IDEAS:

start + end journey

flow map

avg flight distance + density of mig

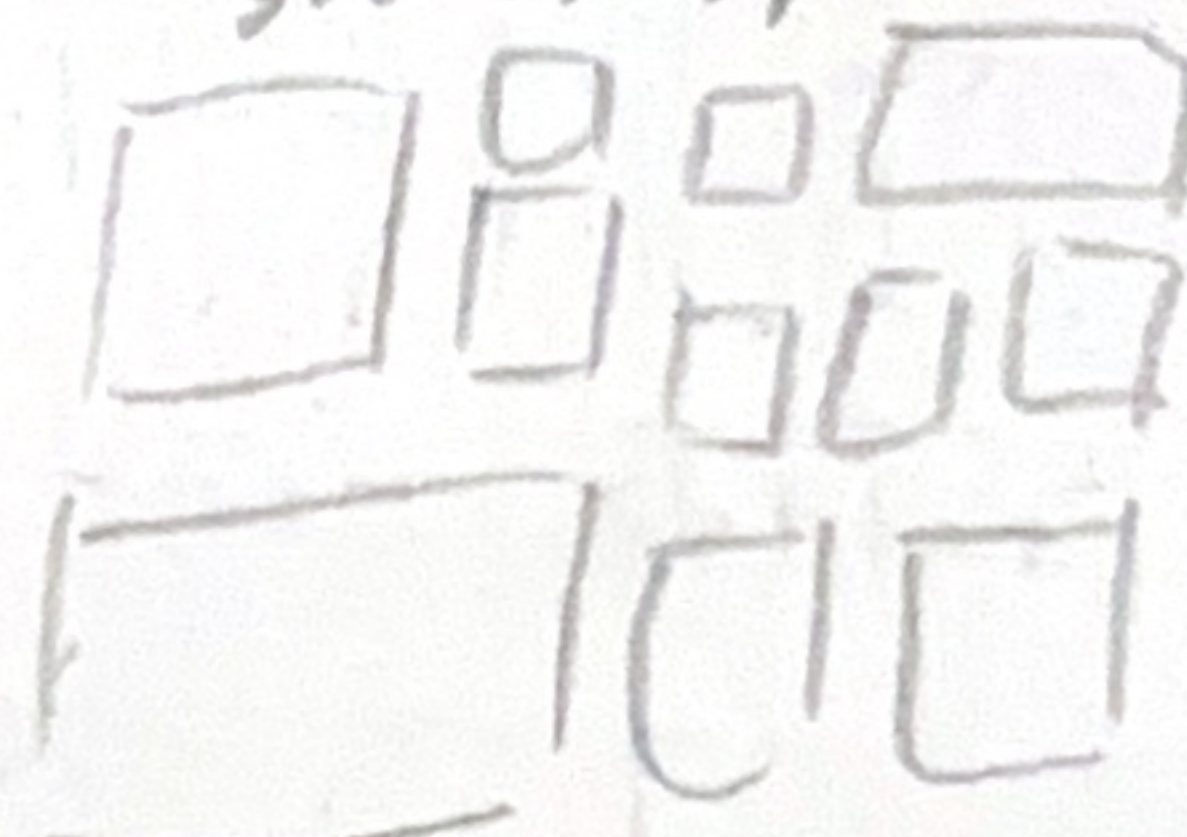
bubble map

distance vs duration

scatterplot

boxplot
distribution of flight distance

violin chart
flight duration

heat map
start month vs duration

FILTER

- flowmap
- boxplot
- scatterplot
- stacked histogram

CATEGORISE

category	purpose	idiom	effective
geographic	why they migrate	flowmap	path comparison
comparison	how distance varies by reason	boxplot	shows variation + endurance
relational	distance vs duration	scatter	reveals efficiency
behavioural	flocking changes	stacked histo	social behaviour
interaction/ link to context	maintain narrative	migration reason filter	coordinated exploration

COMBINE

"why birds migrate"

motivation → movement → endurance → cooperation

LAYOUT

drop-down

legend :

