

Are your data visuals making you pie-eyed?

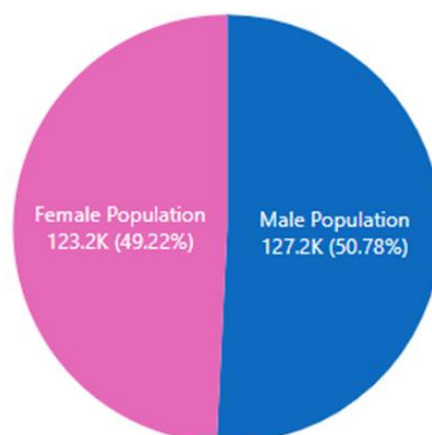
When you find yourself spending more time interpreting a visual than absorbing the information it contains, there's a good chance you're using the wrong visualisation technique. By breaking it down and understanding where the gaps in presentation are, you can fine tune your chart selection and formatting to get the most from your data.

Pie charts usually suck. It's a well-established trope in data visualisation circles. I'm going to explore *specifically* why they let us down. Then, without smashing that "get more visuals" button, what alternative approaches should we consider?

Why do Pie charts suck?

First, they don't *always* suck. To see where they fail in detail let's see an example of a pie working well. Consider this chart that breaks down the estimated population of the Northern Territory into male and female. I'm using data available from the [Australian Bureau of Statistics](#), as at March 2022.

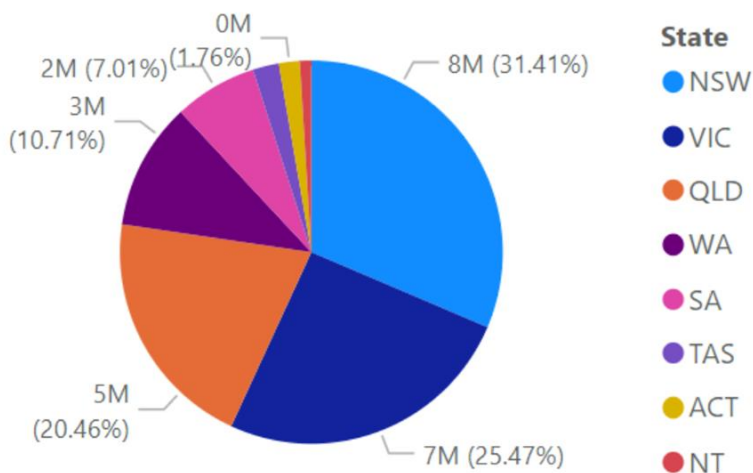
NT Male & Female Population breakdown



It's *fine*. It probably takes up more space than it needs, but I can read it clearly and digest the information immediately. But start adding more slices and things get more inscrutable.

For example, let's do an overall population of Australia breakdown, state-by-state on a pie chart. I'm just going to use the standard Power BI theme and I won't re-format anything too much just yet... I want to see how this looks doing a simple click and drag visual first.

