STARS4ALL
Deliverable
D5.6

STARS4ALL Live Dashboards
(final version)

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Document Information

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Abstract (for dissemination) This deliverable describes the graphical widgets developed to visualize data generated in STARS4ALL. This contains data from sensors and crowdsourcing module.

Keywords dashboard, widget, indicators

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D5.6: Live Dashboards
# Project Information

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1. Introduction

A dashboard is a panel where a user can see information updated continuously, and sometimes control instruments. Our development approach is to create a set of graphical widgets (HTML + JS) that can be inserted in webpages. These widgets will visualize information from: i) the sensor API (D4.9); ii) the and ii) the crowdsourcing module that will be developed in WP5 at M18.

Widgets can be inserted in webpages using the <iframe> label or importing its code, although this last option is more complicated due to a possible conflicts produced by external libraries. This methodology provides more flexibility to the platform, and allows their inclusion in external websites. Also, it will be able to share them in social networks.

The widgets' distribution in a webpage forms what we named a dashboard. Dashboards are an essential part in the community engagement strategy as it can be read in the deliverable D3.1.2

In Section 2, we describe a set of widgets to represent photometers values.

In Section 3, we describe a set of widgets to represent some parameters of the crowdsourcing module.

This new version of the document change the URLs of the examples present in the document.

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1 Sensor Management API (final release)
2 Community Engagement Strategy
2. Photometer widgets

The European Photometer Network initiative (LPI 6) is devoted to monitor the light pollution of European villages. This network will extend the current existing professional photometer network to a citizen-based network of low-cost photometers developed in our project. More information can be found in D4.1.

For displaying photometers results, we have taken inspiration in:
- The Spanish Light Pollution Network\(^4\) (static chart)
- Light Pollution Global Monitoring Network\(^5\) (dynamic chart)
- A test webpage for our photometers\(^6\) (static chart)

The images in the first and third websites are generated every day at 7:00 am and inserted in a webpage. In our case, using the sensor API (described in D4.9 and in apiary\(^7\)), data from photometer will be able to display on real time. For this purpose, the following javascript libraries have been used to build our chart:
- D3.js. This library is used to manipulate data from documents, in our case, JSON format
- Crossfilter.js. This library is used to explore multivariate datasets.
- Dc.js. This library is used to visualize data in form of charts. This library is compatible with the previous libraries.

All widgets developed can be found on a Github repository\(^8\).

2.1 Tess Locations Maps widget

This widget shows the photometers’ distribution on a Google Maps. Its status is written on the colour (green -> ok, red -> failure) and a popup with info is showed when user clicks the marker.
Next widget is a variation of the previous one. In this case, a heatmap is represented indicating the magnitude of sky brightness registered by each device. The average value during the last night is used to calculate the “heat”:

![Figure 2: Heatmap widget](image)

Markers show the location of the photometers. As network is expanded, a more realistic heatmap will be represented.

### 2.2 Magnitude widgets

#### 2.2.1 Single magnitude

This widget visualizes the magnitude value measured by an specific photometer during an interval of time. Its configuration can changed using the following query parameters:

- **name** is the photometer’s id.
  - Default value: stars1
- **begin** is the beginning of the interval expressed in UTC (Coordinated Universal Time) and are formatted as "yyyy-MM-ddThh:mm:ssZ" according to ISO 8601. It is used with the end parameter to define a time interval.
  - Default: Previous day
- **end** is the end of the interval expressed in UTC (Coordinated Universal Time) and are formatted as "yyyy-MM-ddThh:mm:ssZ" according to ISO 8601. It is used with the end parameter to define a time interval.
  - Default: Current Day
- **accuracy** is the number of observations per hour. Note that photometers take one sample each 30 minutes.
  - Default: 120

**Example -1**: evolution of magnitude in Coslada, Spain (photometer:stars1) during the last night.

http://dashboards.stars4all.eu/tess-chart/tess-magnitude.html?name=stars1 (Fig. 3)

**Example -2**: evolution of magnitude in Coslada, Spain (photometer:stars1) during the last night with an accuracy of 6 observations per hour

http://dashboards.stars4all.eu/tess-chart/tess-magnitude.html?name=stars1&accuracy=6 (Fig. 4)
As can be observed, no changes in the chart's shape are appreciated. This parameter reduces considerably the memory and the time of the request.