↓ stacked histogram
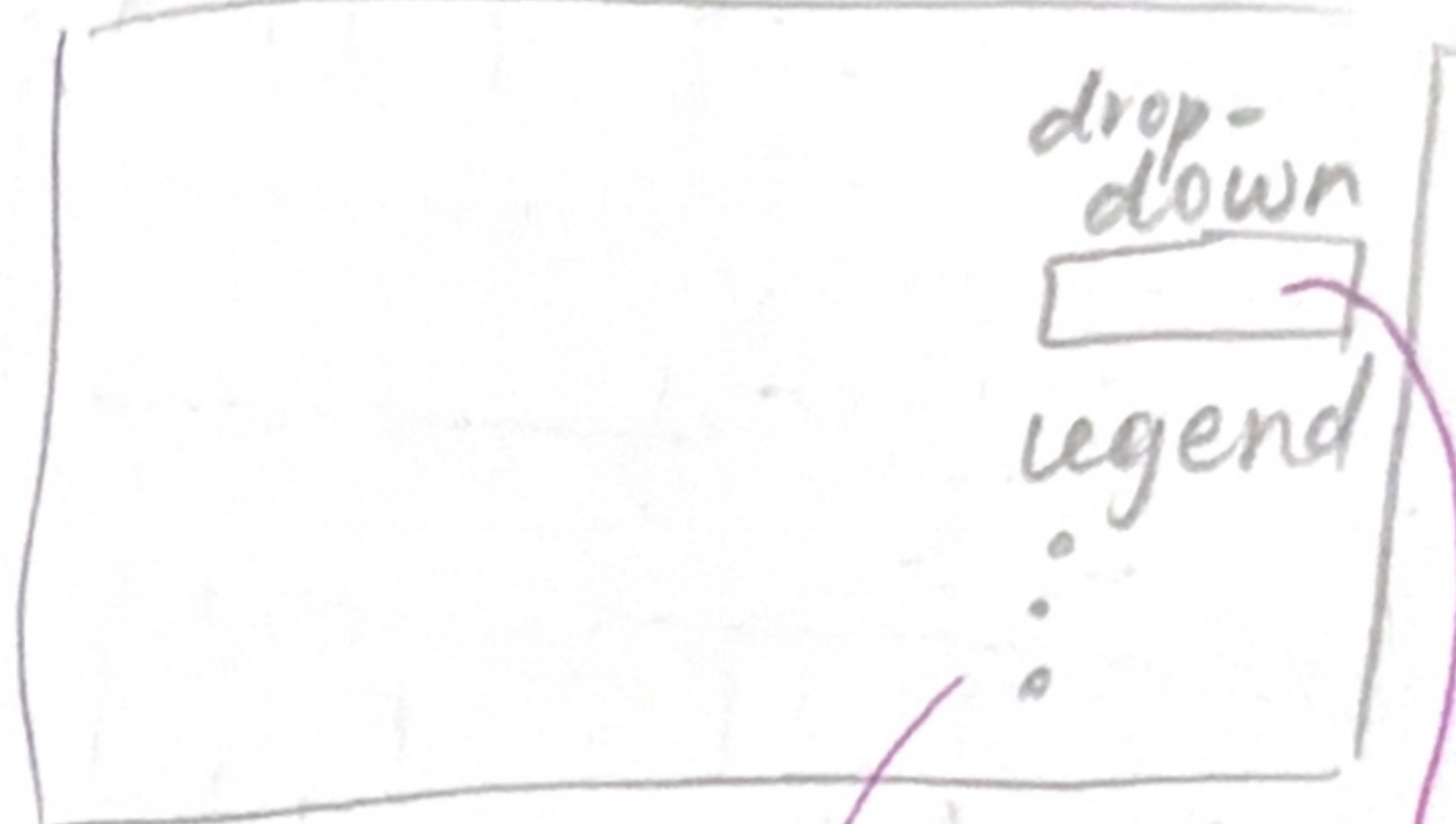
FOCUS/ZOOM

primary focus ⌉
   world map ⌋
- user zooms/pans
  between continents

secondary focus ⌉
   click region ⌋
      bar
- filter map + plots

- tooltips show
   • distance
   • duration
   • species
   • reason
   • start region
   • end region

OPERATIONS

drop-down

legend
:

global
migration
   reason
dropdown
↳ click legend
filters map
+ plots
according to
species

DISCUSSION

+
strong spatial context, geographi
storytelling
integrates distribution + relation
                              ship
views
visually impactful for public
audience

