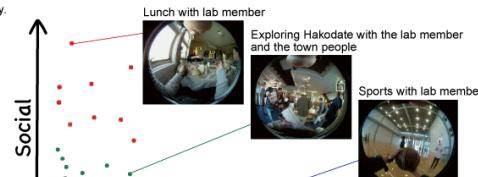
$w_i$ : The width of detected face  $i$ ,  
 $h_i$ : The height of detected face  $i$ ,  
 $R$ : Screen resolution. Unit: pixel.

### ① We classified the one student's various daily activities to see a tendency of activity levels and classes

Eight types of daily activities of one university student were mapped on a two-dimensional plane by the amount of social activity and physical activity.

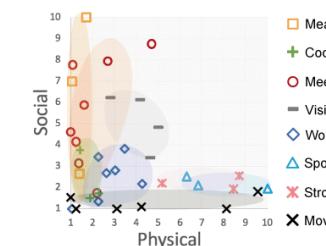


The daily activities were classified into three groups using the k-means method.

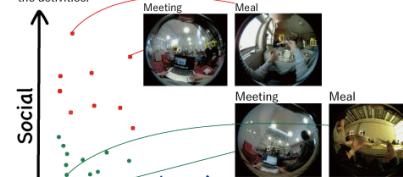


### ② In the same type of activity, map to different positions depending on how much the person participate in the activity

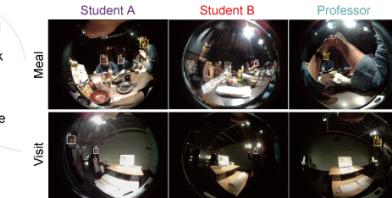
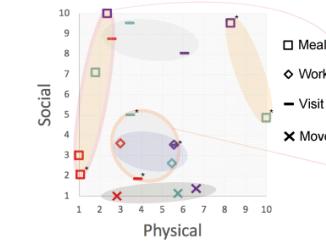
Eight types of daily activities of one university student were mapped on a two-dimensional plane by the amount of social activity and physical activity.



It were mapped to different groups depending on the engagement level in the activities. Conversely, different types of activities were classified into the same group according to the engagement level in the activities.



### ③ The activities measured when three people participated in the same activity at the same time



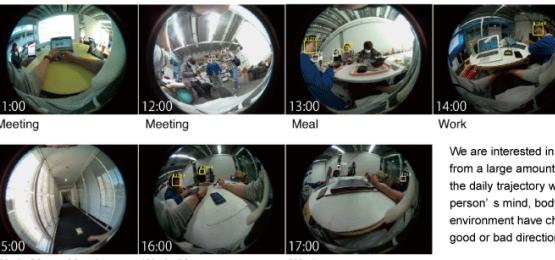
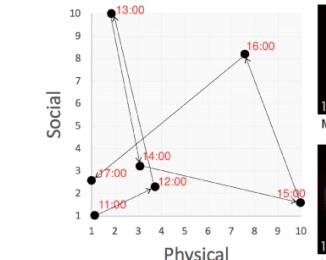
The proposed method measured different activity levels of people in the same space-time.

For example, in the meal, only student B was mapped in the lower left. And student A and the professor were drunk in the dinner, so their activity was mapped to the upper right.

When visiting the museum, there was little difference between individuals.

It is expected that there will be comfortable amounts of activity for each individual.

### ④ Concept of visualization of daily activity rhythm of individual



We are interested in visualizing from a large amount of data on the daily trajectory whether the person's mind, body, or environment have changed in a good or bad direction.