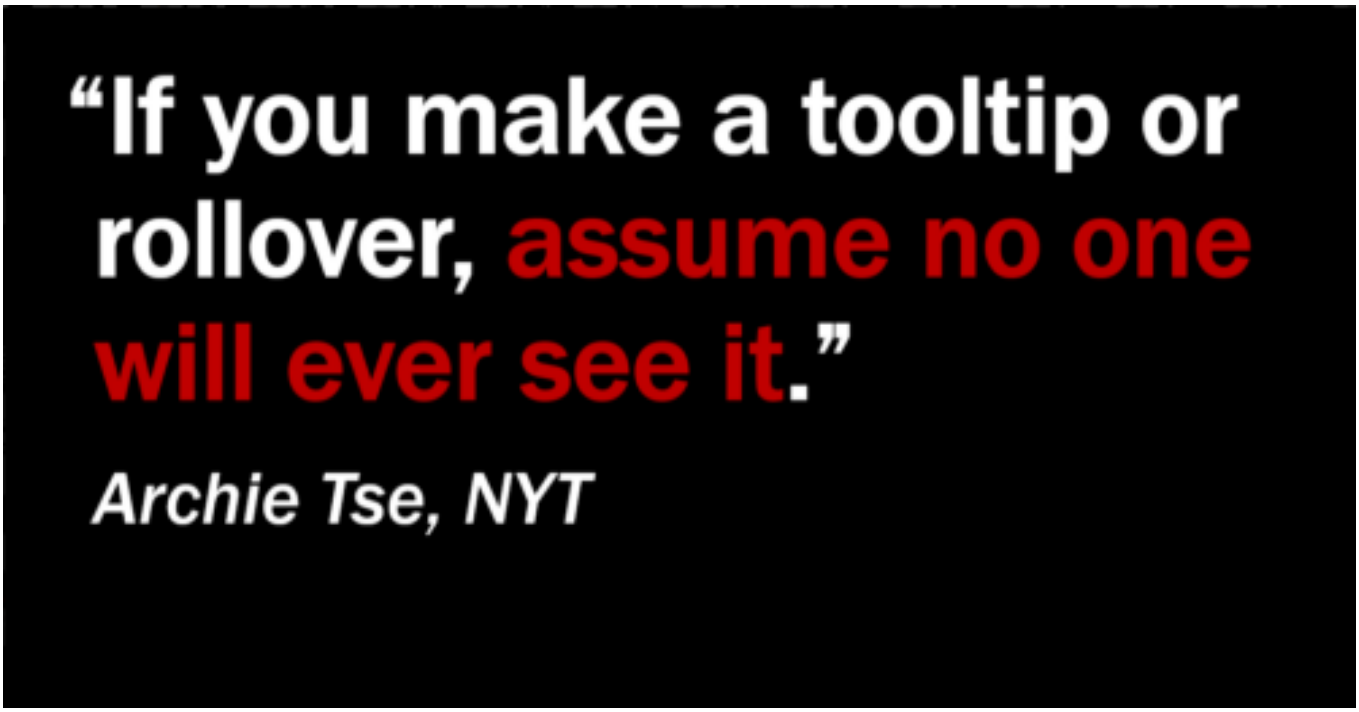
The death of interactive infographics?

Dominikus Baur Follow
Mar 13, 2017 · 15 min read

(This is a write-up of the talk I gave at INCH Munich on March 11)

(edit: Gregor released a new blog post, clarifying some of the aspects and made some great points on the benefits of interactivity)

Last year I was lucky enough to go to the Information+ conference in Vancouver where Gregor Aisch, who works at the New York Times, gave a talk about the publication's graphics and their impact. And the scary resumé of the talk was: Barely anyone interacts with the New York Times' graphics. The New York Times makes arguably some of the best interactives in the field, which made Gregor's talk even more depressing. His number of only 10–15% of people clicking on buttons — even essential ones — tells you that interactives are a waste of time and money.



Gregor's editor, Archie Tse, talked about this earlier in the year at the Malofiej conference, and turned this fact into some utterly depressing rules. One of them was, for example, "**If you make a tooltip or rollover, assume no one will ever see it.**"

85% of page visitors simply ignore them, missing out on information hidden behind interaction. On top of that, interactives are expensive to make — they have to work across devices, using trackpads and fingers. They're error-prone and can tarnish the publication's reception within their audience.

So why even bother?

I've been working on data visualization for almost ten years now, first as a PhD student in Munich, then as a researcher and now as a freelancer. And if I had to name the one aspect that most fascinates me, it's their interactivity and the potential therein.

Of course, the power alone to compress complex datasets into approachable and even appealing graphics is fascinating. The craft of shaping data to perfectly fit into the interface of our visual processing systems. The sheer wonder of being able to squeeze thousands of data points into a picture most of us are intuitively able to grasp.

But interaction lets them do even more. If you think about visualizations as a mass medium, something made for huge audiences, interaction turns them into very personal tools.

If you're doing interaction well, it can turn your visualization from a well-made newspaper that gives you the bullet points into a conversation almost. **As if you were having a tête-à-tête with an expert on the data, patient enough to explain you everything.**

That's the ideal, at least.

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First of all — what do we mean by interaction?

Basically, interactive infographics describe visualization systems that have ways for the end user to change their attributes. This can be super-simple, such as changing the currently visible part of a map or tapping on a circle to get a detailed description of that data point. Interaction can also be more complex though, like drawing an example of the data you're looking for and the machine finding it.

So, it's somewhat of a catch-all term for clicking or tapping somewhere on that digital surface.

