WMMC'19
World Marine Mammal Conference
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Together for Science and Conservation

INFERRING ANIMAL SOCIAL NETWORKS WITH IMPERFECT DETECTION

Olivier Gimenez, Lorena Mansilla, Javier Klaich, Mariano Coscarella, Suzana Pedraza, Enrique Crespo

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@oaggimenez

SOCIAL NETWORK ANALYSIS (SNA)

Damien Farine

Hal Whitehead

« Social network analysis provides a flexible framework for analysing association or interaction data to address a broad set of biological questions (…). Most fundamentally, it provides a description of social structure. »

Farine & Whitehead (2015)
Journal of Animal Ecology 84, 1144-1163

Behavioral ecology: Characterizing social structure

Behavioral Ecology (2019), XX(XX), 1–14. doi:10.1093/beheco/arz029

Original Article

Assortative interactions revealed in a fission–fusion society of Australian humpback dolphins

Tim N. Hunt,[1] Simon J. Allen,[2] Lars Bejder,[3,4] and Guido J. Parra[1]

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Disease ecology: Planning vaccination campaigns

PROCEEDINGS B

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Research

Cite this article: Robinson SJ, Barbieri MM, Murphy S, Baker JD, Harting AL, Craft ME, Littnan CL. 2018 Model recommendations meet management reality: implementation

Model recommendations meet management reality: implementation and evaluation of a network-informed vaccination effort for endangered Hawaiian monk seals

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Demography: Linking social structure and fitness

PNAS

Role of sociality in the response of killer whales to an additive mortality event

Marine Busson[a,1], Matthieu Authier[b,c], Christophe Barbraud[a], Paul Tixier[d], Ryan R. Reisinger[a,e], Anaïs Janc[a], and Christophe Guinet[a]

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What if detection is imperfect?!

And what you see...

Photo by H. Labach

… is not all there is!

Photo by H. Labach

SNA WITH CAPTURE-RECAPTURE DATA

Ecological Modelling 401 (2019) 69–74

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Inferring animal social networks with imperfect detection

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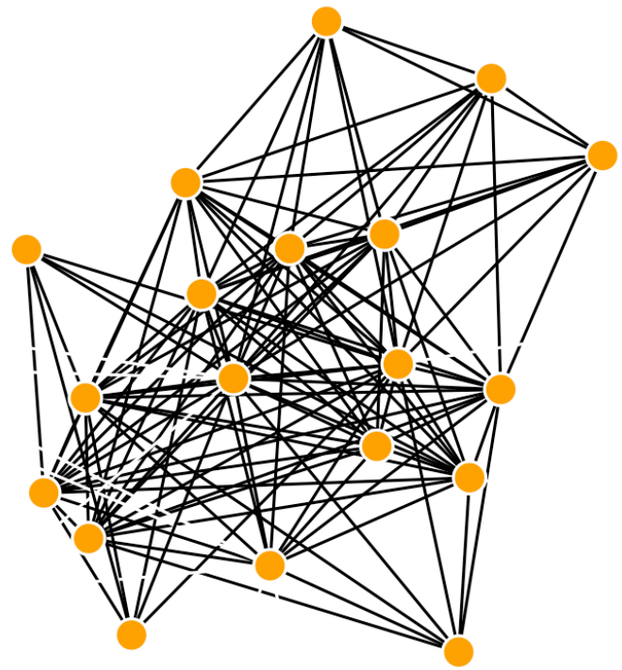
ABSTRACT

Social network analysis provides a powerful tool for understanding social organisation of animals. However, in free-ranging populations, it is almost impossible to monitor exhaustively the individuals of a population and to track their associations. Ignoring the issue of imperfect and possibly heterogeneous individual detection can lead to substantial bias in standard network measures. Here, we develop capture-recapture models to analyse network data while accounting for imperfect and heterogeneous detection. We carry out a simulation study to validate our approach. In addition, we show how the visualisation of networks and the calculation of standard metrics can account for detection probabilities. The method is illustrated with data from a population of Commerson's dolphin (*Cephalorhynchus commersonii*) in Patagonia Argentina. Our approach provides a step towards a general statistical framework for the analysis of social networks of wild animal populations.

