CYCLES AND (A)SYMMETRY EXPLORING THE DESIGN OF SHAREABLE PERSONAL VISUALIZATIONS

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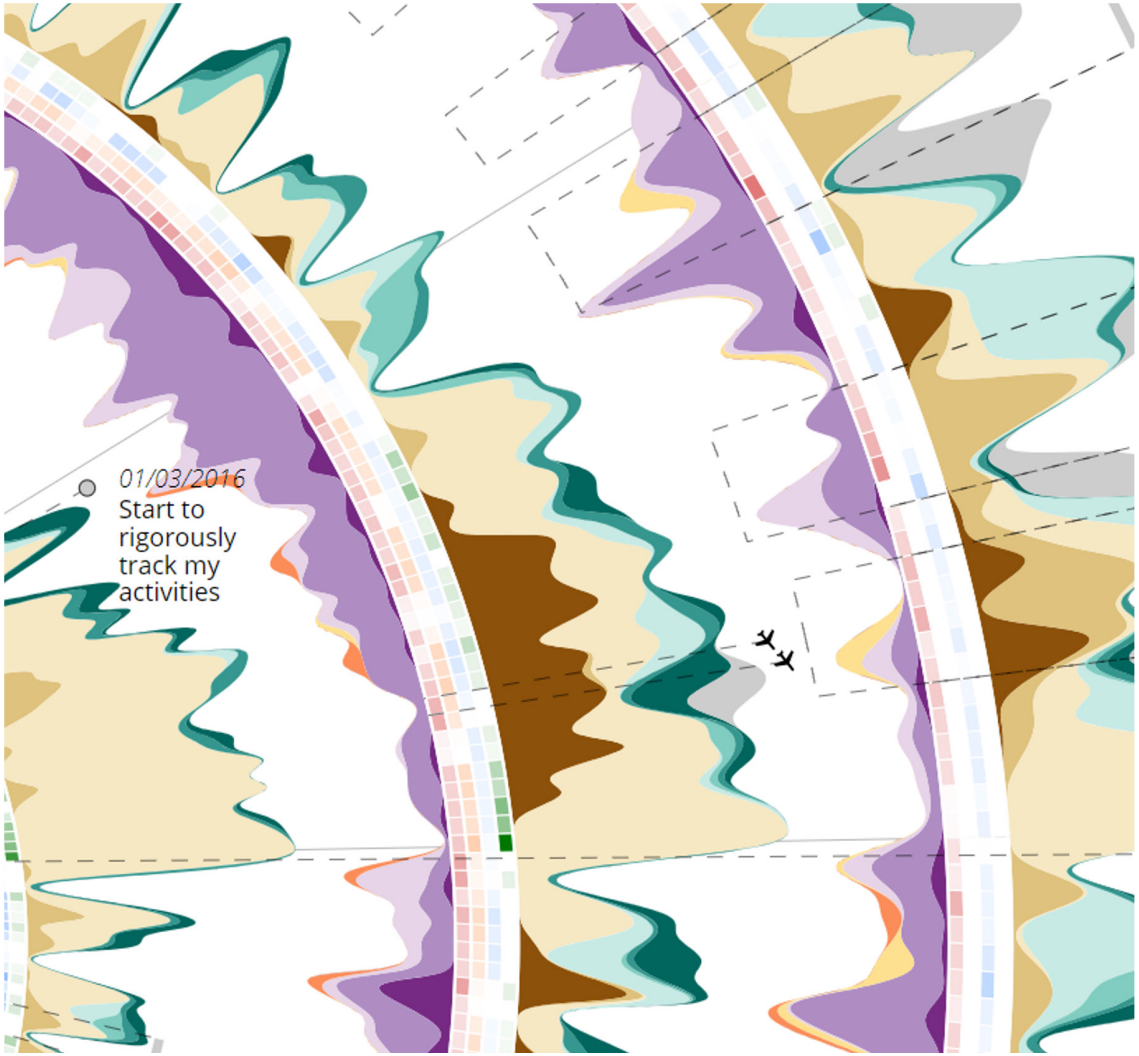


Abstract
Personal data is increasingly seen as a political and economic weapon, used by evil industries against the will of individuals. But personal data is also a resource of great value as it provides a medium to reminisce, to reflect and to share personal stories that shape our identities. I explore with this visualization design the peculiarities of visualizing personal data for the purpose of private reminiscing and public sharing.

Authors Keywords
Personal visualization; introspection; awareness; identity; life patterns.

VISAP'18, Annotated portfolios and annotated projects.

When visualizing personal digital data, people have little choice but to use generic tools like Microsoft Excel or Tableau Software. While such tools provide state of the art techniques to visualize data accurately and efficiently, they encourage the creation of standard, generic charts that lack expressivity.

