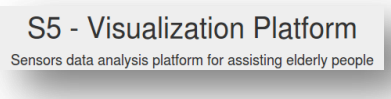
VISUALIZATION PLATFORM

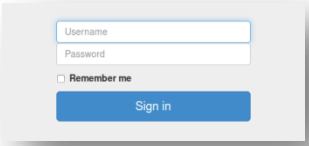
Sensors Data Analysis For Assisting Elderly People

ACCESS

1 Through the website



2 First login with your username and password



OBJECTS & DATA IMPORTS

Objects

This visualization platform aims to give you, as doctor of patients, the results and analysis of the sensors placed in you patient smart home.

Actually the website has three main visualization pages :

✓ **ADLs** : giving you information of the performed activities of daily living

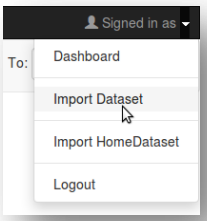
✓ **Dependency** : giving you details about the correlations between the different performed activities

✓ **Sensors** : giving you information about the geographic positions and the raw sensors data

Data imports

➢ Activities Dataset

On the navigation bar, click on “Import Dataset” as follow :



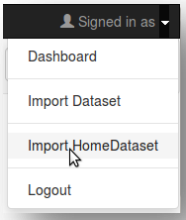
An import system page opens and enables you to upload the activities dataset of you patient.

Be careful to respect the format of the file that as to be according to the following scheme “**date time activity status**” as shown below :

```
2008-02-25 00:19:32 brush teeth start
2008-02-25 00:21:23 brush teeth end
2008-02-25 00:22:46 go to bed start
```

➢ Home and Sensors Dataset

On the navigation bar, click on “Import HomeDataset” as follow :



An import system page opens and enables you to upload **three files** : the first being the map of you patient home (**image file**), the second informing about the sensors coordinates (in pixel) With the format “**sensorName[tab]width[tab]height**”, the last one giving the sensors data (with header) with format “**startDatetime[tab]endDatetime[end]SensorName**”

1

3

tart time	End time	Sensor
2008-02-25 00:20:14	2008-02-25 00:22:57	Hall-Bedroom door

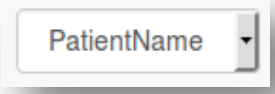
2

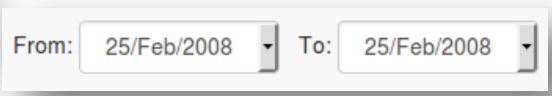
rontdoor	519	716
Dishwasher	710	130
ToiletFlush	253	562

SELECTIONS

➢ Patient Selection

➢ Dates Selection





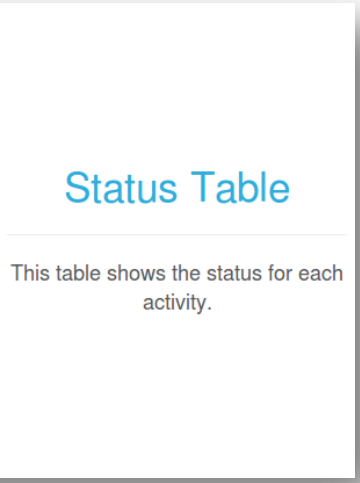
Possible from the navigation bar

Visualization Platform : ADLs page (default page)
First Graph : Status Table

GRAPH : STATUS TABLE

Example of Status Table :

Event	LastTime
Go to bed	
Use toilet	
Brush teeth	



PARAMETERS

Measures

1. **Last time green dot :** the last time the activity has been performed is less than 0.5 days.
2. **Last time orange dot :** the last time the activity has been performed is between 0.5 and one day.
3. **Last time red dot :** the last time the activity has been performed is more than one day.

Filters

4. **Patient :** selection of the patient from the navigation bar. Result given for this patient.
5. **Dates :** selection of a date of start and a date of end to consider activities data.
   Not useful here as it is compared with the current date time.