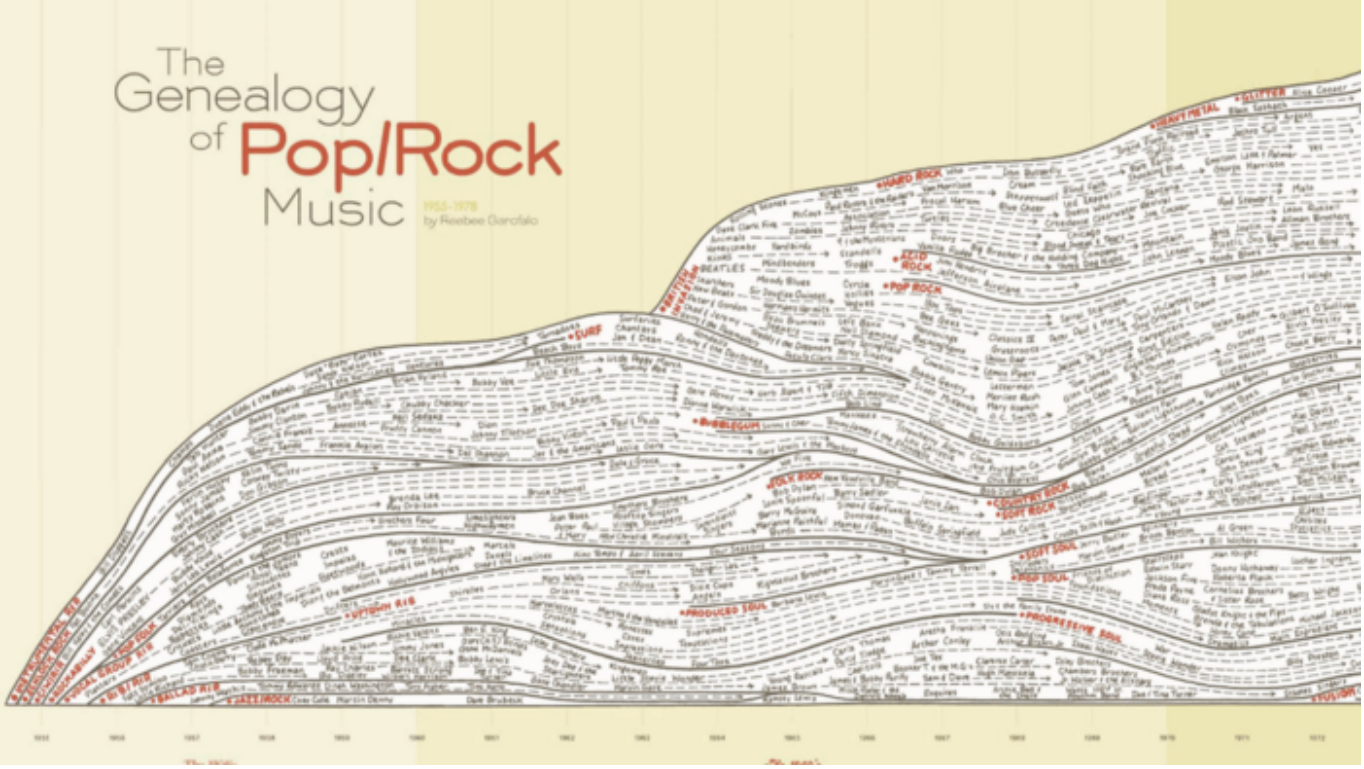
Doing a full definition would probably take a lot longer than the length of this talk, so for our purposes, let's go with this simple one:

Interaction in visualizations changes the lens on the data.

This can mean to filter certain datapoints, select a different area of the data or even changing the type of visualization altogether. The important point is: an interactive visualization is no longer static and doesn't represent a single view on the data. Interaction enables people to adjust a visualization to their own needs and ask it different questions.

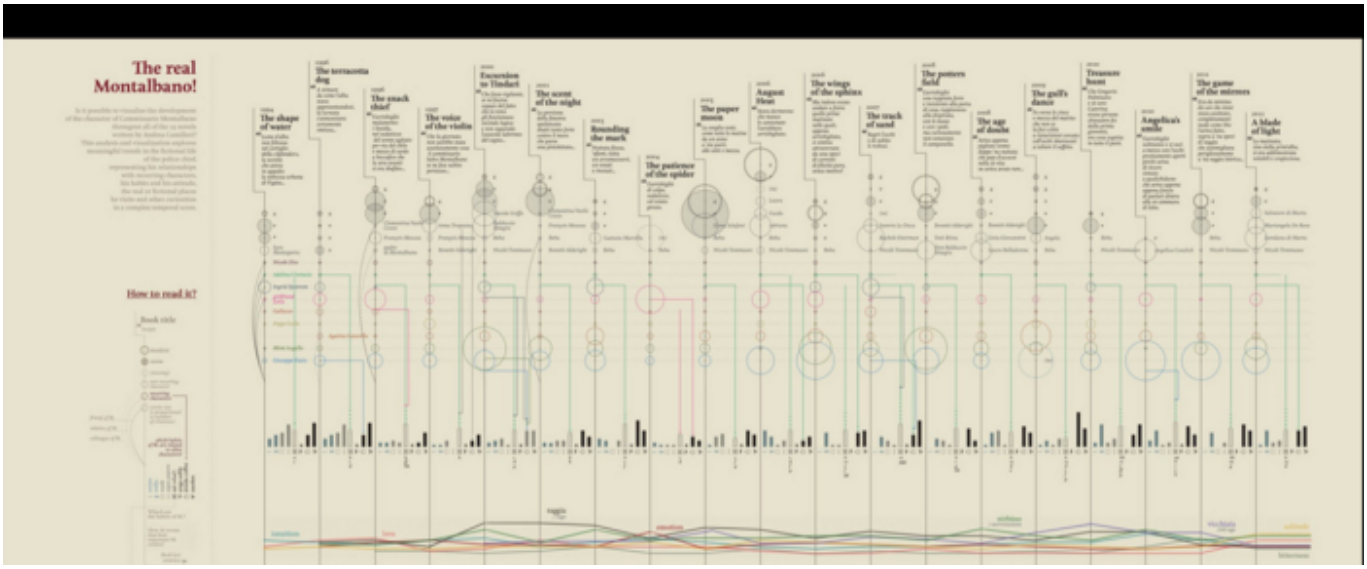
Interaction does not have to happen with clicky-things on websites.