Sum of Population by State

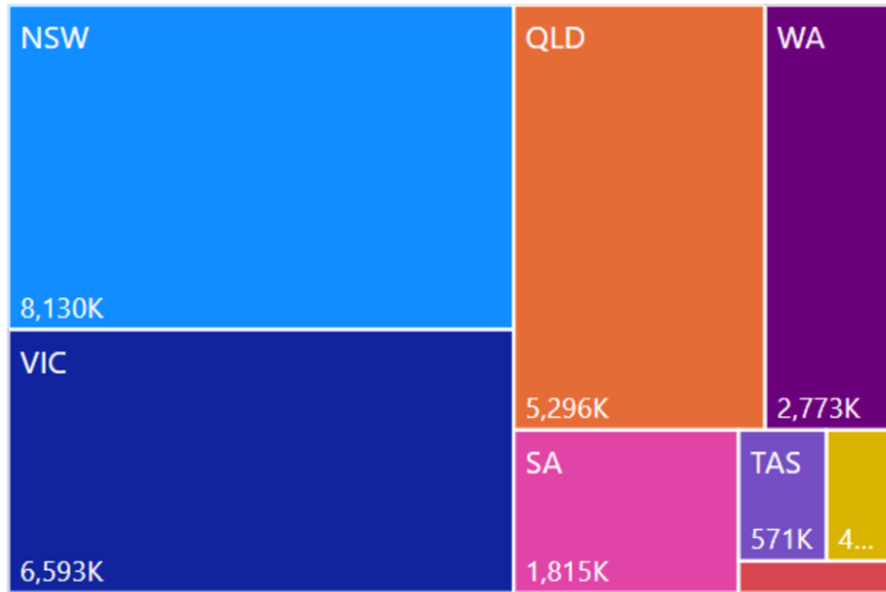


- It is hard to see relative sizes at a glance. The human eye is just not designed to use angles as a relative measurement. Anything more than 2 segments and the pie angles become difficult to process.
- Not all the states have space for the detail labels, so some of the data is essentially just missing by default.
- Labels need to summarise data in order to fit into the screen space – often sacrificing important information to fit in the space allotted.
- I need to continually look back and forth between the legend and the chart to see which state is which pie segment. We could ditch the legend and add state names to the labels, but that will only make the labels even more clipped and difficult to read – Imagine if you wanted to use full state names – e.g. “Australian Capital Territory” instead of “ACT”.
- Information for smaller states is completely lost
- There is no total

Changing font sizes and other layout tricks can help, but this can only correct the intrinsic problems so much. The pie concept is just too flawed as a data visualisation technique. We need to consider other ways to convey the information.

The next logical go-to visual might be a tree map. After all, it's doing a very similar thing to the pie chart, but it's removing those angle-based comparisons. We also have a more suitable space in each tree map slice to add numbers and text detail.

Sum of Population by State

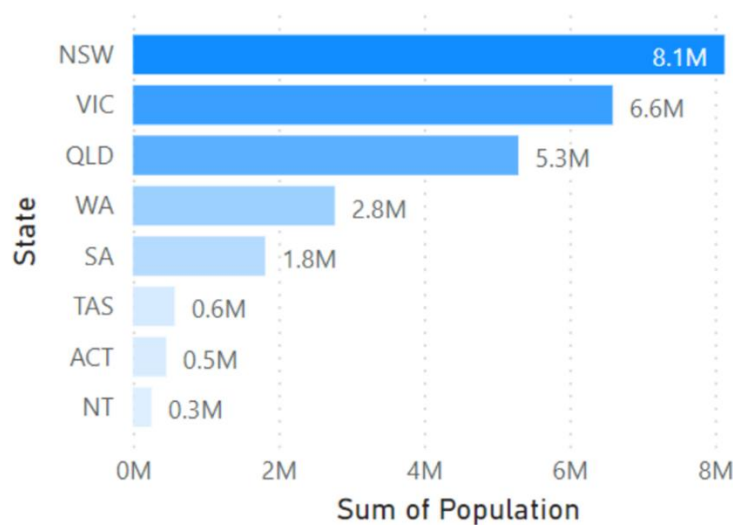


Most of the slices now have a clearly labelled state, so that's better. NT and ACT are out of space so the data is missing. It's a bit easier to see relative sizes here, but let's face it: this is only a marginal improvement – we're unable to see the value labels in small tiles and we've lost our percentages! For many, the automatic slicing by percentage is the reason we reach for a pie in the first place.

Moreover, it turns out that our eyes are not much better at determining relative surface area in rectangles than in pie wedges. Since we don't have a standard width or height on the tiles, we can't directly compare tiles in this visual easily. I think this visual is another nope from me.

If we had a standard height for each rectangle, then the widths of each rectangle could be used to compare relative values at a glance. A visual with fixed height rectangles, representing comparative values by width? ...that sounds like a bar chart!

Sum of Population by State



This is great, we can now very clearly see the relative size of each state along with the number value. This might meet the brief. But we're still missing a total and now we don't have the percentages either. That's a deal breaker.