UTILIZATION

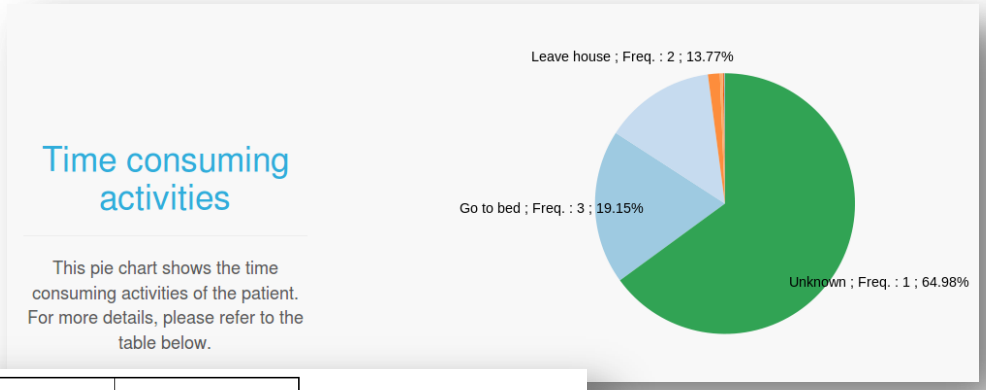
How to read the graph?

This graph provides information about the last time an activity has been performed by the patient. If the dot is red, it may means that an anomaly has occurred.

Visualization Platform : ADLs page (default page)
Second Graph : Time Consuming Activities Pie Chart

GRAPH : PIE CHART

Example of a pie chart and its details table:



Event	Frequency	Duration
Brush teeth	3	0.06 %
Get drink	3	0.04 %
Go to bed	3	19.15 %
Leave house	2	13.77 %
Prepare breakfast	2	0.14 %
Prepare dinner	1	1.48 %
Take shower	2	0.36 %
Use toilet	11	0.03 %
Unknown	1	64.98 %

Details

This table details the above pie chart. For each event, you can find the frequency of occurences and also the proportion of time it represents compared to the period you consider (whether day, week or month).

PARAMETERS

Measures

1. **Event :** the performed activity during the considered period
2. **Frequency :** the occurrences of the performed activity during the given period.
3. **Duration :** the proportion of time it represents regarding to the selected period (in percents).

Filters

4. **Patient :** selection of the patient from the navigation bar. Result given for this patient.
5. **Dates :** selection of a date of start and a date of end to consider activities data.

UTILIZATION

How to read the graph?

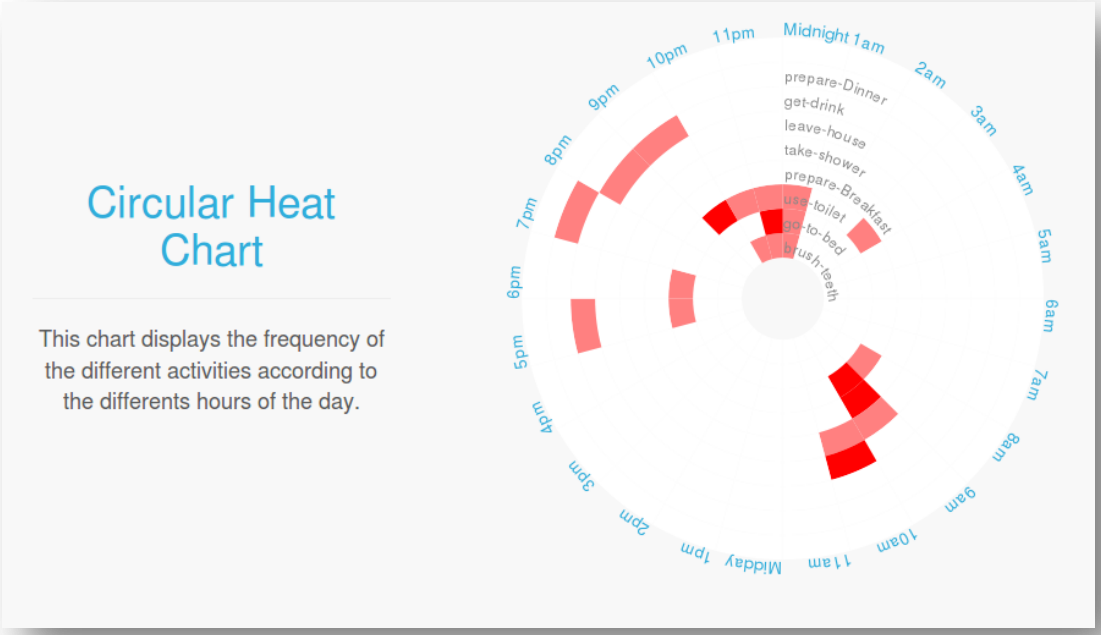
These graph shows you how the time is spent during a selected period. The table completes the pie chart by given all the results numbers included the smallest ones. You will then be able to check how often an activity is realized by the patient in a given time.