Interaction with an infographic on a high-resolution medium such as paper can be a powerful experience.



Reebee Garofalo: The Genealogy of Pop/Rock Music

Edward Tufte likes to present the above chart in his workshops and let participants really drill into the data. Explore the chart not using your hands, but using your eyes. Focusing on this corner, then that. Building up an image of the data in your head. And even going so far as forming hypotheses in your mind and trying to confirm them by looking at the relevant section of the visualization.



Accurat: The real Montalbano! (for Corriere della sera)

The design studio Accurat also did several brillant infographics for newspaper ‘Corriere della sera’ and their Sunday supplement ‘La Lettura’. Highly detailed, complex graphics, with unusual ways of data encoding and presentation.

Since we now have a rough idea of what interaction can be — can we maybe find the criteria for successful interactive pieces? What are the requirements for those?

While I don’t have an algorithm for that (sorry), maybe we can get some idea. My main impression however is: **we data vis people spend too much time thinking about the interactions themselves and less about the audience who is supposed to be using them**.

And then, well, they might end up NOT using them.

general to be entertained and learn something. They don't mind "working" their way through the data with interaction. If presented in the right way, this interaction can even be part of the fun.

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GOALS

In addition to time, successful interaction also has to take into account the goals of the viewer. And these can be pretty different.

In the EPFL Monolith case, students and teachers at the university are a big part of the audience. They might have fun trying to find themselves in the PEOPLE visualization. University visitors, though, might be more interested in getting an overall picture of the university climate and personnel. And datavis people might just be interested in breaking stuff ;)

Interaction, if done well, caters to all these groups. They're able to shape the data based on their own interests. Like being able to ask the data expert specific questions.

We might be super excited about some clever interaction trick, but maybe we've already lost our audience before they even saw the graphic. So, as always in design, be aware of your assumptions and your personal bias.

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Going back to the New York Times, their pieces are made for a very specific situation: dealing with news in this realm of data journalism means that speed is everything. Content has to be produced quickly and timely. It's extremely hard to do an interactive graphic for something unexpected and some of their pieces have weeks of work put into them.

Speed is also the most important aspect on the other end of the chain: how do you consume your New York Times articles? Are you sitting down for half an hour with your iPad in hand after breakfast, carefully scouring the Times' website, making notes? Or is it more that someone on Twitter or Facebook shared an article and clicking on that link takes the same amount of time as clicking on the little 'X' button in the top-right?

TIME

Being able to really appreciate something like a visualization or even interacting with it needs TIME. Which gives us a clue for one of the requirements for successful interactive infographics: you have to be aware of the audience's context, if they're actually in the mood for in-depth data exploration.

Think back to the image of the newspaper versus the data expert. If you're sending that expert to some random bus stop to talk to people who have about two minutes before their buses leave you can imagine how much they'll get out of it. And how many datapoints they will miss.

That's why I really like doing interactive installations.

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End of 2014 I was working with Moritz Stefaner, Lev Manovich, Daniel Goddemeyer and a couple other highly talented people on a project called ON BROADWAY, something heavy on the interaction side, with which you could browse along the Broadway in New York and its associated digital data.

Last year, Moritz and I had another installation project for the Ecole Polytechnique Federale de Lausanne, the university in Lausanne, Switzerland. For their new wing they wanted to have a visualization representing the wealth of data that they had collected about their university — aspects of their teaching as well as research capabilities.

