

Visualizing Personal Activity Logs

Hung-li Chen (Henry) [henry129129@hotmail.com]

Topic

The proposed project falls into the realm of personal analytics. By investigating personal activity log data, we are interested in exploring the pattern of time expenditure on activities of interest. These activities all belong to goals that one commits to or wants to do over a long time span, for instance, take a course at school, exercise more, or learning a new language or instrument. While some are commitments that are both urgent and important, many of them could be classified as important but not urgent, and one goal of this visualization project is to allow us to explore when these activities are performed, and how much time one spends on these activities.

Personal Experience

My experience with the domain of personal data analytics is limited, but like most others, I have been engaged in time management activities. In terms of technical expertise, I am an experienced programmer with a little bit of experience working with user interfaces.

Goal Description

The target users for the proposed tool are people who are relatively new to time logging and time planning. The goal is to help them reflect on their current state of performance on the time usage on long term commitments and goals, and to provide a starting point for future planning and/or further data gathering. The tool may also be used to track progress and provide a way to check the impacts of behavioural changes.

Reflection is key in the process of personal improvement, because it informs further decisions. If someone is currently spending twenty hours on long term commitments, a plan that requires forty hours a week may just be too much. The fact that many long term goals do not have to be completed in the short term made such plans even harder to implement. By providing a tool to explore past working schedules, we want to help the users answer the questions such as “Am I committing enough to long term goals?”, “How much long term goal may I fit to my current life style?” and “Does my current work schedule match my priorities?”. With the answer of these questions, the users may decide to rearrange commitments in accordance to priorities, collect further data to find ways to expand the total hours spent, or maybe simply be content with the state of performance and be careful not to over commit.

Data Description

The dataset is a personal activity log recorded over a span of three months. This log contains entries with the following attributes: start date time, end date time, project name, and activity name. The time segments denoted by the entries do not overlap, and the time segments only cover portions of the day that are devoted to long term activities of interest. Also, most of the activities recorded do not have a fixed schedule, and several are optional since they are goals without formal commitment.

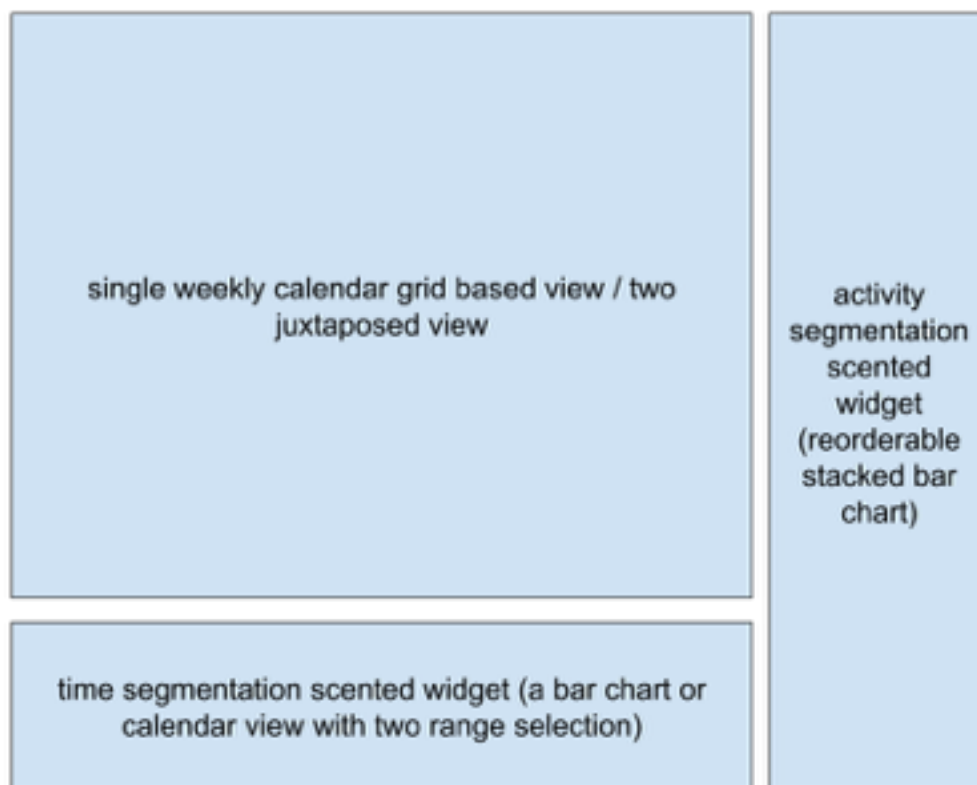
Task Description

The main task to support is to provide users with an overview of their schedule and to help them identify patterns for the time spent on long term activities of various time span and subsets of activities. Example patterns may include the amount of time spent in subsets of the activities, the distribution of time spent on different activities over days, weeks and months, and changes

over time and with respect to fluctuations of available time budget. A concern one may have with this task is that this information maybe readily available to the user without the proposed tool. We argue otherwise for the following three reasons 1) the schedules of the activities are flexible and many decisions are made on spot, 2) the available time for long term commitments fluctuates due to the state of short term tasks and events, 3) the composition of commitments changes as new commitments are made and as old commitments are completed. These dynamics combined make it difficult for the users to cognitively construct an overview of their activity schedule, especially when they have been focusing on their activities.

