

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 to 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()
```

enter/exit_*()

```
enter_exit_fade()
anim_a + enter_fade()

enter_grow()/exit_shrink()
anim_a + exit_shrink()

enter_exit_fly()
anim_a + enter_fly(x_loc = 0, y_loc = 0)

enter_exit_drift()
anim_a + exit_drift(x_mod = 3, y_mod = -2)

enter_exit_recolour() (or enter/exit_recolor())
anim_a + enter_recolour(color = "red")
```

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.

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transition_*()

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

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

transition_reveal()
c + transition_reveal(date)

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

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

... 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...

... 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.

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()...

... 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)
```

Saving animations

view_*()

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

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

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...

... 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 vice 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

Label variables

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 be 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

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.

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).

```
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 `ffmpeg_renderer()`) or spritesheets (`sprite_renderer()`):

- # requires you to have the `av` package installed

```
anim_save("third_saved_animation.mp4", renderer = av_renderer())
```

view_*

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



By **Pranav V A**
cheatography.com/pranav-v-a/

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