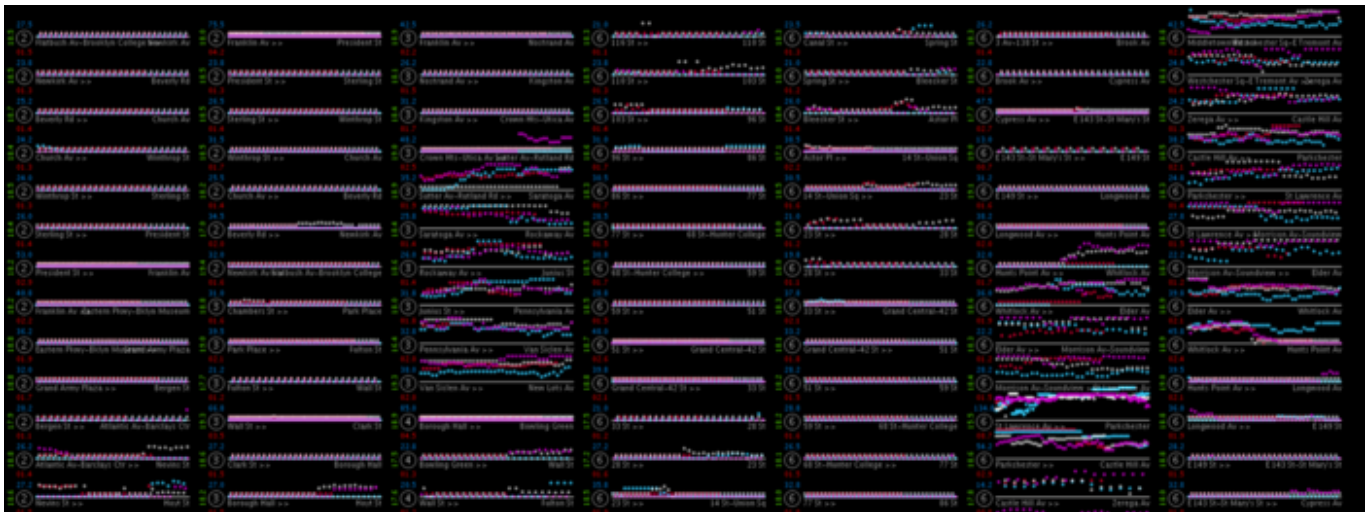
Talking about goals, these goals that an audience has can also be of a more practical nature. It doesn't have to be 'I want to learn about X'. It can also be 'I want to do Y, show me how'. I like to call this idea **Visualization As Interface**. A way to access the data in a more humane way, a middle ground between untraceable black box machine learning answers and spreadsheets.

One project from last year where I went this route together with Daniel Goddemeyer was SUBSPOTTING.

If you've ever been to New York and used the subway, you might have noticed that, officially, there's no cellphone reception on the subway. But if you're aware of where to look, you can actually find reception on the subway here and there, there are pockets of connectivity, with antennas from aboveground being able to penetrate down to the subway tunnels. It's just a little hard to tell where.

That's where Subspotting comes in. For the project, Daniel and I were interested in the how extensive these hidden cellphone networks actually are. So we started looking for the corresponding datasets … but couldn't find any. And finally decided to collect this data ourselves.

We had a case with four iPhones (for the four carriers) in it as a logging device. So, it was a super guerilla approach as you can see. And of course we needed someone to actually bring that case along the over 1000kms of subway network found in New York. So, Daniel went on his merry way, since I wasn't in the city… no, actually we hired a task rabbit to do it for us who was pretty excited about getting paid to ride the subway, read a book and press a button at every stop.



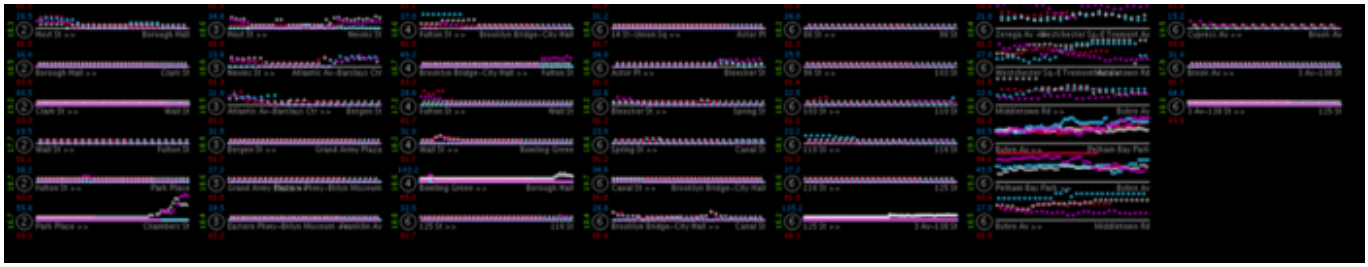
The end result, called THE DATA MONOLITH, is a pretty massive thing. It's over 4 meters tall, contains two touchscreens, one 4K display and a back projection at the very top. The touchscreens work as remote controls for the big screen, with which you can change which part of the data you're looking at.

The visualization is organized along three perspectives on the data — PEOPLE, TOPICS and IMPACT.

PEOPLE is about students, teachers and researchers in the university. Each person who has anything to do with the university becomes a little bubble and re-organizes themselves based on the current visualization. TOPICS presents the network of researchers and research topics — almost like a neural network that maps out the university's research interests and their corresponding brain power. Finally, there's the IMPACT view on the data, that shows the impact that EPFL's researchers have on the science landscape and their collaborations world-wide.