A second task to support is comparison of patterns over different time frames. The users should be able to see the difference between their activity schedules before and after schedule changes and commitment changes, and should be able to monitor their progress over time, and check if the schedule meets with the expectation.

Proposed Visualization



There are two selection widgets in the design. The bottom widget is a scented widget that allows the user to choose ranges of weeks to filter data on a bar chart or a annual calendar view heat map that encodes the derived data of total hours of activities in that week. The widget located on the right is a scented widget that allows the user to choose and filter on tasks. It is represented as a stacked bar chart where the length of each component encodes the derived total number of hours of the task in the selected time frame or the percentage of the project in the total number of hours. The projects are labelled and encoded with distinct hues. The default

selection on entry is choosing the last week with data available, with all the projects in that week selected.

The main view of the system is the weekly calendar grid at the top right. When only one week, or only one project is selected, the log entries are mapped to the grid as calendar entries with hues consistent with the hue mapping in the widget. This provides an overview of a specific week. When user selects a time range of longer than one weeks, this view becomes a heat map with a monotonic colour map that shows the derived data of how many times this minute is utilized in the time span. This information does not only inform that the user is usually busy at that time, but also inform that the user can usually find available time and motivation to work on long term tasks at that time. In this view, the user can select a range of time within a day, and the composition of projects will be reflected as a second stacked bar chart in the right scented widget.

The user may also split the main view into two juxtaposed grids that are the same as the main view. During multiple view, the right widget will show two stacked bar chart instead of one, and the bottom widget would contain two range selectors instead of one.

Scenario of Use

Henrik is a busy student who is interested in doing many things in his life, including reading extracurricular books, learning to play the trumpet and do well in school. He has tried to setup schedules for doing all of the above, but found that it is hard to stick with the schedules. To learn more about what he may achieve, he recorded the task category, start time, and end time each time he does those tasks for ten weeks, and would like to learn more about when he usually find time and motivation to do these tasks.

He loaded his data into the tool, and saw when and what he did this past week for these tasks. He saw that he found three hours last week to practice his instrument and found three hours last week to read extracurricular books. To learn more, he chooses all the past ten weeks, and find concentrated region of about thirty minutes before midnight, and he hypothesize the reason to be that he practice playing instruments before going to sleep. He quickly verifies it by looking at only the music practice data by choosing the project in the right widget. He then choose the reading task, and see that he reads in short intervals of time throughout different afternoons, and find that he usually finds about three hours in total from those small intervals. From this information he thoughts that given his current life style, he should only commit to three hours of studies that could be done in short intervals and about three hours of activities that could be done before midnight.

Proposed Implementation

The project is to be implemented using D3 targeting usage on the browser. The implementation is going to be completely front-end with data file loaded along with the scripts. The project milestones contains the following

- Nov 21 - Initial literature review; Clean the data; Design software architecture.
- Nov 28 - Ramp up with d3; Implement the layout, static heat map and static bar chart.
- Dec 05 - Implement data filtering and aggregation for the widgets and link the views.
- Dec 12 - Complete first prototype; Evaluate the prototype with walkthroughs.
- Dec 15 - Be ready for the presentation.
- Dec 17 - Finish and submit the final paper.

Related Work

Personal visual analytics and similar concepts regarding visualizing personal data have been proposed in the literature along with suggested research directions. Huang et al. [1] provided design dimensions and discussed their perspectives on the future of this line of research. Dey et al. [2] also discussed the use of personal information and provided a stage-based model for reasoning about personal informatics that is not limited to visual analysis.

There has also been some work specific to time log data, Barata et al. [3] presented a system visualizing computer usage history and in their user study found that users could use the system to introspect about their lives. Yang et al. [4] discussed their early work on designing visualization systems for life log data for different platforms and considered different usage scenarios.

There are also several visualizations provided by commercial time tracking tools such as toggle [5] embedded in reporting features. Typical features include bar charts for the total time usage, pie charts for the task composition, and interactions through segmentation with various filters.

Bibliography

[1] Huang, D., Tory, M., Aseniero, B. A., Bartram, L., Bateman, S., Carpendale, S., ... & Woodbury, R. (2015). Personal visualization and personal visual analytics. *Visualization and Computer Graphics, IEEE Transactions on*, 21(3), 420-433.

[2] Li, I., Dey, A., & Forlizzi, J. (2010, April). A stage-based model of personal informatics systems. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 557-566). ACM.

[3] Barata, G., Nicolau, H., & Gonçalves, D. (2012, May). Applinsight: what have I been doing?. In *Proceedings of the International Working Conference on Advanced Visual Interfaces* (pp. 465-472). ACM.

[4] Yang, Y., Lee, H., & Gurrin, C. (2013, April). Visualizing lifelog data for different interaction platforms. In *CHI'13 Extended Abstracts on Human Factors in Computing Systems* (pp. 1785-1790). ACM.

[5] Toggl, toggl.com