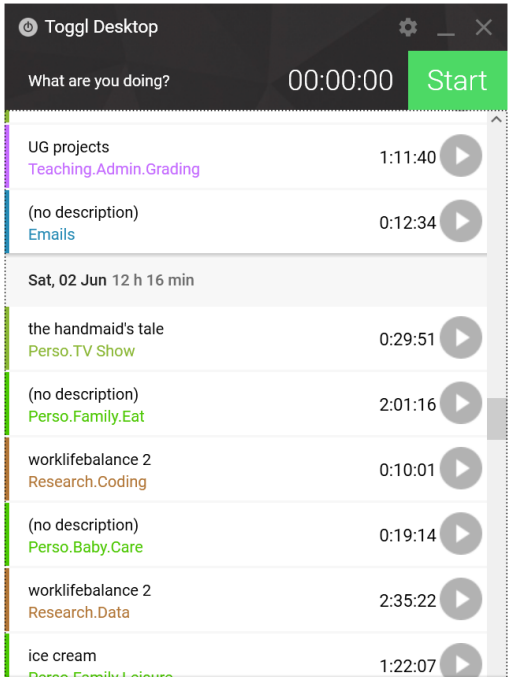
In this project, I explore the process of designing a relatable, aesthetically pleasing, intriguing visualization; a visualization that is as personal as the data it represents; and a visualization whose purpose is to support the telling of personal stories; from telling stories to a semi-private audience like colleagues at a conference to telling more intimate stories to close relatives who might have shared some moments of my life.

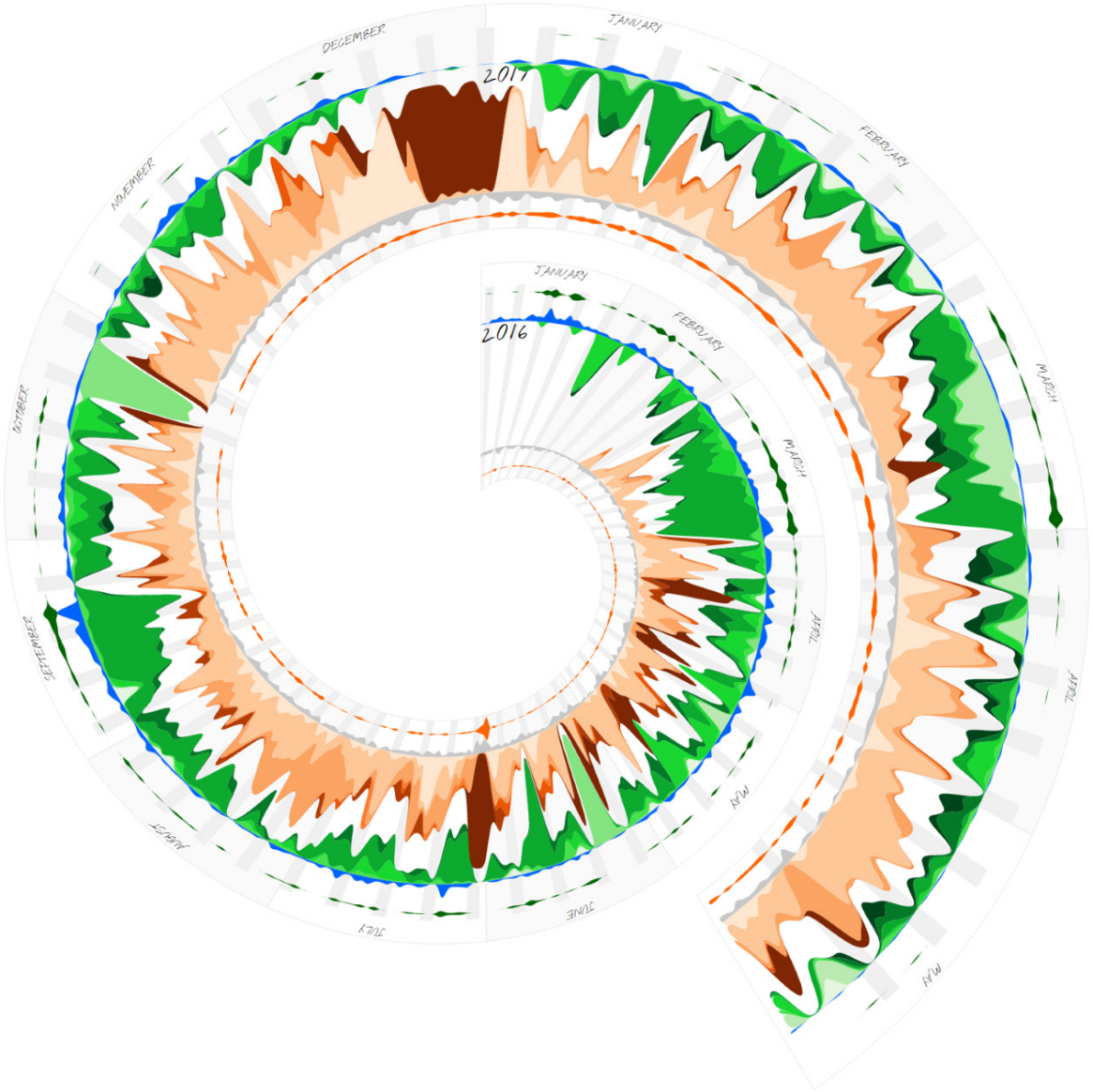
The data I collected for this project consists of work-related data and personal data. The backbone of this visualization is the manual activities I logged for the past two years and a half. To log my activities, I used the Toggl application. The application consists of a simple timer that makes it possible to record activities in real time activities and to associate to each activity a description and a category.