Example 3 – evolution of magnitude in Coslada, Spain (photometer:stars1) during an interval of three days.

http://dashboards.stars4all.eu/tess-chart/tess-magnitude.html?name=stars1&accuracy=6&begin=2018-03-10T18:00:00Z&end=2018-03-11T07:00:00Z (Fig. 5)
2.2.2 Multi magnitude chart

This widget visualize allow users to explore the magnitude information of all photometers in a same component. Users can click in a photometer (left) and see the values registered, on the right side of the widget. Same url parameters than previous charts are applied.

Example:

http://dashboards.stars4all.eu/tess-chart/tess-magnitude-list.html (Fig. 6)
3. Crowdsourcing widgets

In STARS4ALL, crowdsourcing activity is related to the development and deployment of a cross-validation mechanism and associated tools to make sense of the contributions coming from the participant citizens and to compute suitable indicators to evaluate the effectiveness of the crowdsourcing activities.

Tasks of this module are not concluded yet but we have developed some widgets to show results related to stats of users and tasks. One objective in STARS4ALL is to integrate data generated by projects such as Cities At Night. This initiative is run in Crowdcrafting platform. Widgets developed have been tested using the results generated by this project.

3.1 Numbers widget

This widget shows a number that represents number of tasks or users. It accepts some query parameters to configure it such as:

- **color**, is the RGB code in hexadecimal without the #.
  - Default value: ffffff (black)
- **size**, is the size of the font.
  - Default value: 64px
- **project** is the project id. It shows only the related records of this project.
  - Default value: All registered projects
- **begin** is the beginning of an interval expressed in UTC (Coordinated Universal Time) and are formatted as "yyyy-MM-dd" according to ISO 8601. It is used with the **end** parameter to define a time interval.
  - Default value: First record registered
- **end** is the end of an interval expressed in UTC (Coordinated Universal Time) and are formatted as "yyyy-MM-dd" according to ISO 8601. It is used with the begin parameter to define a time interval.
  - Default value: Last record registered

Example:

http://dashboards.stars4all.eu/crowdsourcing-chart/crowdsourcing-number.html
http://dashboards.stars4all.eu/crowdsourcing-chart/crowdsourcing-number.html?size=32&color=ff0000

(Fig. 7)

![Number widget example](http://dashboards.stars4all.eu/crowdsourcing-chart/crowdsourcing-number.html)

Figure 7: Number widget

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9 http://www.citiesatnight.org
10 http://www.crowdcrafting.org

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3.2 Pie Widget

This widget can be configured with these options:

- **begin** is the beginning of an interval expressed in UTC (Coordinated Universal Time) and are formatted as "yyyy-MM-dd" according to ISO 8601. It is used with the end parameter to define a time interval.
  - Default value: First record registered
- **end** is the end of an interval expressed in UTC (Coordinated Universal Time) and are formatted as "yyyy-MM-dd" according to ISO 8601. It is used with the end parameter to define a time interval.
  - Default value: Last record registered
- **width** is the width of the chart.
  - Default value: 768
- **height** is the height of the chart.
  - Default value: 480
- **parameter** is the variable that you want to show (tasks or users)
  - Default value: tasks

Example 1 shows a comparative between Cities At Night projects

http://dashboards.stars4all.eu/crowdsourcing-chart/crowdsourcing-pie.html (Fig. 8 left side)
http://dashboards.stars4all.eu/crowdsourcing-chart/crowdsourcing-pie.html?parameter=users (Fig. 8 right side)

![Pie chart example](image)

Figure 8: Pie widget – Left: Tasks, Right: Users

Example 2 – shows data generated in different years.

http://dashboards.stars4all.eu/crowdsourcing-chart/crowdsourcing-pie.html?begin=2015-01-01&end=2015-12-31 (Fig. 9 left side)
http://dashboards.stars4all.eu/crowdsourcing-chart/crowdsourcing-pie.html?begin=2016-01-01&end=2016-12-31 (Fig. 9 right side)
3.3 Time series widget

This widget visualizes comparatives between projects during an interval of time. Same options than previous widget can be applied.

**Example 1** - number of tasks executed in 2015 (see Fig 10 left)


**Example 2** – number of tasks executed in 2016 (see Fig 10 right)