Visualization Platform : ADLs page (default page)

Third Graph : Circular Heat Chart

GRAPH : CIRCULAR HEAT CHART

Example of a circular heat chart:



PARAMETERS

Measures

1. **Hour of the day :** from midnight to 11pm.
2. **Activity:** the performed activity during the considered period
3. **Frequency Gradient Color :** the occurrences of the performed activity at the given hour of the day during the considered period

Filters

4. **Patient :** selection of the patient from the navigation bar. Result given for this patient.
5. **Dates :** selection of a date of start and a date of end to consider activities data.

UTILIZATION

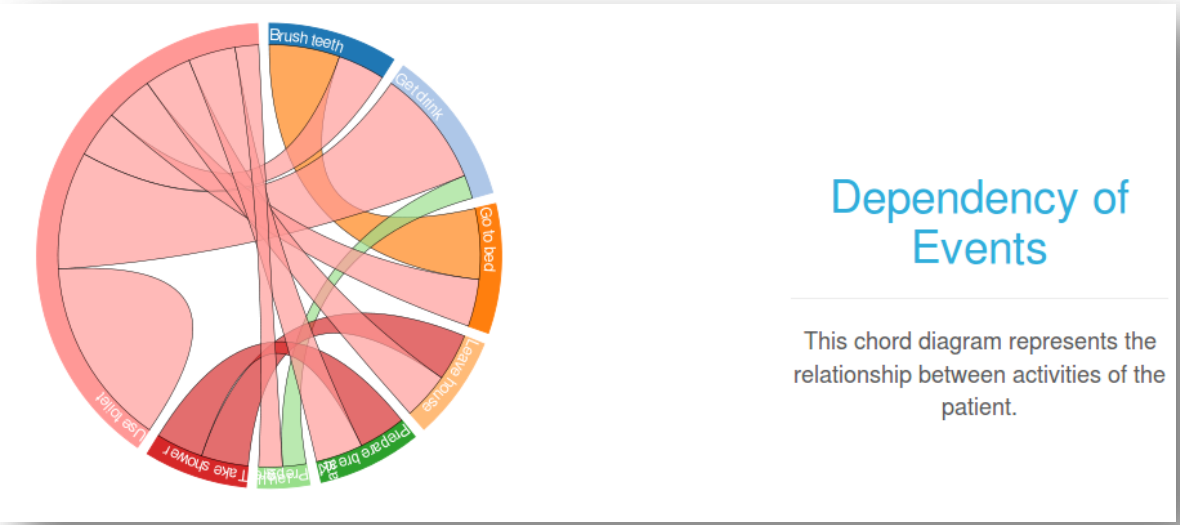
How to read the graph?

The graph enables you to check the habits of your patient and deduce a potential typical day. Indeed you can for instance see when the patient is used to going to bed or eating.

Visualization Platform : Dependency page
First Graph : Chord Diagram

GRAPH : CHORD DIAGRAM

Example of a chord diagram:



PARAMETERS

Measures

1. **Relation between activities branch :** activities directly related (one happens juste after the other) and frequency of this relation thanks to the length of the branch
2. **Activity:** the performed activity during the considered period

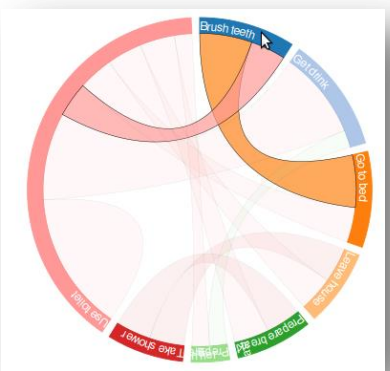
Filters

3. **Patient :** selection of the patient from the navigation bar. Result given for this patient.
4. **Dates :** selection of a date of start and a date of end to consider activities data.

UTILIZATION

How to read the graph?