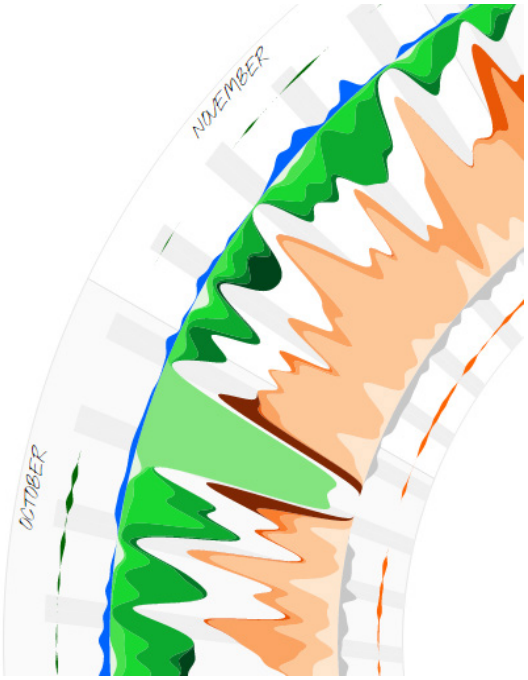
The application exists on desktop and mobile, making it easy to log personal activities outside of working hours; this has the side effect of being very annoying to people around.

Although the data is very detailed, it also contains sensitive or private information. A crucial step in the process of designing this visualization was to create a script to generate a series of data files of different levels of aggregation. The data file I use for this project differentiates only 17 different categories, which are higher level categories I created to regroup over 70 low-level categories of activities. In this process I realized that my life is quite hierarchically organized. For example, the categories Research.Coding, Research.Writing and Research.Data belong to the same Research category. The resulting dataset is a multidimensional time-series with 365 data points per year that each contains durations (for each category of activity), integers (e.g., for number of emails sent and number of steps) and subjectively significant events (manual annotations)

I start by describing some iterations of the visualizations.