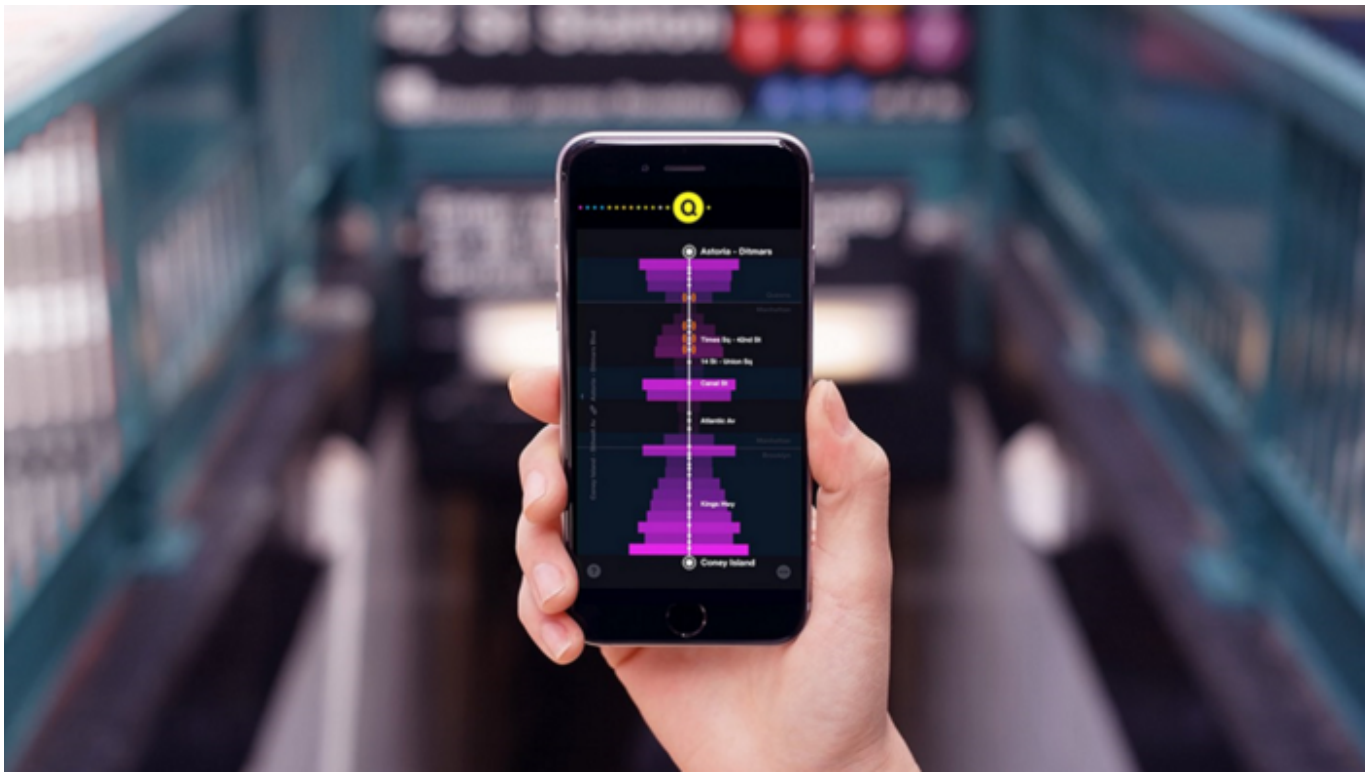
This massive dataset with its various perspectives would be too hard to boil down to specific messages — interaction is absolutely required.

Fortunately — and that's the great thing about developing interactive installations — in such contexts people have the time. Most people go to museums or such installations in



The end result was a pretty massive dataset of the cellphone reception for each of the 25 lines. After some data cleaning, we turned to paper as our favorite high-resolution visualization medium and created two posters, one highlighting the geographical aspects, the other the subway lines themselves. They're great for exploring the data, following the lines and checking out specific carriers.

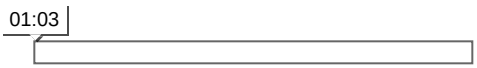
But of course they're not much use for actual people riding the subway and looking for a cellphone signal.



For that, we created an additional app, called Subspotting. And here's where the Visualization As Interface aspect comes in. Users can draw a more concrete benefit from having access to this data, by finding out where on their daily commute they can get cell phone reception and plan accordingly.

SUBSPOTTING Interaction

from **Dominikus Baur**



The data is organized as a series of cards, showing each subway line as overview or in detail. Cell phone reception strength is encoded as bar charts mapped to each part of the line. Switching lines happens by swiping left or right, moving to different parts of the line works through scrolling and you can filter for different carriers. This way, interaction enables quick access to the complex dataset and visualization makes the data understandable.

Subspotting shows that interaction can be successful if people are actually getting something out of it. When it comes to simply teaching them about a certain dataset and its aspects, the immediate benefit might not be as clear cut. If they want to find out where exactly they will have cellphone access on their morning commute, an interactive visualization is probably the best way to give them quick access.

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In which other ways than respecting their TIME and their GOALS can we make sure that people will actually be interacting with our visualization pieces.

Again: be aware of your assumptions. Especially us datavis nerds often have the dangerous assumption that everyone is as crazy about datavis as we are. I mean, just think back to my grandiose introduction of visualization in the beginning here.