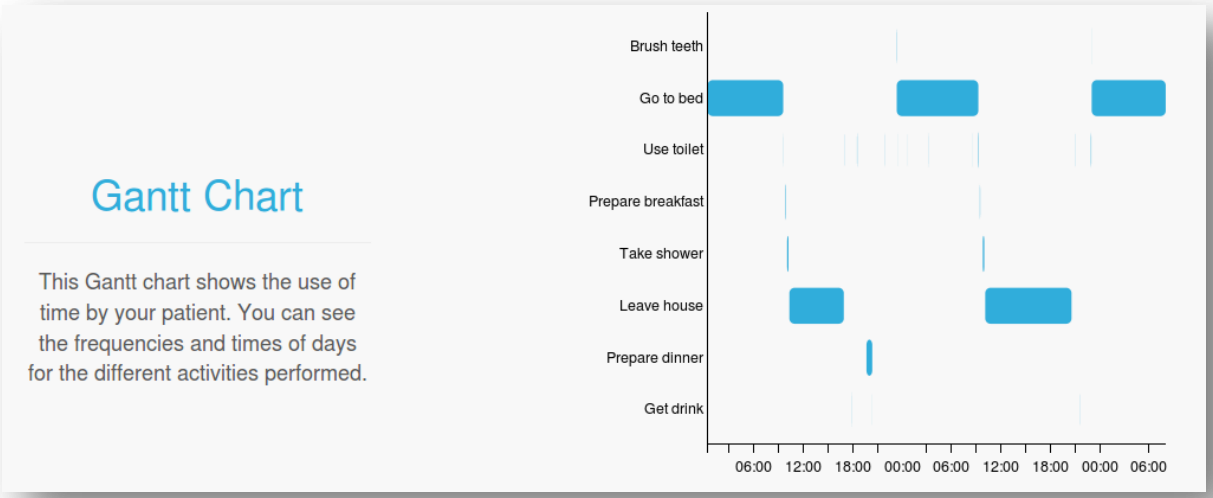
First you can focus on the relation of one activity by clicking On it. It will fade the other relations away. Then the length of the branch on the considered activity side represents how often it is realized after the linked activity and, the same way, the length of the same branch on the linked activity side displays the times the considered activity is followed by this one (inversed relation)



Visualization Platform : Dependency page
Second Graph : Gantt Chart

GRAPH : GANTT CHART

Example of a gantt chart:



PARAMETERS

Measures

1. **Time :** time of day and thus duration during which activity is performed.
2. **Activity:** the performed activity during the considered period

Filters

3. **Patient :** selection of the patient from the navigation bar. Result given for this patient.
4. **Dates :** selection of a date of start and a date of end to consider activities data.

UTILIZATION

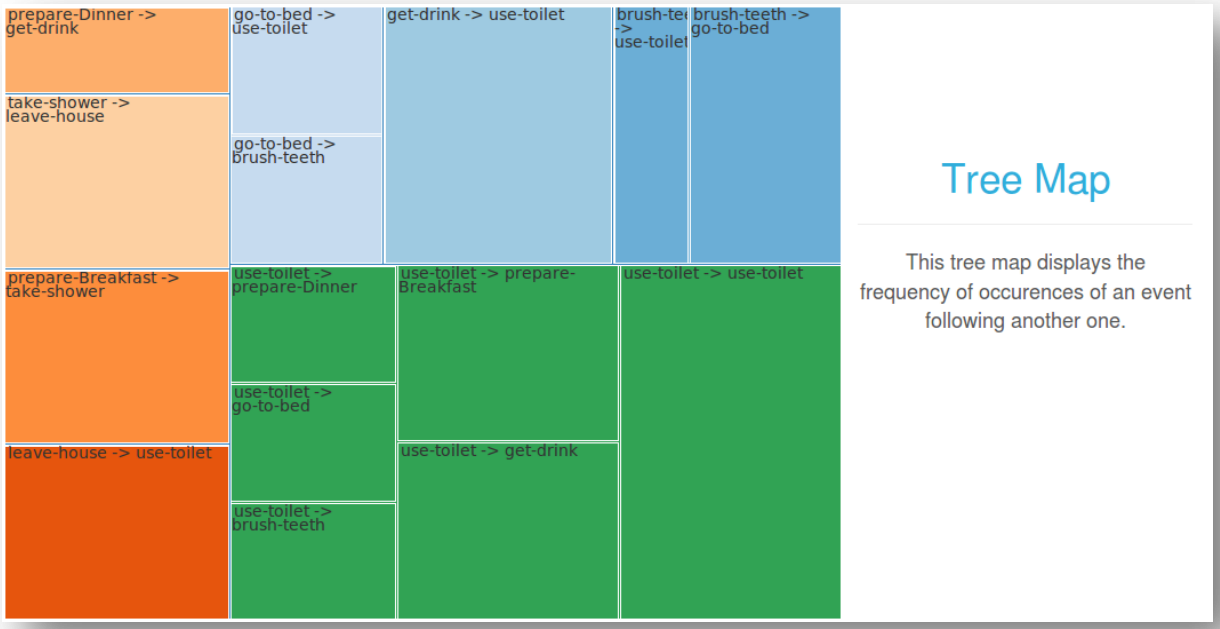
How to read the graph?