—
map crowding
low clarity for numerical
trends
requires large display

LAYOUT

distance vs duration

scatterplot | parallel coords

flock size

bubble charts | stacked histogram / violin charts
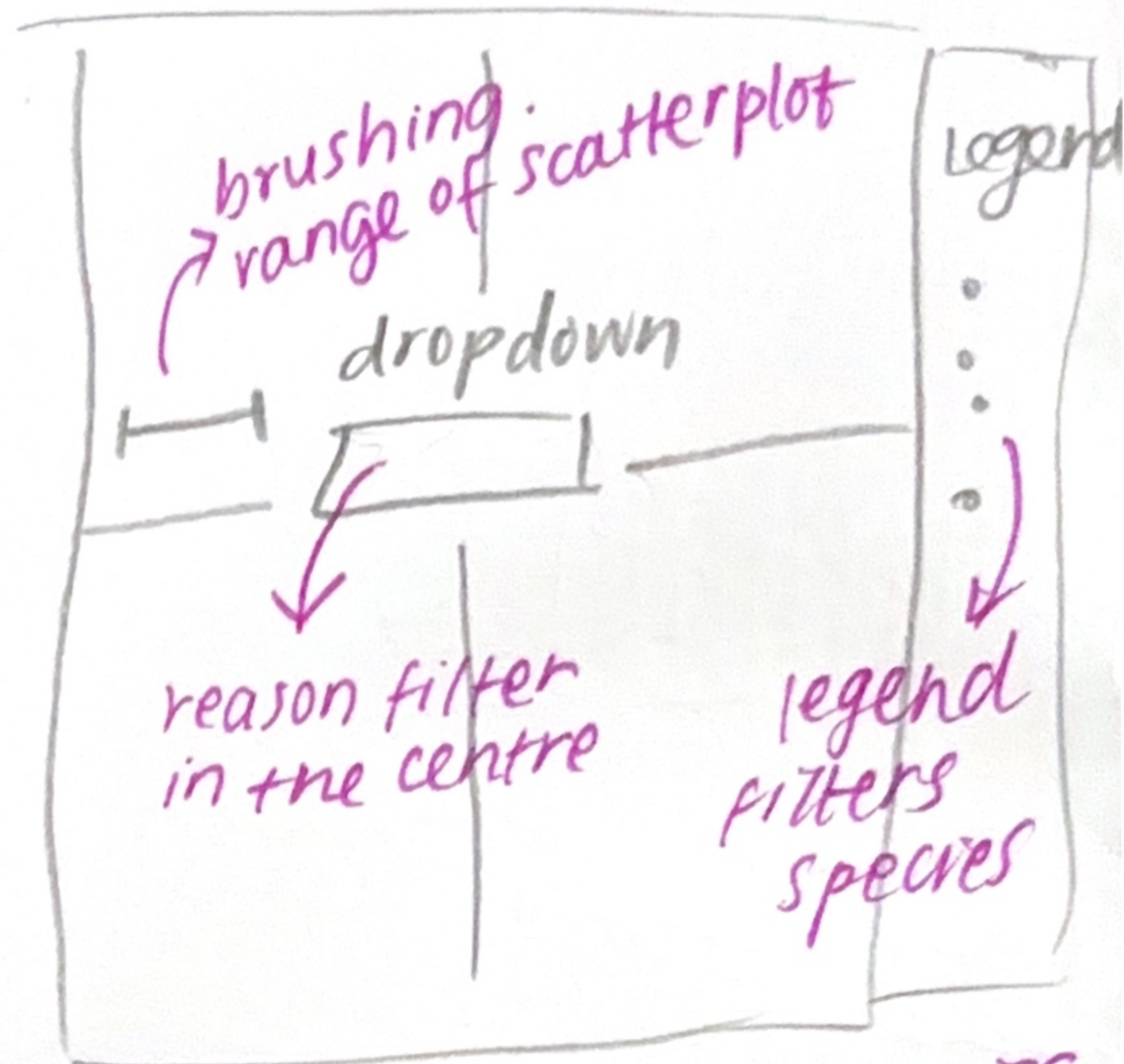
avg distance | distance distribution

ZOOM

- default overview shows all species
- user clicks legend to zoom on one species across plots
- hover line in parallel coords highlights same points in scatter.

OPERATIONS

brushing:
range of scatterplot

dropdown

Legend

reason filter in the centre

legend filters species

tooltip — efficiency metrics

DISCUSSION

+

multivariate insight suited for analytical audience
linked filtering shows environmental drivers