Analyses, data & codes: https://tinyurl.com/vhyzxqp

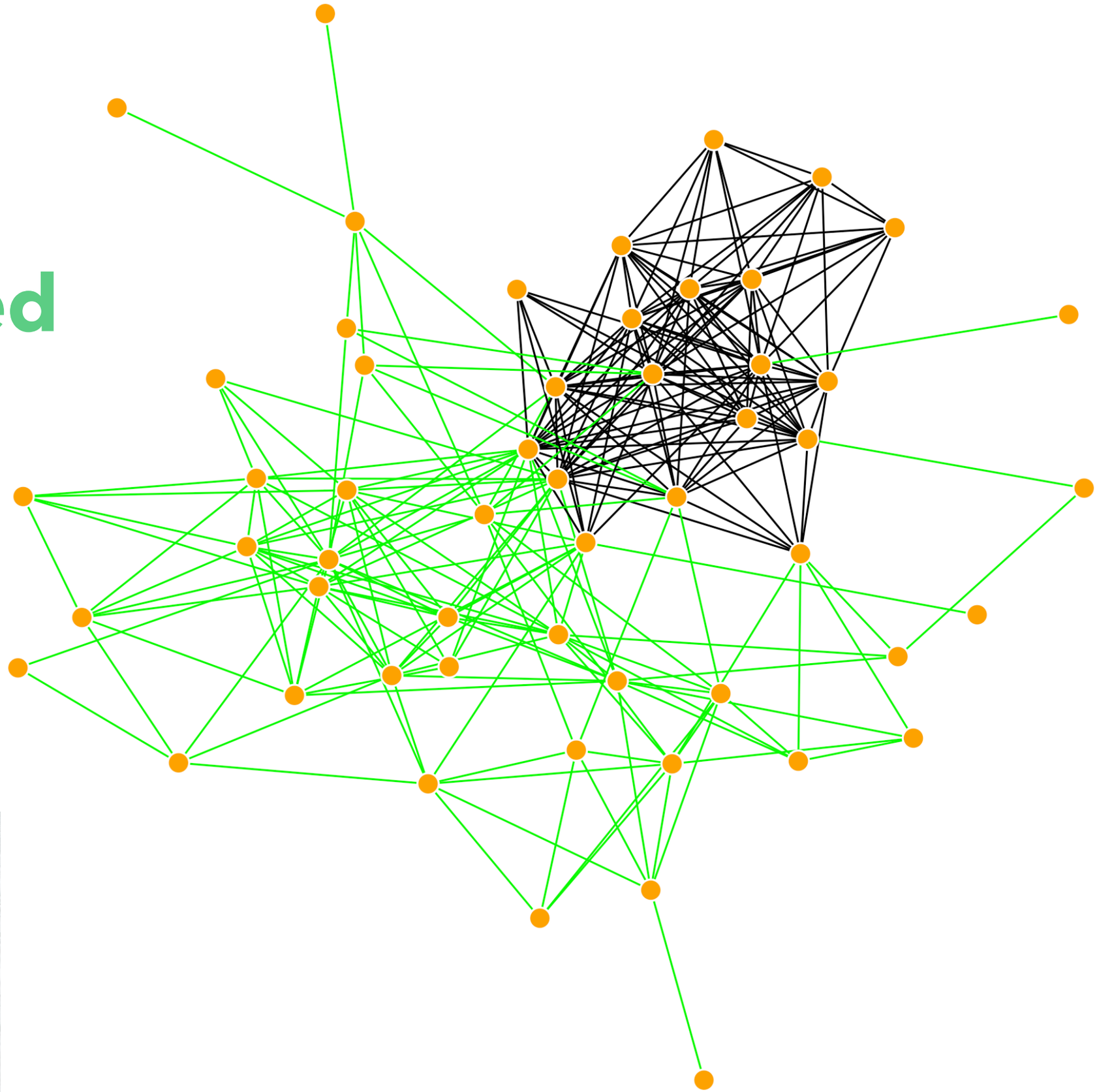
CASE STUDY ON COMMERSON'S DOLPHINS

Observed



Observed

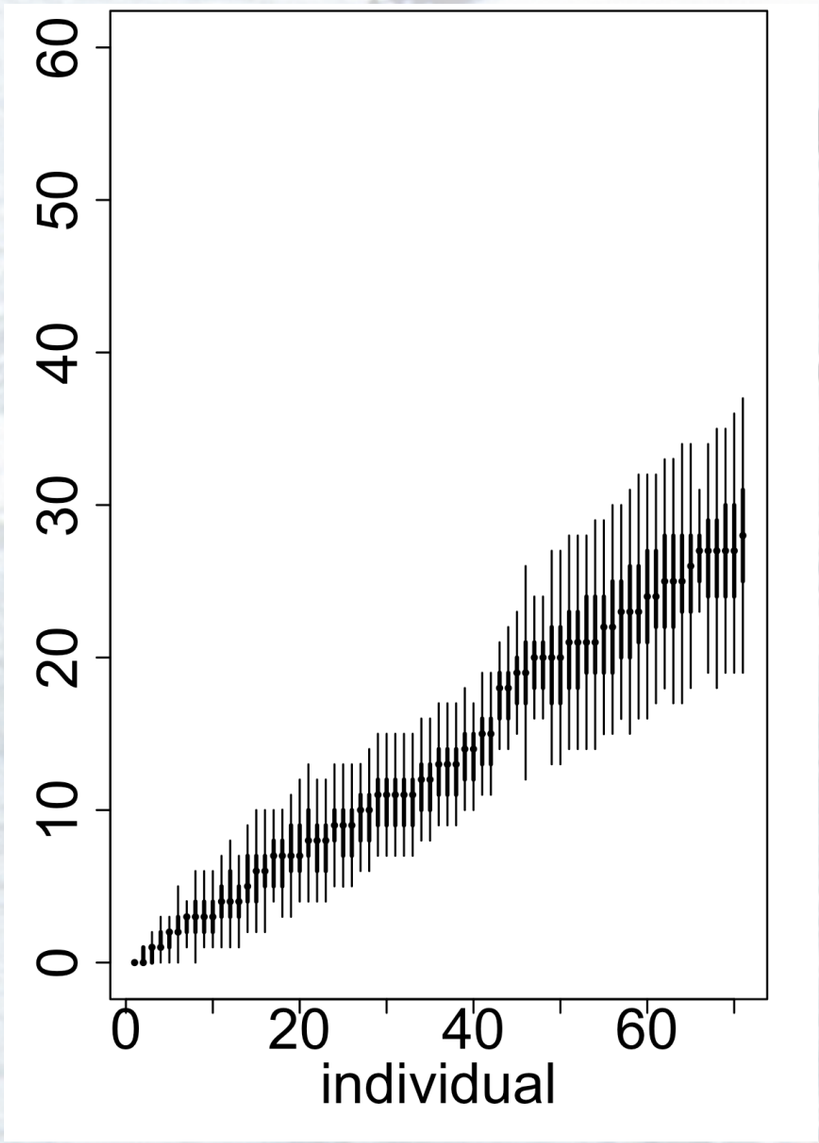
Estimated