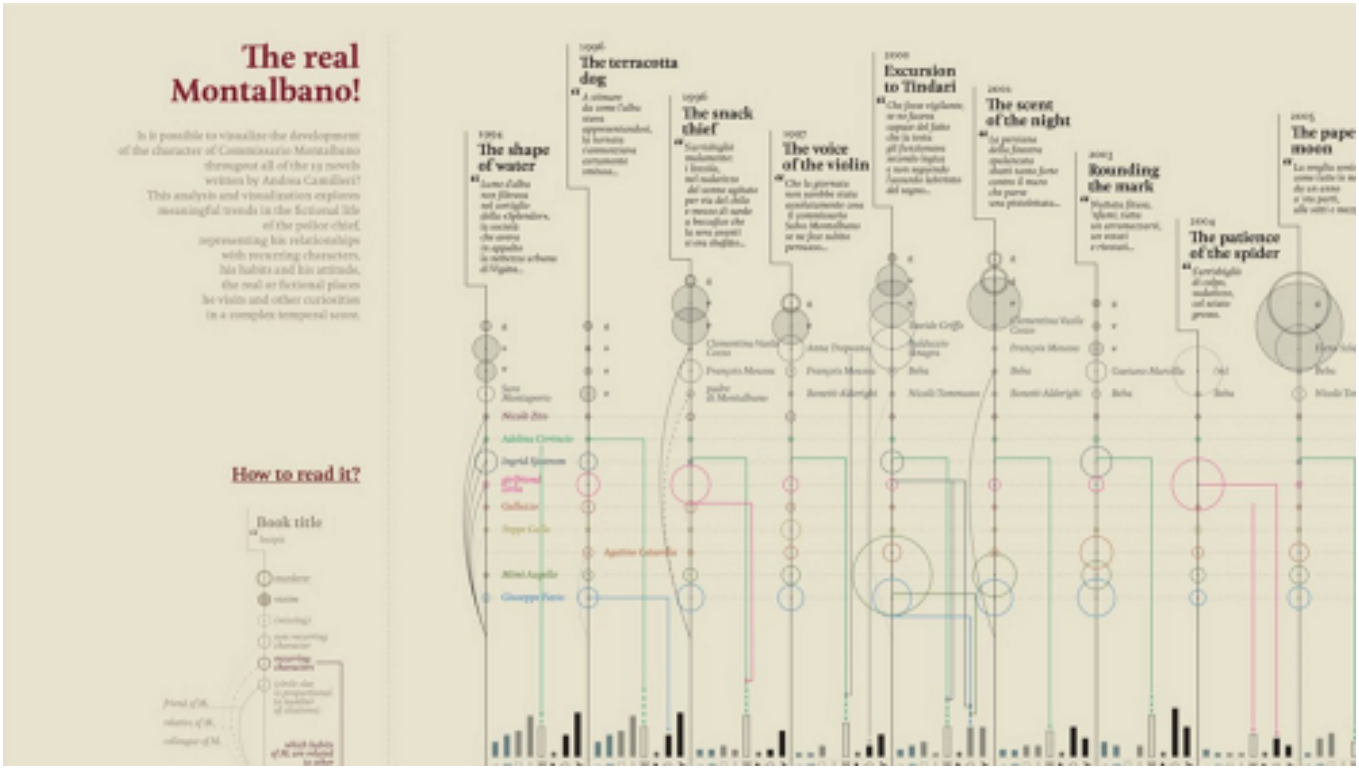
But, of course, that's wrong. And that's healthy! It's a good thing not everyone is fighting about pie charts on Twitter!

So, given that most people aren't that interested in visualization (let's be honest here), we have to find a way to make them CARE about it. Because if they don't care, they won't look at it, let alone interact with it.

And even before they start caring about it, you want to make sure that you're not closing the door right in their face. Don't throw bar charts at them until they close that browser tab.

ONBOARDING

One aspect of that is the new fangled term "user onboarding" (how to get people *on board*). Basically, what happens in the first moments after a person opens your app or website or even newspaper page. This can shape the rest of people's experience with your infographic. And of course also if they're quickly frustrated and just close it and go do something else.



Onboarding is something that even happens in print. If we go back to Accurat's La Lettura visualizations, each of them has a short introductory paragraph on the top left (where you would naturally start reading with a Western background) and then a

section titled ‘How to read it?’. That gives you a clear idea of how to work with the graphic before diving into the details.

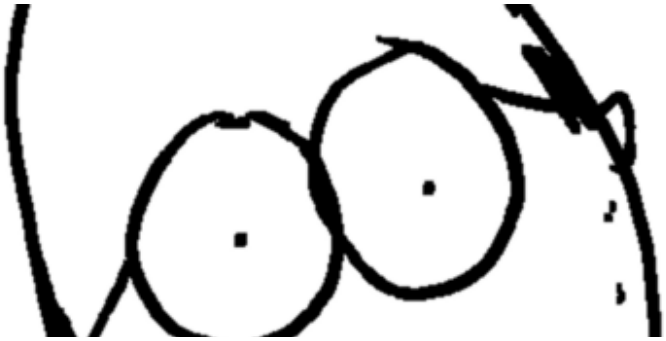
Other great examples for tutorials and guided exploration of visualizations are Nicky Case’s projects — if you haven’t played with ‘Parable of the polygons’, for example, you should definitely check it out. A clean text explanation of what this project is about plus interspersed interactive elements for exploration.

Super-thorough research

…. and those are basically all great examples for user onboarding in visualization that I’ve found despite my super-thorough research.

But seriously, it’s something that I and the visualization community really could become better at.

Good onboarding is the data expert giving a short introduction to the data and what they know about it, instead of just looking at you… blankly … staring into your soul…



But beyond simply teaching people how to read and understand your visualization, respecting their time and interests can go even further.

CARE

You want to make sure that they CARE about your visualization. Now, how to do that?