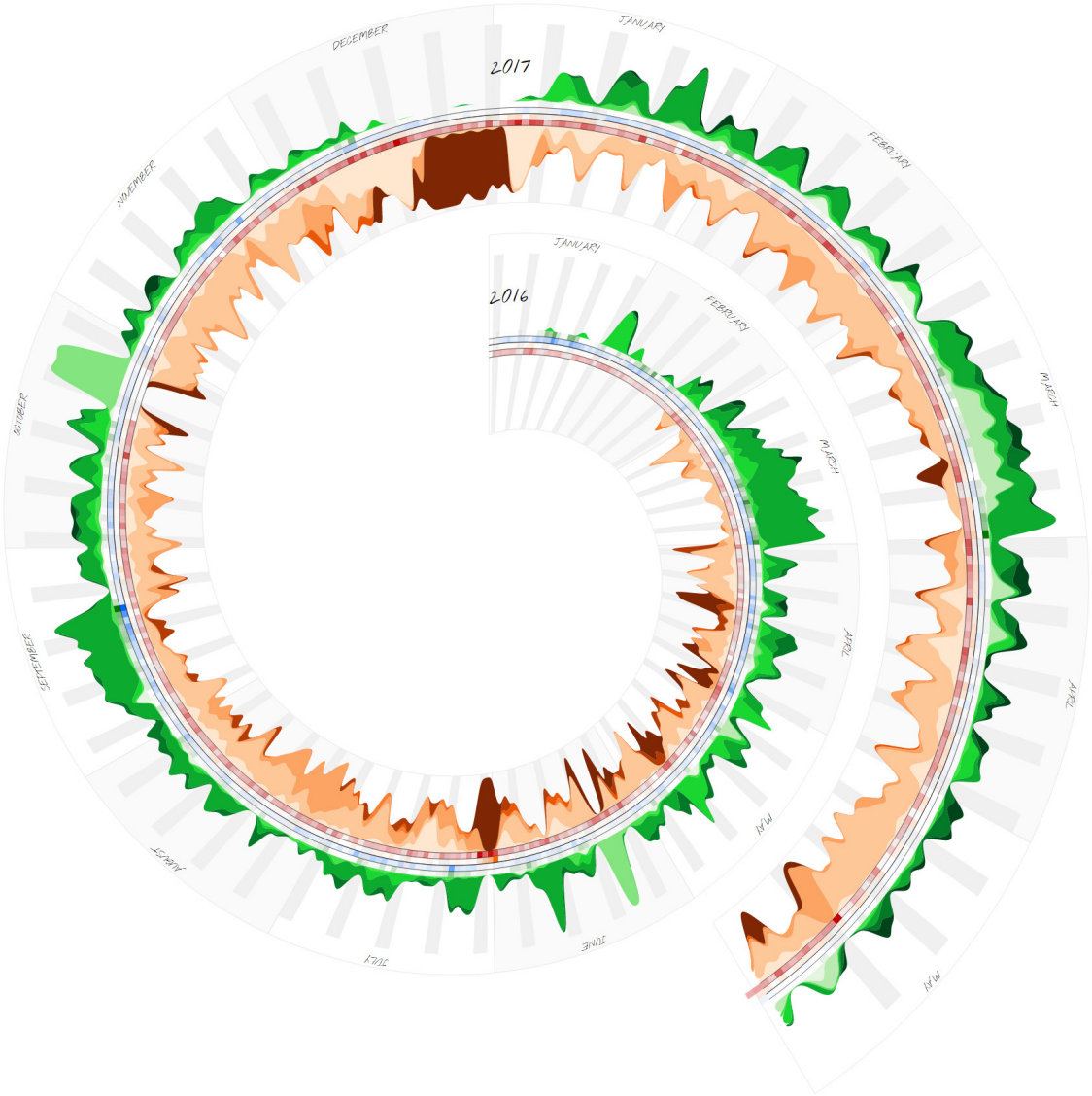


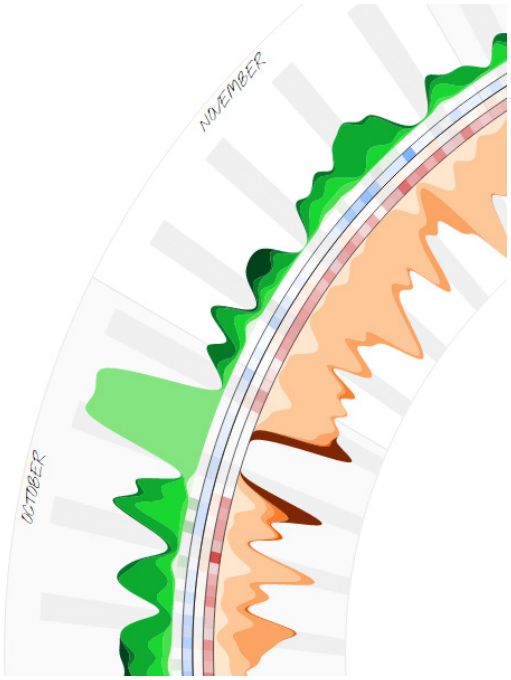


#1 | INSIDE-OUT LAYOUT

The streams in green represent work-related activities. The streams in orange represent personal activities. This layout emphasizes the complementarity of work and life activities, and large amounts of white space between the two streams indicate irregularities. For example, in the close-up view above the IEEE VIS conference at the end of October notably contains very few white space – sign of little non-logged activity (such as sleep).

In this design, the small filled harts in orange, grey, blue and green represent the daily numbers of steps, floors, emails and SVN commits.