—

less aethetic — technical
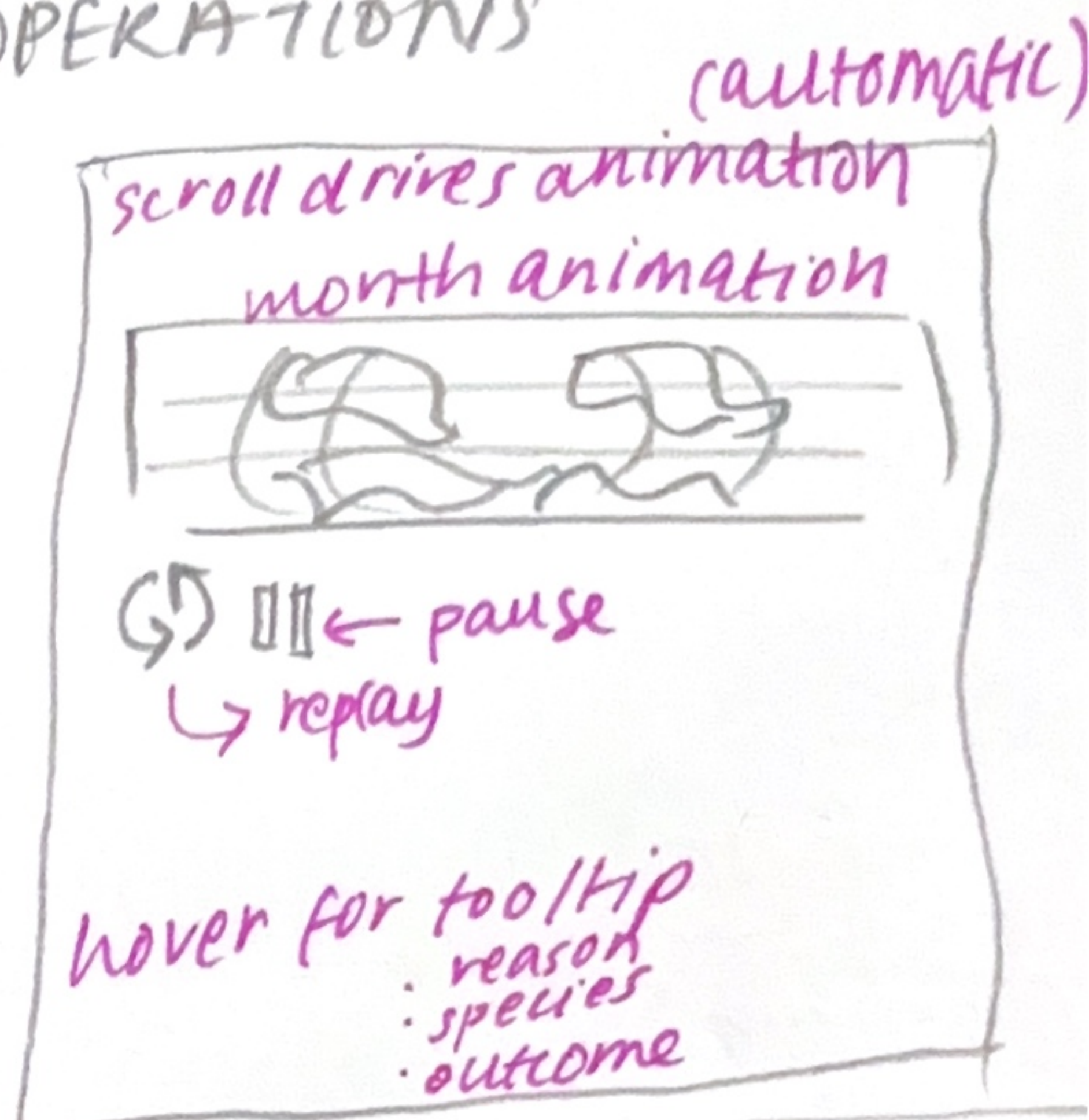parallel coords hard to interpret for non-experts
dense legend needed for clarity

LAYOUT

Intro text

animated flowmap

calendar heatmap

area chart

OPERATIONS

(automatic)

scroll drives animation
month animation

⟳ ❚❚ ← pause
↳ replay

hover for tooltip
· reason
· species
· outcome

DISCUSSION

\+
· engaging + story driven
· strong temporal narrative
· visually memorable for public communication

—

hard to compare
technical implementation
less interactive - auto-
matic
for direct data exploration

ZOOM

- one chart fills screen at a time
  · focus on current idea

- automatic zoom into region when user scrolls

- details - on - demand pops up for highlighted species.

LAYOUT

flowmap

boxplot | scatterplot | stacked histogram

dropdown | legend

OPERATIONS

flowmap
- migration reason from drop-down
- map filters

boxplot
hover box to show tooltip
median, ~~medium~~ mean, range

scatterplot
click species in legend
shows ~~proportion~~ trend
~~scatterplot~~ histogram
hover over segment
shows proportion of flock size

dropdown
filters all graphs

user flow
select reason → migration routes →
comparison → relationship →
pattern

FOCUS

Wings Across the World :
why birds migrate ?

spatial - where birds go
quantitive - how far + efficiently
behavioural - with whom
interactive - filters

DETAIL

framework/tools
vega v5 in HTML and CSS
google fonts
algorithm
reactive vega signals
box-plot quartile + outlier
efficiency math/metric map
dependencies
chrome, safari
dataset from kaggle
vs code
effort

3 - 4 days   2hrs a day