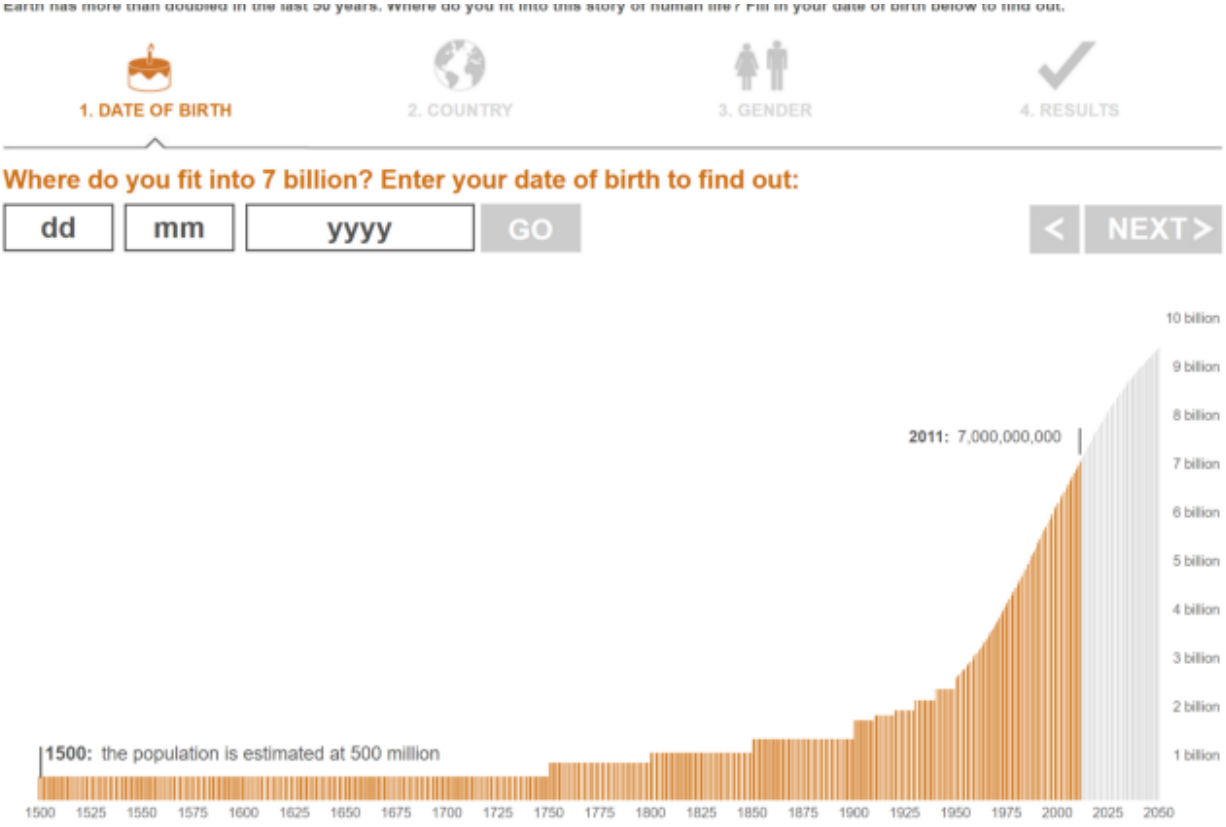
If we're really _really_ honest about ourselves, what's the one thing that's endlessly fascinating to us and we could talk about forever?

Right. Ourselves.

So one simple trick to draw people into a visualization is by appealing to this inherent narcissism. Quickly answer the question 'Why should I care. What is it to me? Why would I give any expletive about the situation in so-and-so?'

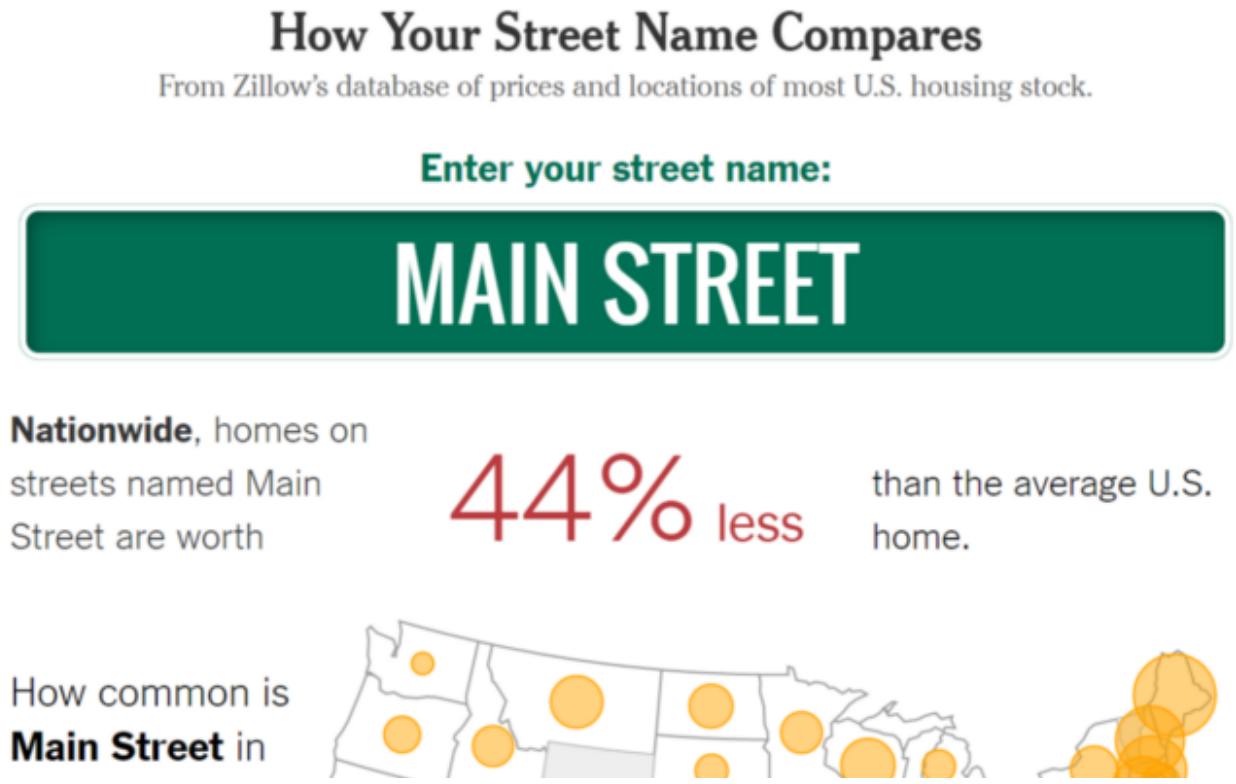
If you provide them with an answer right away, telling them what this dataset could mean to them, they might actually listen.