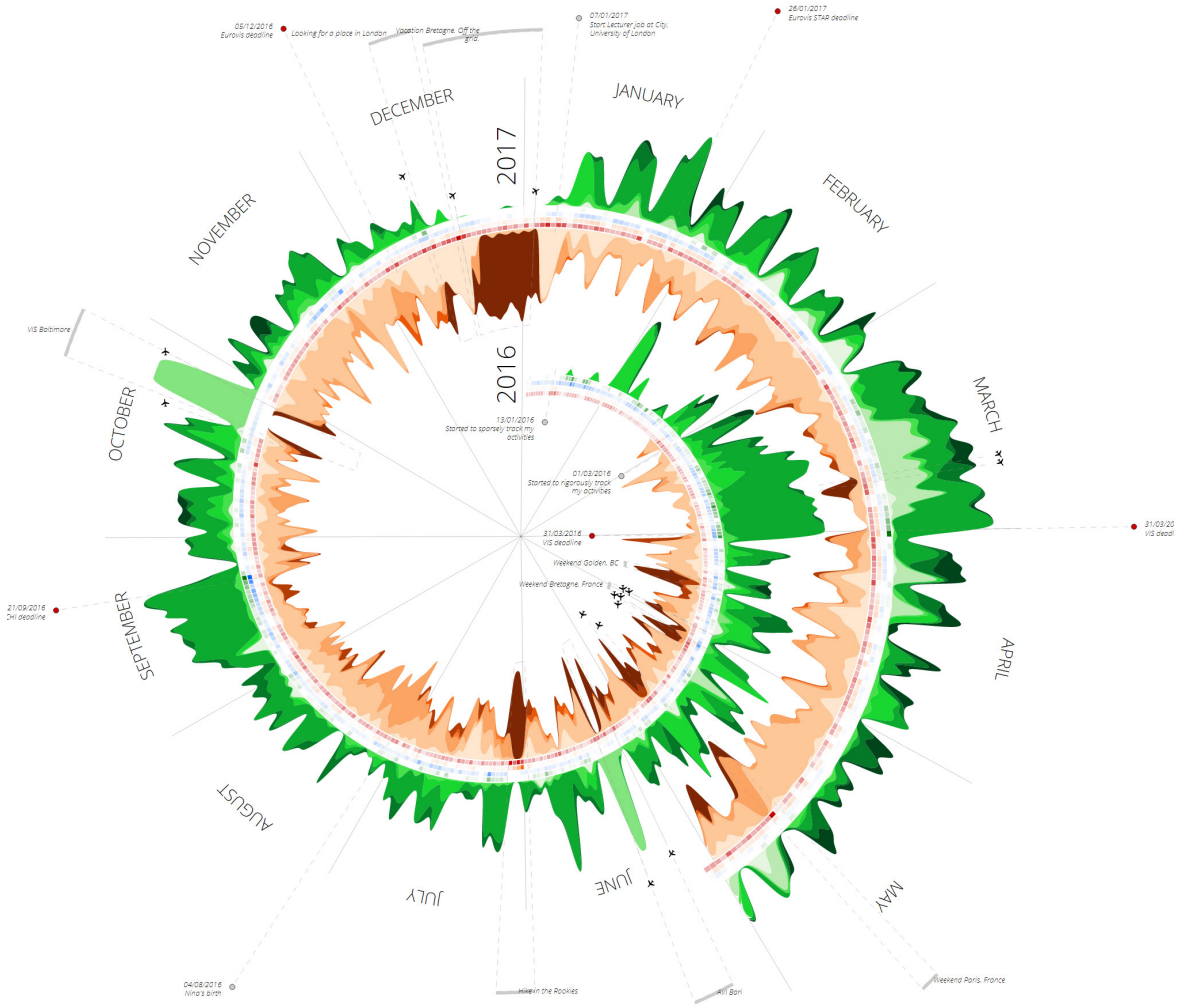


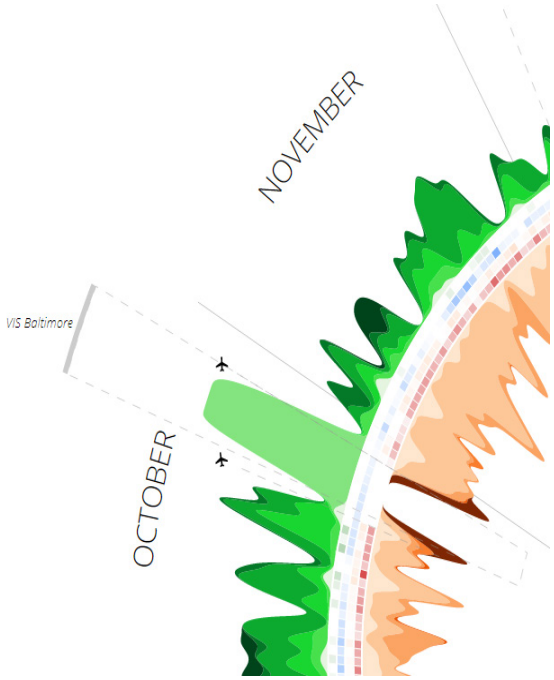


#2 OUTSIDE-IN LAYOUT

This variant emphasizes the cyclic patterns across years rather than the complementary at each point in time. Indeed, larger amounts of white space between two consecutive turns of the spiral indicate that the patterns of activities are different from one year to the other.

In this design, the daily numbers of steps, floors, emails and SVN commits are shown *inside* the mirrored streams, using colored squares of varying opacity to convey their magnitude.





#3 | GRID

In the previous designs, months were repeated each year (i.e. for each turn of the spiral). Displaying the months like the hours on a clock makes it possible to draw consecutive turns closer to each other. They now appear to fit into each other when cyclical patterns exist, typically in March of each year.

To refine the design, the alternating white and grey zebras that communicate weekdays and weekends in the previous designs are removed; a radial grid is added in the background; and a simpler font is used. Some annotations are added.

THE SYMMETRY OF MY LIFE

AN AUTOBIOGRAPHICAL VISUALIZATION

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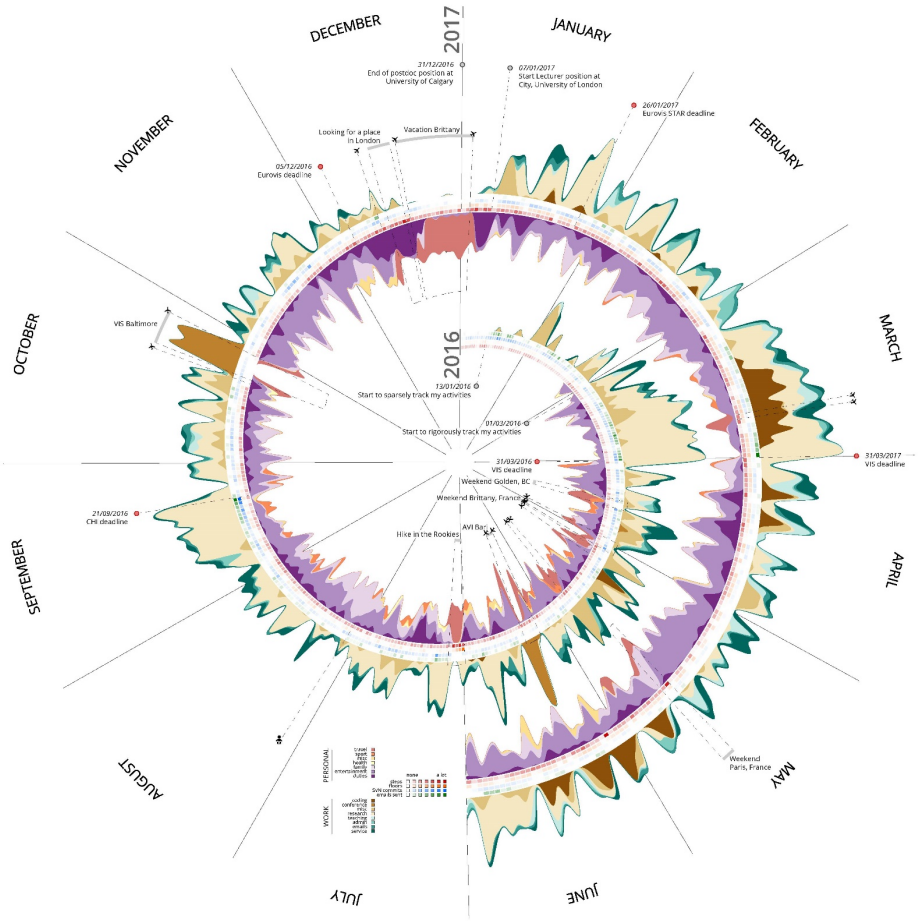

