A grid-based approach to map animals social landscape

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# ABSTRACT

Animal social behaviour is under focus since some decades. Integrating approach merging different field, like movement ecology, disease ecology and socio-biology are emerging over the last years. Yet, we feel there is still a gap in liking those approach within the landscape ecology field. Movement data are generally use for individuals or population level investigations, resource selection, habitat use, movement strategies. Yet these doesn’t inform us about . Although, it is slowly changing, We believe tracking data are still underexplore under the social prism. We proposed here a simple grid-based tool enabling to convert animal tracking data into social landscape. This tool uses a set of metrics enabling to uncover the relative importance of landscape for direct and indirect social interactions. Specifically it enables to vizualize social hubs where information or diseases can be transmitted wihtin individuals. We apply this approach to a disease ecology case, the spread of African Swine Fever in wild boar populations *+cheetah data from IZW?*, and illustrate how the proposed approach can potentially fill a missing gap in the movement-social and landscape scientific bubble.

*Keywords*: Social hubs, interactions, aggregations, disease ecology, information, wild boar

# INTRODUCTION

# OBJECTIVE - RESEARCH QUESTIONS

# METHODS

| Type | Metrics | Unit | Description |
| --- | --- | --- | --- |
| indirect | n\_ind | % of tracked individuals |  |
| indirect | revisit\_interval | every x hours |  |
| indirect | visit\_frequency | x by day/week/month |  |
| direct | n\_ind\_max | % of tracked individuals |  |
| direct | visit\_duration | hours |  |
| direct | group\_composition | index 0-1, 1 = always same individuals/dyads/group, 0=always different |  |

We applied a linear model where

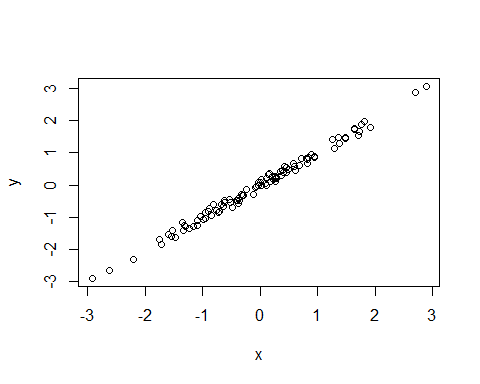
We used the statistical language R (R Core Team 2020) for all our analyses. These were implemented in dynamic rmarkdown documents using knitr (Xie 2014, 2015, 2020) and rmarkdown (Xie et al. 2018, 2020, Allaire et al. 2021) packages. All the multilevel models were fitted with lme4 (Bates et al. 2015).

## Analysis

# APPLICATIONS

A glimpse of the famous Iris dataset.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sepal.Length | Sepal.Width | Petal.Length | Petal.Width | Species |
| 5.1 | 3.5 | 1.4 | 0.2 | setosa |
| 4.9 | 3.0 | 1.4 | 0.2 | setosa |
| 4.7 | 3.2 | 1.3 | 0.2 | setosa |
| 4.6 | 3.1 | 1.5 | 0.2 | setosa |
| 5.0 | 3.6 | 1.4 | 0.2 | setosa |
| 5.4 | 3.9 | 1.7 | 0.4 | setosa |



Just my first figure with a very fantastic caption.

# DISCUSSION

Discuss with other existing landscape-habitat available tools:

* Habitat network (**???**)
* Grainscape toolbox
* Movescape (**???**)

# CONCLUSIONS

Wrap up

# ACKNOWLEDGEMENTS

On the shoulders of giants.

# REFERENCES

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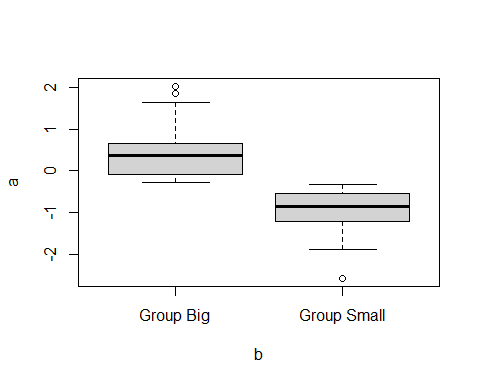
Xie, Y., C. Dervieux, and E. Riederer. 2020. R markdown cookbook. Chapman; Hall/CRC, Boca Raton, Florida.

###### Supplementary Table (on new page)

Now a subset of mtcars dataset.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | mpg | cyl | disp | hp | drat | wt | qsec | vs | am | gear | carb |
| Merc 280 | 19.2 | 6 | 167.6 | 123 | 3.92 | 3.440 | 18.30 | 1 | 0 | 4 | 4 |
| Merc 280C | 17.8 | 6 | 167.6 | 123 | 3.92 | 3.440 | 18.90 | 1 | 0 | 4 | 4 |
| Merc 450SE | 16.4 | 8 | 275.8 | 180 | 3.07 | 4.070 | 17.40 | 0 | 0 | 3 | 3 |
| Merc 450SL | 17.3 | 8 | 275.8 | 180 | 3.07 | 3.730 | 17.60 | 0 | 0 | 3 | 3 |
| Merc 450SLC | 15.2 | 8 | 275.8 | 180 | 3.07 | 3.780 | 18.00 | 0 | 0 | 3 | 3 |
| Cadillac Fleetwood | 10.4 | 8 | 472.0 | 205 | 2.93 | 5.250 | 17.98 | 0 | 0 | 3 | 4 |
| Lincoln Continental | 10.4 | 8 | 460.0 | 215 | 3.00 | 5.424 | 17.82 | 0 | 0 | 3 | 4 |

###### Supplementary Figure (on new page)



A boxplot.