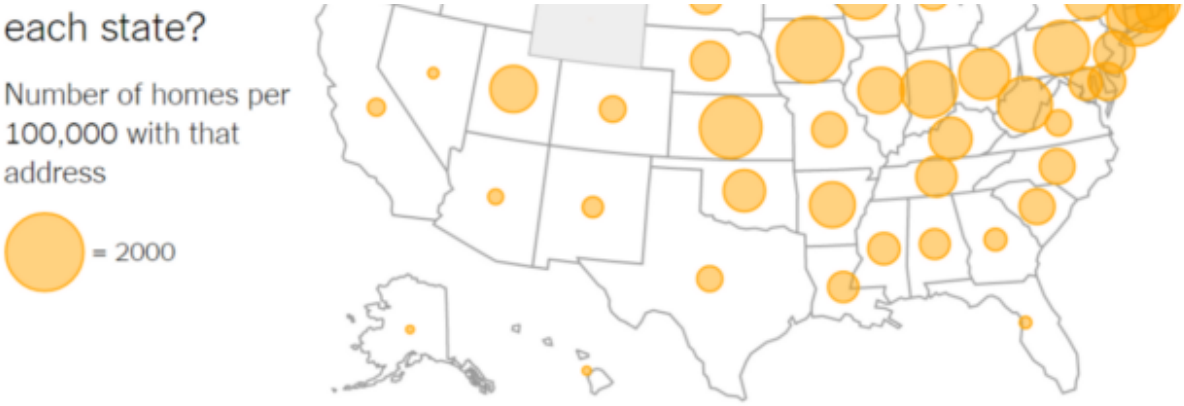
This is a pattern that you often see in visualizations:



BBC: The world at seven billion

In this piece by the BBC about humanity crossing the number of 7 billion people (those were the days), they ask you a few questions to arrive at your very unique and personal place in the world.





New York Times: The Secrets of Street Names and Home Values

Here's another one by the New York Times, that shows you how much less your house is worth because it's built on Main Street instead of Ocean Boulevard. Again, you can enter your own street name and explore how that changes things.

But instead of directly asking people you can also be more subtle about it. An easy way to get access to this type of contextual information is through the various sensors hidden in our smartphones and laptops. You could almost call that 'passive interaction'.

Or even go somewhere completely different. Starting in your own region lures you into the visualization and gives you a reason to actually care about it.

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Ok, after these ideas when it comes to interaction, going back to our original question:

Are interactive infographics dead?

My admittedly super-lame answer is: it depends (as always).

It very much depends on your audience and their context. Maybe the heyday of interaction actually is over this period of total excitement about all the things that have suddenly become possible. The field of data visualization is maturing and that also always means cutting away the wild growth that has sprung from all the original possibilities.

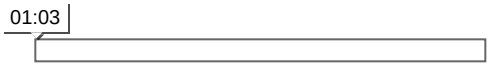
Think about your audience's TIME — do they have 30 seconds or 15 minutes?

Moritz Stefaner and I did a project for the OECD in 2014 called “Regional Well-Being”. The OECD is spending a lot of time capturing factors of well-being in their member countries and with this project, they decided to dive from a national to a regional level. So it was no longer about the quality of life in Germany, but in Bavaria versus Berlin and so on.

This of course also made the dataset much more complicated — while their Better Life Index contains 11 dimensions for 35 countries, the Regional Well-Being data contains 11 dimensions for 395 regions! Since this can make the data pretty overwhelming at first, Moritz and I decided to start with something that our audience could relate to — the quality of life in their own region.

OECD Regional Well-Being Interaction + Onboarding

from **Dominikus Baur**



So, when you open www.oecdregionalwellbeing.org your browser asks you to give them your current location (browsers can do that, and if you’re not comfortable with it you can also select it from a list). And the visualization then starts at this location, so you can look at how life is around you. From there as a starting point, you can branch out in your exploration — either looking at spatially close regions or regions that are similar to your own.

Also think about their GOALS — what can they get out of your visualization? Is it maybe more than just fun factoids? Can they use the visualization as an interface helping them with something specific?

Finally, think about what they CARE about — guide them into the visualization, make your visualization about themselves and show them why the data is relevant to them. And if that's not possible, maybe intricate interaction won't be required anyway…

Once you're done thinking about it, add your interaction or leave it. Just doing it for interactivity's sake doesn't help anyone. Don't force it on everybody just because you can.

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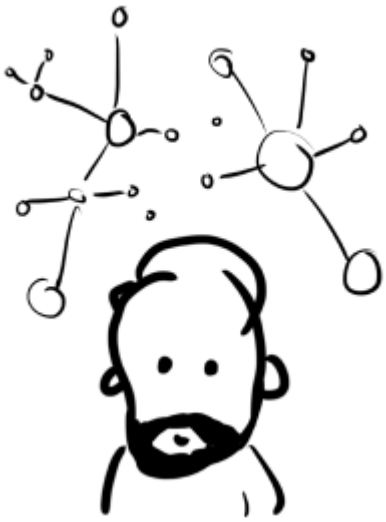
About me



Me, datavis-ing AF

I'm Dr. Dominikus Baur, an award-winning datavis designer and developer. You can find the projects I'm most proud of and more on my website: https://do.minik.us.

You have a fascinating project to work on? You want to turn these ideas into reality? Let me know!

Data Visualization Design Interaction Talk Infographics