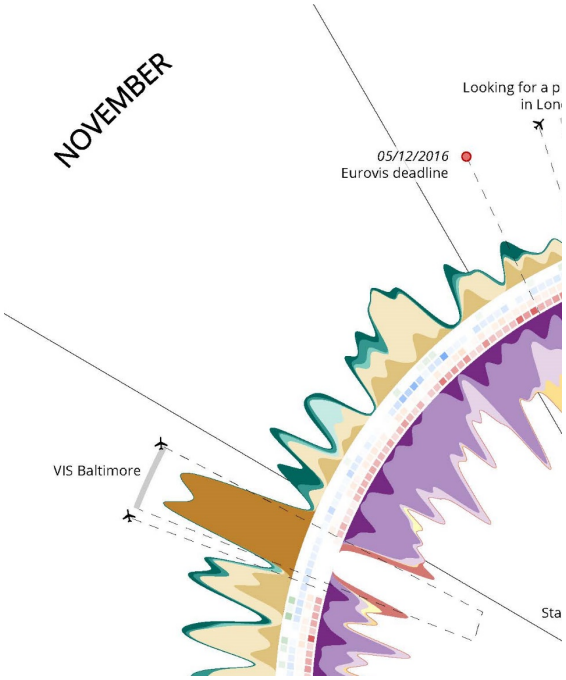

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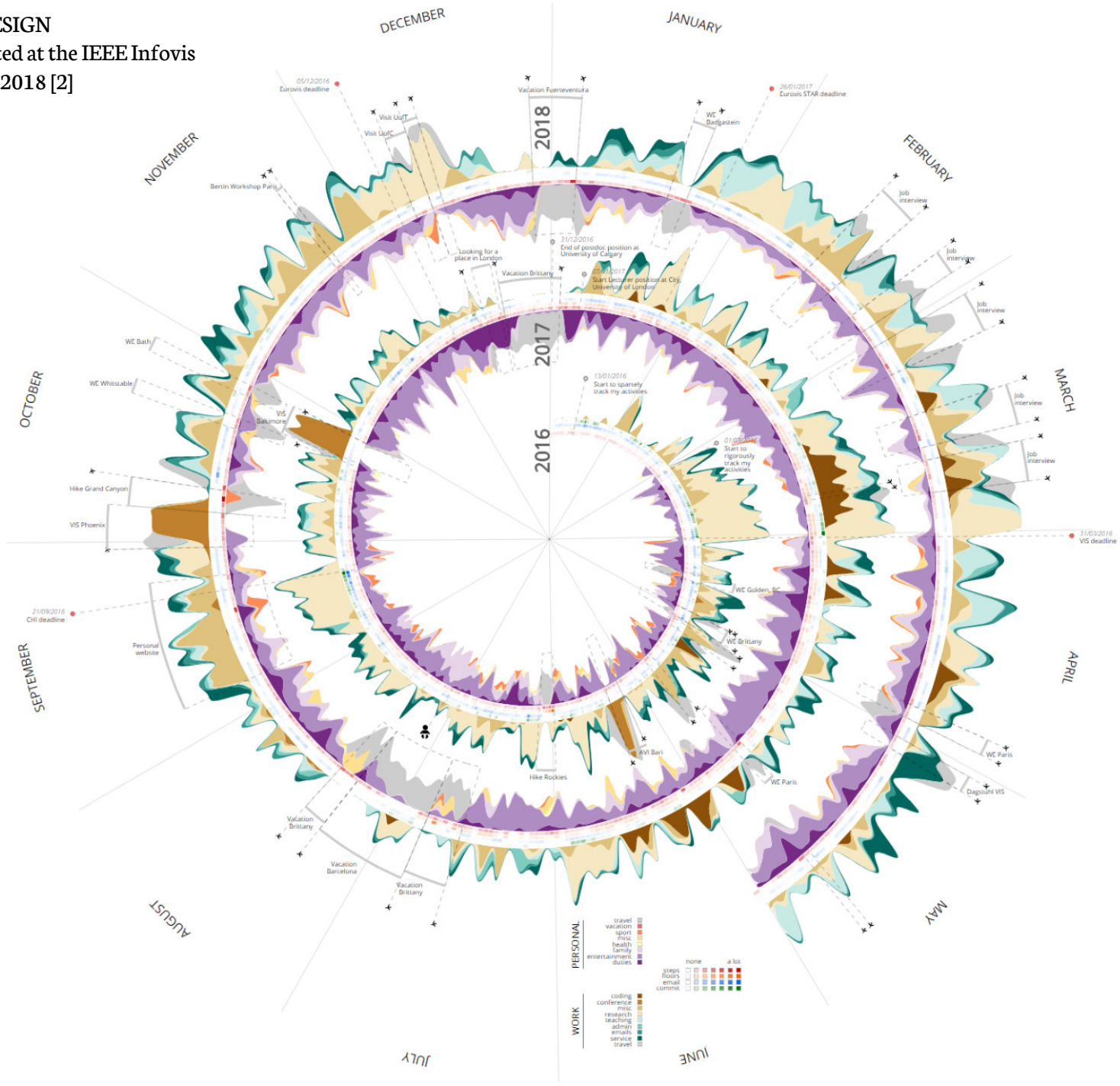
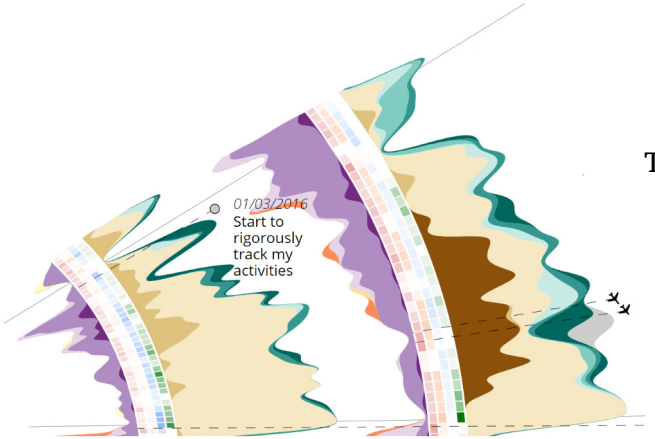
VISAP'18, Annotated portfolios and annotated projects.

