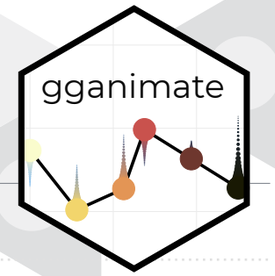
Animate ggplots with gganimate : : **CHEAT SHEET**



Core Concepts

gganimate builds on ggplot2's grammar of graphics to provide functions for animation. You add them to plots created with `ggplot()` the same way you add a geom.

Main Function Groups

- **`transition_*()`**: What variable controls change and how?
- **`view_*()`**: Should the axes change with the data?
- **`enter/exit_*()`**: How does new data get added the plot? How does old data leave?
- **`shadow_*()`**: Should previous data be "remembered" and shown with current data?
- **`ease_aes()`**: How do you want to handle the pace of change between transition values?

Note: you only need a `transition_*()` or `view_*()` to make an animation. The other function groups enable you to add features or alter gganimate's default settings .

Starting Plots

```
library(tidyverse)
library(gganimate)

a <- ggplot(diamonds,
            aes(carat, price)) +
  geom_point()

b <- ggplot(txhousing,
            aes(month, sales)) +
  geom_col()

c <- ggplot(economics,
            aes(date, psavert)) +
  geom_line()
```

transition_*()

We're cycling between values of **color**, ...

transition_states()

```
a + transition_states(color, transition_length = 3, state_length = 1)
```

... and spending **3** times as long going to the next cut as we do pausing there.

We're cycling through each **year** of the data...

transition_time()

```
b + transition_time(year, range = c(2002L,2006L))
```

...from **2002** to **2006** (range is optional; default is the whole time frame). Unlike `transition_states()`, `transition_time()` treats the data as continuous and so the transition length is based on the actual values. Using **2002L** instead of **2002** because the underlying data is an integer.

transition_reveal()

```
c + transition_reveal(date)
```

We're adding each **date** of the data on top of 'old' data

`transition_length` and `filter_length` work the same as `transition/state_length()` in `transition_states()`...

transition_filters()

```
a + transition_filter(transition_length = 3,
                      filter_length = 1,
                      cut == "Ideal",
                      Deep = depth >= 60)
```

... but now we're cycling between these two filtering conditions. **Names** are optional, but can be useful (see "Label variables" on next page).

Other transitions

- **`transition_manual()`**: Similar to transition_states(), but without intermediate states.
- **`transition_layers()`**: Add layers (geoms) one at time.
- **`transition_components()`**: Transition elements independently from each other.
- **`transition_events()`**: Each element's duration can be controlled individually.

Baseline Animation

```
anim_a <- a + transition_states(color, transition_length = 3, state_length = 1)
```

view_*()

view_follow()

```
anim_a +
  view_follow(fixed_x = TRUE,
              fixed_y = c(2500, NA))
```

x-axis shows **full range**, y shows **[2500, as much is needed for that frame]**. Default is for both axis to vary as needed.

We're spending **twice** as long moving between views as staying at them...

view_step()

```
anim_a  +
  view_step(pause_length = 2,
            step_length = 1,
            nstep = 7)
```

... and we're cycling between **seven** views. Seven is the number of steps in the transition, so the view is changing when the points are static, and visa versa. Views are determined by what data is in the current frame.

view_zoom()

`view_zoom()` works similarly to `view_step()`, except it changes the view by zooming and panning.

Note: both `view_step()` and `view_zoom()` have `view_*_manual()` versions for setting views directly instead of inferring it from frame data.

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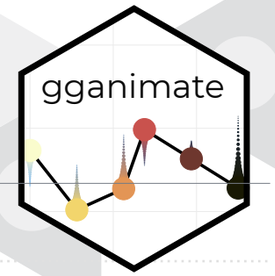

enter/exit_*()

Every `enter_*()` function has a corresponding `exit_*()` function, and visa versa.

enter/exit_fade()
```
anim_a + enter_fade()
```
When new points need to be added, they will start transparent and become opaque.

enter_grow()/exit_shrink()
```
anim_a + exit_shrink()
```
When extra points need to be removed, they will shrink in size before disappearing.

enter/exit_fly()
```
anim_a + enter_fly(x_loc = 0,
                   y_loc = 0)
```
When new points need to be added, they will fly in from **(0, 0)**.

enter/exit_drift()
```
anim_a + exit_drift(x_mod = 3, y_mod = -2)
```
When extra points need to be removed, They drift **3** units to the right and down 2 units before disappearing.

enter/exit_recolour() (or enter/exit_recolor())
```
anim_a + enter_recolour(color = "red")
```
When new points need to be added, they start as **red** before transitioning to their correct color.

Note: `enter/exit_*()` functions can be combined so that you can have old data fade away and shrink to nothing by adding `exit_fade()` and `exit_shrink()` to the plot.

shadow_*()

shadow_wake()
```
anim_a + shadow_wake(wake_length = 0.05)
```
Points have a wake of points with the data from the last **5%** of frames.

shadow_trail()
```
anim_a + shadow_trail(distance = 0.05)
```
Animation will keep the points from **5%** of the frames, spaced as evenly as possible.

shadow_mark()
```
anim_a + shadow_mark(color = "red")
```
Animation will keep past states plotted in **red** (but not the intermediate frames).

ease_aes()

`ease_aes()` allows you to set an easing function to control the rate of change between transition states. See `?ease_aes` for the full list.

Compare:
```
anim_a
anim_a + ease_aes("cubic-in") # Change easing of all aesthetics
anim_a + ease_aes(x = "elastic-in") # Only change `x` (others remain "linear")
```

Saving animations

```
animation_to_save <- anim_a  + exit_shrink()
anim_save("first_saved_animation.gif", animation = animation_to_save)
```

Since the `animation` argument uses your last rendered animation by default, this also works:
```
anim_a  + exit_shrink()
anim_save("second_saved_animation.gif")
```

`anim_save()` uses gifski to render the animation as a .gif file by default. You can use the `renderer` argument for other output types including video files (`av_renderer()` or `ffmeg_renderer()`) or spritesheets (`sprite_renderer()`):
```
# requires you to have the av package installed
anim_save("third_saved_animation.mp4",
          renderer =  av_renderer())
```

Label variables

gganimate's `transition_*()` functions create label variables you can pass to (sub)titles and other labels with the glue package. For example, `transition_states()` has `next_state`, which is the name of the state the animation is transitioning towards. Label variables are different between transitions, and details are included in the documentation of each.

```
anim_a + labs(subtitle = "Moving to {next_state}")
```
We're using the **next_state** label variable to tell the viewer where we're going.

Label variable	Description	Transitions
transitioning	TRUE if the current frame is an transition frame, FALSE otherwise	states, layers, filter
previous_state/layer	Last shown state/layer	states, layers
next_state/layer	State/layer that will been shown next	states, layers
closest_state/layer	State/layer that current frame is closest to (if between states/layers, either next or closest).	states, layers
previous/closest/ next_filter/ expression	Similar to their state/layer analogs. `*_filter` variables return the name of the filter, `*_expression` variables return the condition.	filter
frame_time	Time of current frame	time, components, events
frame_along	Current frame's value for the dimension we're transitioning over	reveal
nlayers	Number of layers (total, not just currently shown)	layer