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We can do better.

Let's look at using a simple table visual – with conditional formatting we can place data bars into cells, effectively creating a bar chart within the table. And by adding a % column, we get our percentages back. And we've got a totals row!

State	%GT Sum of Population	Sum of Population
NSW	31.41%	8,130,115
VIC	25.47%	6,593,314
QLD	20.46%	5,296,098
WA	10.71%	2,773,435
SA	7.01%	1,815,485
TAS	2.21%	571,165
ACT	1.76%	455,869
NT	0.97%	250,398
Total	100.00%	25,885,879

Now we can:

- Clearly see the relative rank of each slice
- Get the full detail number behind each state, no rounding needed to save space
- We've got our % value back
- We've got totals!

This is great, because now we've addressed all the requirements, and with a smaller footprint to boot!

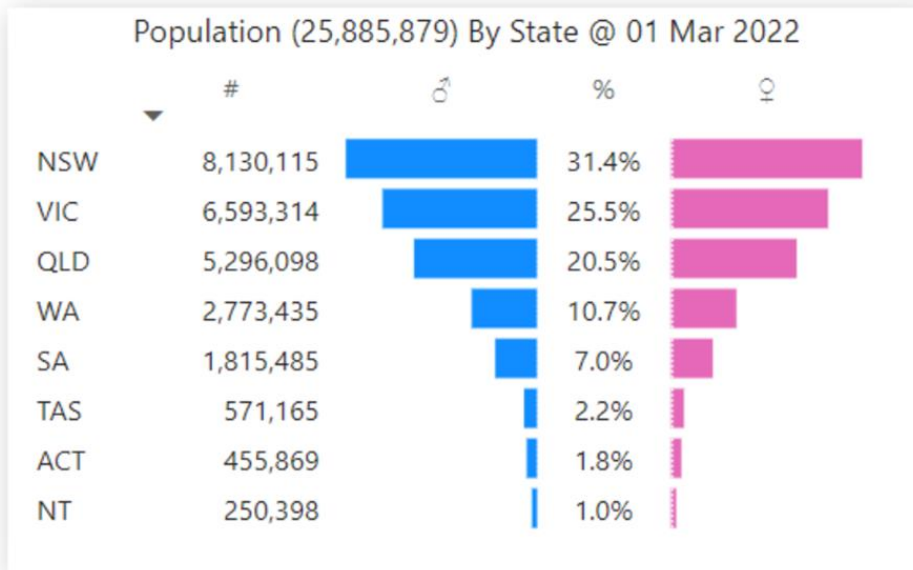
In fact, with the more information per pixel, we now can fit more data points if needed. In fact, we can even make a butterfly chart by combining two columns with data bars!

State	%GT Sum of Population	Sum of Population	Male Population	Female Population
NSW	31.41%	8,130,115	4,040,433	4,089,682
VIC	25.47%	6,593,314	3,259,519	3,333,795
QLD	20.46%	5,296,098	2,624,757	2,671,341
WA	10.71%	2,773,435	1,388,765	1,384,670
SA	7.01%	1,815,485	897,079	918,406
TAS	2.21%	571,165	283,489	287,676
ACT	1.76%	455,869	224,932	230,937
NT	0.97%	250,398	127,159	123,239
Total	100.00%	25,885,879	12,846,133	13,039,746

Taking up only slightly more screen space than the pie chart we started with, we now have more data points and greater detail, while at the same time it is also easier to read than our traditional pie chart.

Are your data visuals making you pie-eyed?

Now let's make it pretty: we can format as needed to fit the aesthetic of your report, removing any detail you don't need for a clean, focussed, high-impact visual.



In this example I have added a measure driven title and removed the total row and the numbers behind the data bars. I'm sacrificing some information for aesthetic appeal here, but this is where you will need to decide for yourself what data adds value and what is simply noise. I've also stripped out the horizontal stripes, reduced the font size and added cell padding for a decluttered look.

If you would like to know more, please contact our Fujitsu Data & AI specialist now.

Contact

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