#4 | POSTER

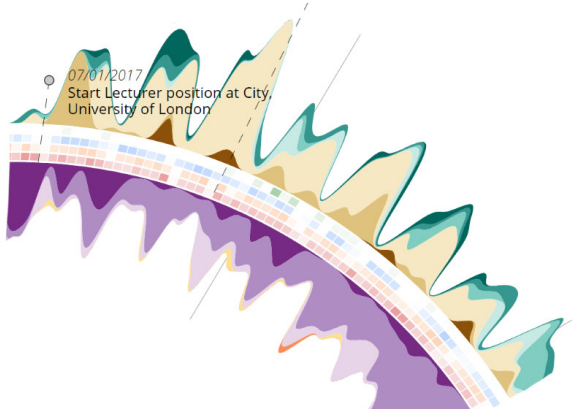
Poster presented at the IEEE Infovis conference in 2017 [1].

#5 | FINAL DESIGN
Poster presented at the IEEE Infovis conference in 2018 [2]

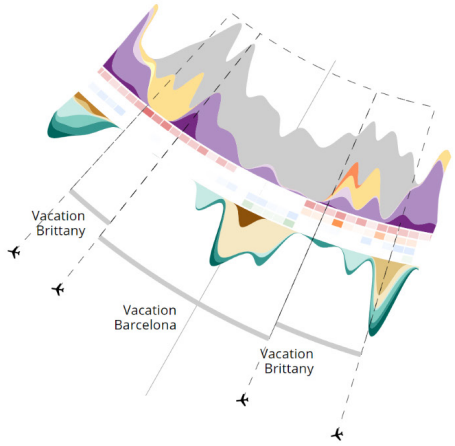




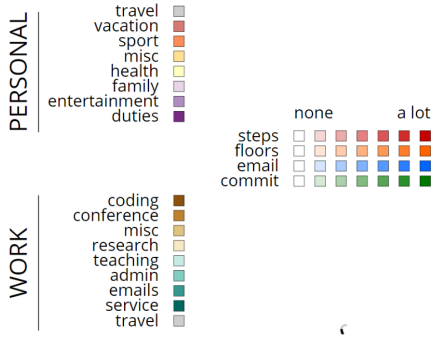
The IEEE VIS March Madness.



Weekly work patterns.



Work during holidays.



There are many stories I can tell about myself supported by the visualization. However, these stories often require some external knowledge that only me, as the person having lived these events, can explain. But these are anecdotes people can easily relate to.

For example, the month of March, that leads to the IEEE VIS deadline, shows a period during which my personal life tends to sadly disappear and where the amount of research is at its maximum.

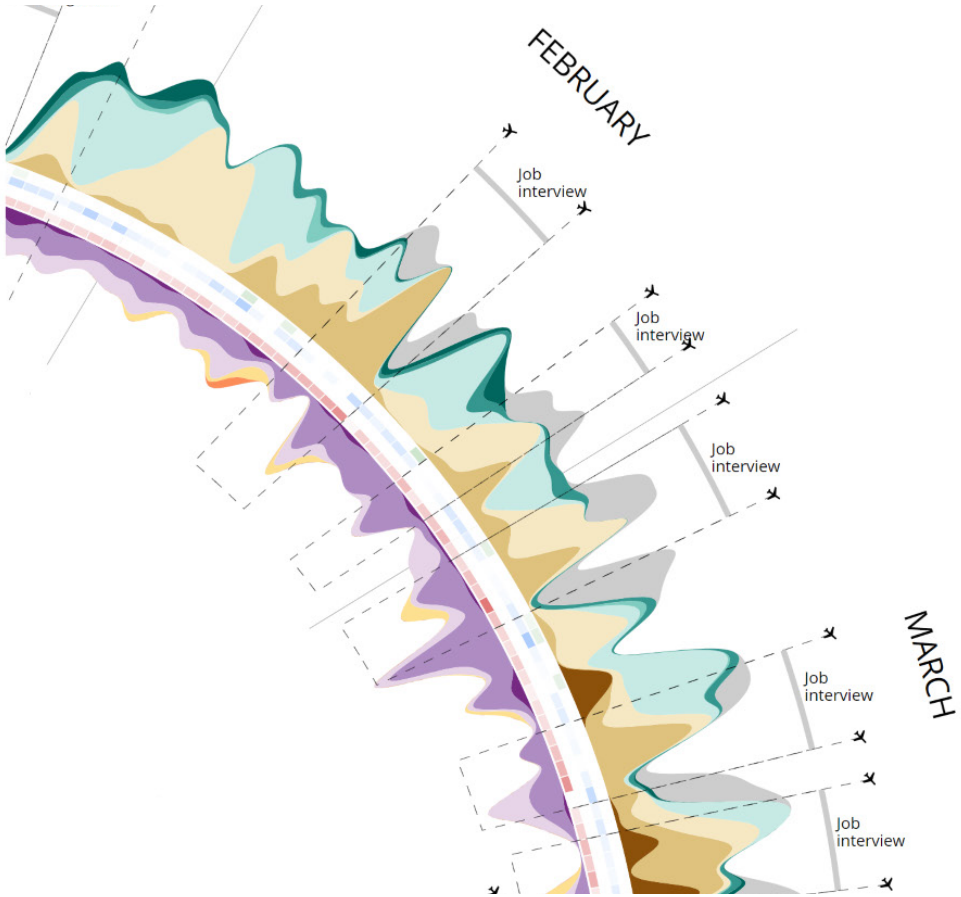
Or, the well balanced first months when I started working at City, University of London, show a period of my life when I intentionally tried to enforce working during weekdays. This worked for a few months.

