
ENAC-SIE, SIE/Master Project, Fall		Start: 19/09/2017
30 ECTS credits (master project) - 4 ETCS credits (semester project)		End: 22/12/2017

Title	Sensitivity analysis of a species distribution model to different formulations of the fitness function	
Supervisors	Damiano Pasetto, Jonathan Giezendanner, Prof. Andrea Rinaldo	
Objective	<p>The aim of this project is to assess which environmental features play the most important role in determining the distribution of given species through a spatially-explicit metapopulation model. To achieve this goal, different formulations of the fitness function will be considered, eventually incorporating remotely sensed measurements.</p>	
Abstract	<p>Metapopulation models have been developed to estimate the spatiotemporal dynamics of given species in the domain of interest. In particular, the model used in this project is based on a stochastic representation of the colonization and extinction processes, which rates may vary among the species. The fitness function quantifies how well a certain location is suitable for each species, thus determining the probabilities of extinction/colonization in that location. Different environmental properties can be considered in the fitness functions, for example, temperature, irradiation, and soil properties. This project will investigate the possible formulations of the fitness function, aiming to obtain a reliable response of the model to the environmental properties. These steps are fundamental to improve the modeling of the species distribution under scenarios of climate change.</p>	
Task description	<ul style="list-style-type: none">• Formulation of possible fitness functions considering different environmental features• Sensitivity analysis of the species distribution model to different fitness functions• Possible application to real species distribution data (required for the master project)	
Required skills	<ul style="list-style-type: none">• Good programming skills• Notions of sensitivity analysis• Notions about remote sensing and GIS	
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