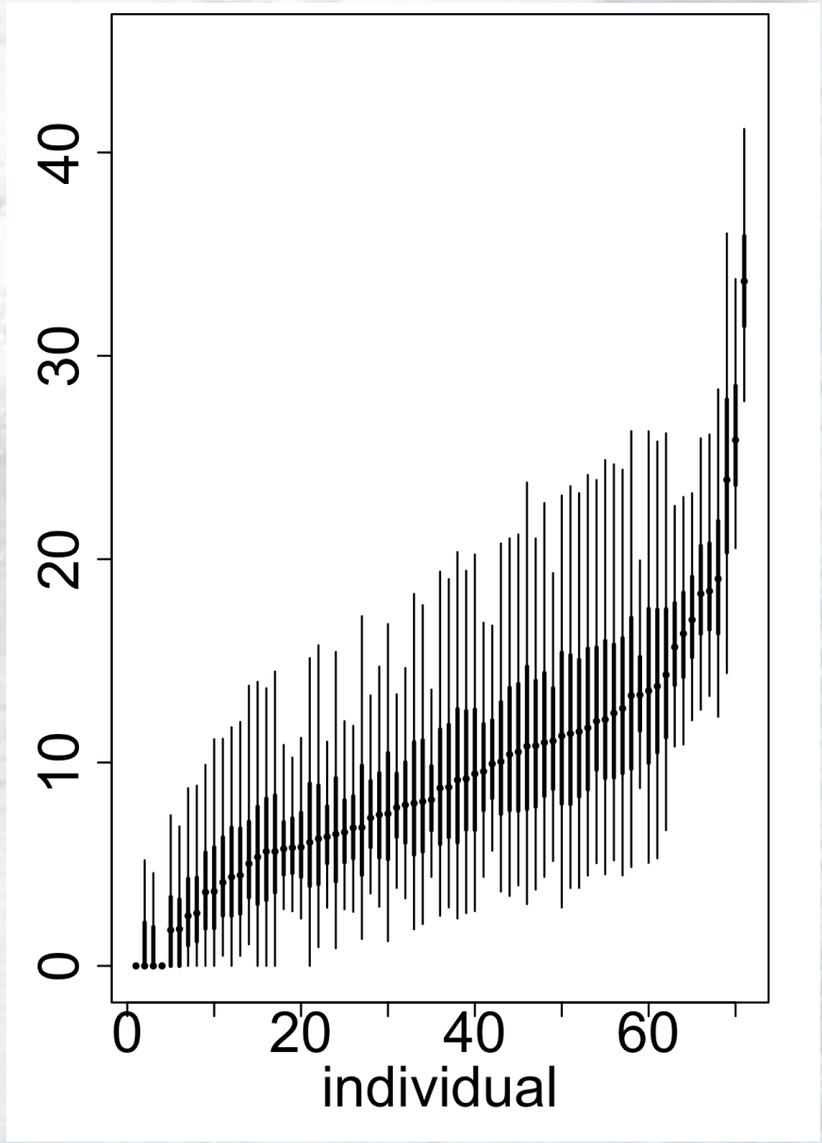
Commerson’s dolphin

Network characteristics with uncertainty

Number of links
(degree)



Influential nodes
(betweeness)



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