Or, how summer 2017 highlights both the fact that I took almost a month of vacation, something I had not done for a very long time; but also the despairing fact that it is very hard for an academic to *really* be on vacation. The work that happened in the middle of my holidays while I was in Barcelona is mostly due to working on the IEEE VIS video previews for both a poster and a paper.

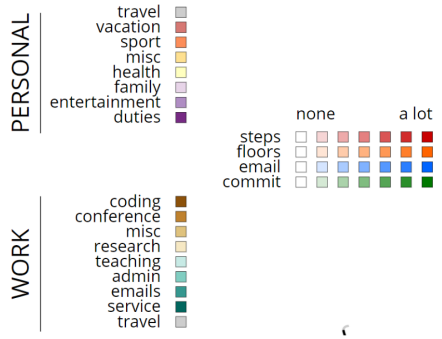
Finally, the months of March and February 2018 were very work-intensive as I worked on my job talk and interviewed at five Universities outside Europe. Between travelling (in light-grey) and interviewing (in light brown), I was teaching two courses each week, (in light green) and working on IEEE VIS submissions (in darker shades of brown).

A key element of this visualization is that I made several choices that go against guidelines for good visualization design. For example, the radial layout is known to distort the data and is more difficult to read than a linear layout. The stacked area charts on each side of the spiral also have the reputation of being difficult to read as they distort the data and make it difficult to compare streams. Further, the activity categories are vague enough to not detail too personal aspects of my life; the scale for quantitative data does not provide any value, ranging from “none” to “a lot”; and there is no scale at all for the stacked area charts. One cannot tell how many hours I work per day, per week, per month, or how many emails a day I send, or how much time I spend teaching.

I made *all* these design choices so that one can get the *gist* of the story, but cannot retrieve any *precise* value. In the specific context of this work, knowing absolute value is not the point. What I wanted to convey is a relative comparison of work and life activities, and to emphasize recurrent patterns that might emerge.



These design iterations emphasize that personal data is complex. No single design exists to represent such data, and many tradeoffs require subjective preference from the author. The richness of the data requires different designs for different granularities of the represented data. This design is inappropriate to representing the breakdown of the high level activities.



Discussion

Through building, designing and sharing this work over the past two years, I have made several observations about personal visualizations that I think are worth sharing. Here I present these opinions, which are yet to study and back up through rigorous research.

More than following the golden rules of visualization design (efficiency, accuracy, truthfulness, clarity) many people want to craft visualizations that are as personal as the stories behind the data and that serve a specific purpose, such as triggering empathy and making people laugh or cry. Personal visualizations can become part of the spaces we live in, make people emotionally connect to, and increase their awareness of, their data. But crafting autobiographical visualizations is a tedious task without the right tools. The space of authoring tools for personal visualization is ripe for research exploration. .

Visualization is already playing a role in our everyday lives. Devices and sensors such as "smart" meters and thermostats in our homes; personal devices such as fitbit trackers, mobile phones and smart watches on our bodies; online companies logging everything they can, and can't, about us; all generate massive amounts of data. This changes the relationship our societies have with surveillance and authority, and raises public concerns about personal data, privacy and security.

I believe the only way individuals can cohabit with these technologies and the data they generate is by learning how to read and write the language of data. I see in personal visualization an approach to help people become data literate and seamlessly embrace the complexity of our increasingly data-driven societies. In a close future, visualization will be ubiquitous, embedded in our homes, offices, clothes and skin [3]. Being visual mementos [4], they will be displayed like any other everyday object and part of everyday life discussions. Like people display books in their bookshelves, postcards on their fridge and pictures on their walls, personal visualizations will become digital artefacts that people cherish and aid in the construction of meaning and identity.

I see three major research directions towards developing tools for the authoring of personal, autobiographical visualizations:

#1 | Supporting narrative styles through personal data storytelling
When crafting autobiographical visualizations, the data is not an end in itself, it is only a medium that people use to share their personal experiences. Storytelling for personal visualization still is in its infancy.

#2 | Supporting people's needs for privacy
While the golden rules of visualization are about being objective, impartial, truthful, and allow for efficient and accurate perception of data, in a personal context what matters more is that the visualizations are inspiring and relatable, that they trigger emotions and self-reflection. Visualizations tend to give the illusion that data is complete, clean and accurate. But that almost never true. Embracing data subjectivity a way to educate people about the messiness, the uncertainty that exists in any dataset or visualization. Supporting people in visually conveying subjectivity with visualizations is an almost untouched area of visualization [5].

#3 | Supporting fast authoring and sharing
Finally, we should wonder what the Instagram of personal visualization could be. Providing people with tools to author and publish representations of their own data could bring visualization to another level. Giving people ways of expressing their identity in artistic, expressive, unique ways through visualization can be a starting point for helping everyone become more data- and visualization- literate.

References

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5 Alice Thudt, Charles Perin, Wesley Willett, and Sheelagh Carpendale. 2017. Subjectivity in Personal Storytelling with Visualization. Information Design Journal, 23(1):48–64.