This Gantt graph enables you to see the sequences of the activities during a given period. Each colored segments represents the duration of the activity. We can thus read the date and time of start and end of this activity too.

Visualization Platform : Dependency page
Third Graph : Tree Map

GRAPH : TREE MAP

Example of a tree map:



PARAMETERS

Measures

1. **Activity:** the performed activity during the considered period given by a specific color.
2. **Next Activity Frequency:** the occurrences of the activity following the considered activity given by the size of the rectangle.

Filters

3. **Patient :** selection of the patient from the navigation bar. Result given for this patient.
4. **Dates :** selection of a date of start and a date of end to consider activities data.

UTILIZATION

How to read the graph?

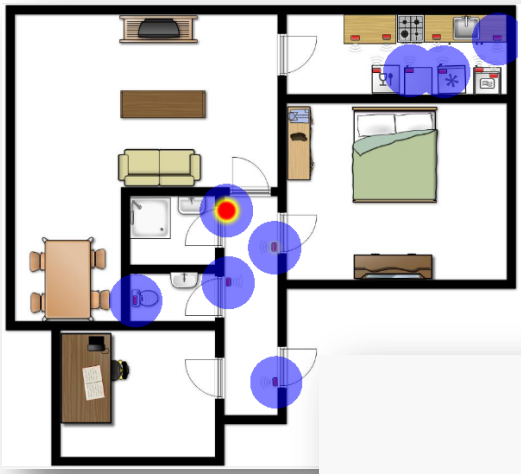
Each color represents a performed activity during the considered period. The rectangles represents the sequence frequency of another activity following this one. The sum of all the rectangles of the same color give logically the frequency of the corresponding activity.

On a click or hoover in a rectangle we can see the frequency value, its proportion (in percent) regarding the parent activity and finally its proportion regarding all rectangles.

Visualization Platform : Sensors page
Graph : Heat Map

GRAPH : HEAT MAP

Example of a heat map and its details table:



Heat Map

This map gives the frequency of the geographic points of the patients in a given time.

Details

This table details the above heat map. For each sensor, you can find the frequency of occurences and the average duration of the sensor activation.

Sensor	Frequency	AvgDuration
Hall-Toilet door	3	96 sec.
Hall-Bathroom door	7	5 sec.
Plates cupboard	2	4 sec.
Frontdoor	1	5 sec.
ToiletFlush	3	1 sec.
Freezer	3	9 sec.
Washingmachine	3	39 sec.
Hall-Bedroom door	4	1016 sec.

PARAMETERS

Measures

1. **Sensor :** the activated sensor during the considered period.
2. **Frequency :** the occurrences of the sensor activation given by a gradient color on its geographic point on the map.
3. **AvgDuration :** the mean time the sensor is activated during the considered period.

Filters

4. **Patient :** selection of the patient from the navigation bar. Result given for this patient.
5. **Dates :** selection of a date of start and a date of end to consider activities data.

UTILIZATION

How to read the graph?

The heat map will show you the most frequent position taken by the patient at a given period. The frequency is represented by a gradient color going from the blue (cold color) for few passages to yellow for medium passages to red for very frequent positions. A details table completes the heat map graph by giving for each sensor the frequency exact value and also providing the average time the sensor stays activated during the considered period.