

Enseñanza basada en reproducibilidad

Modelado y Simulación de Fenómenos basados en Agentes

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Curso en: **T**ecnologías **R**eproducibles en la **E**nseñanza de la
Metodología y la **E**stadística



Objetivo del Curso

Comprender, a través del software **NetLogo**, los beneficios de adoptar nuevas tecnologías reproducibles para la enseñanza de contenidos metodológicos y estadísticos orientados al modelado y simulación de fenómenos de interés para las ciencias naturales y sociales.



Agenda

- 1 ¿Qué es NetLogo?
 - ¿Qué es un agente?
 - 2 Justificación de la herramienta
 - 3 Requerimientos Técnicos
 - 4 NetLogo Web
 - 5 NetLogo en Psicología y Ciencias Sociales
 - 6 Recomendaciones
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¿Qué es NetLogo?

NetLogo es un lenguaje de programación dentro de un entorno de desarrollo integrado para modelar y simular fenómenos implementando **agentes inteligentes** (Tisue y Wilensky, 2004).



¿Qué es un agente?

Un agente inteligente (en su “noción débil”) es una entidad no biológica, con las siguientes propiedades: (Wooldridge y Jennings, 1995):

- **Autonomía:** Actúan sin la intervención directa de un humano, teniendo cierto grado de control sobre sus propias acciones.



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- **Proactividad:** Son capaces de mostrar conductas orientadas a metas tomando la iniciativa y actuando con anticipación a la ocurrencia de eventos en su entorno.



¿Qué es un agente?

Según Wooldridge y Jennings (1995) la “noción fuerte” de agentes, además de incorporar a la noción débil, asume al agente como un sistema “que emplea conceptos que se aplican más usualmente a los humanos” (p. 117); lo que implica que los agentes tienen “conocimientos”, “obligaciones”, “intenciones” o hasta “emociones”.



<https://ccl.northwestern.edu/2020/Final%20Draft.pdf>

NetLogo Mobile: An Agent-Based Modeling Platform and Community for Learners, Teachers, and Researchers

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Northwestern University

Abstract: A complex systems perspective provides a major opportunity for learning. NetLogo is a powerful tool to foster computational thinking with complex systems. This poster reports on our prototype of NetLogo Mobile, a new interface to NetLogo designed for wide scaling. We introduce its underlying design principles. Through scaling the community, expanding the interactive repertoire, and scaffolding, we empower a variety of stakeholders to create models and curricula for localized needs, embracing learning designs and social behaviors to emerge.

(Chen y Wilensky, 2020)



Justificación de la Herramienta

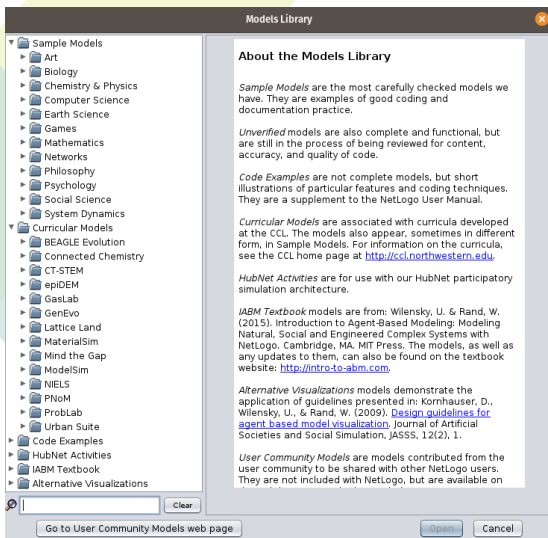
“Las ideas poderosas son las que pueden usarse como herramientas para pensar durante toda la vida. La idea de un sistema complejo es intrínsecamente poderosa (...) brinda una gran oportunidad para cerrar la brecha cada vez mayor entre la comprensión actual en el mundo académico, la práctica de los profesionales, los hacedores de política y los ciudadanos.”

(Chen y Wilensky, 2020, p. 2633)



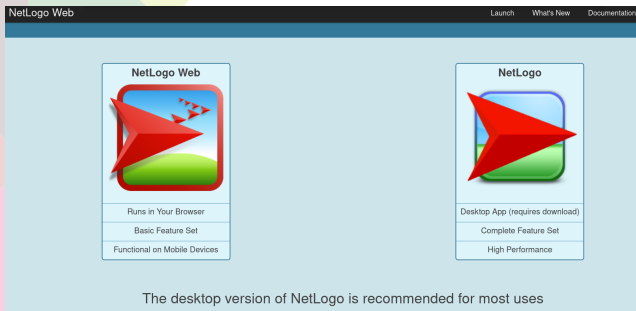
Justificación de la Herramienta

En la librería de NetLogo hay muchísimos modelos listos para usar.



Requerimientos Técnicos

Para seguir el paso a paso de este tutorial, es necesario que usted cuente con un acceso a Internet para visitar la página de Netlogo web (<http://www.netlogoweb.org/>) o instalar NetLogo Desktop (<https://ccl.northwestern.edu/netlogo/download.shtml>).



NetLogo Web

Tutorial para su uso docente



NetLogo Web: Paso 1

Ingresamos a NetLogo Web

The screenshot shows a web browser window displaying the NetLogo Web interface. The browser's address bar shows the URL [www.netlogoweb.org/launchhttp://www.netlogoweb.org/assets/modelslib/Sample Models/Social Science/Traffic 2 Lanes.nlogo](http://www.netlogoweb.org/launchhttp://www.netlogoweb.org/assets/modelslib/Sample%20Models/Social%20Science/Traffic%202%20Lanes.nlogo). The NetLogo Web interface has a dark blue header with the title "NetLogo Web" and navigation links: "Launch", "What's New", "Documentation", and "About NetLogo". Below the header is a search bar for the Models Library and an "Upload a Model:" button. The main content area displays the "Traffic 2 Lanes" model, which is powered by NetLogo. The model is interactive, and the "Commands and Code: Bottom" tab is selected. The interface includes a "model speed" slider, a "view" button, and a "setup" button. A list of sliders on the left allows for adjusting parameters: "number-of-cars" (set to 40), "acceleration" (set to 0.065), "deceleration" (set to 0.02), and "max-patience" (set to 10). Below these sliders are buttons for "select car", "follow selected car", "watch selected car", and "reset perspective". At the bottom, there are three monitors: "selected car speed" (displaying "N/A"), "mean speed" (displaying "N/A"), and "Cars Per Lane" (displaying "0"). The bottom right corner features three line graphs: "Car Speeds" (showing average, max, min, and selected car speeds over time), "Driver Patience" (showing average, max, min, and selected car patience over time), and "Cars Per Lane" (showing the number of cars per lane over time).



NetLogo Web: Paso 2

Clic en el botón Setup

The screenshot shows the NetLogo Web interface in a Firefox browser. The address bar shows the URL: [www.netlogo.org/launchhttp://www.netlogo.org/assets/modelstolib/Sample Models/Social Science/Traffic 2 Lanes.nlogo](http://www.netlogo.org/launchhttp://www.netlogo.org/assets/modelstolib/Sample%20Models/Social%20Science/Traffic%20Lanes.nlogo). The page title is "NetLogo Web". The main content area displays the "Traffic 2 Lanes" model. The interface includes a search bar, a "Launch" button, and a "Setup" button. The "Traffic 2 Lanes" model is displayed with a central road view and three monitors at the bottom: "Cars Per Lane", "Car Speeds", and "Driver Patience".



NetLogo Web: Paso 3

Clic en el botón go

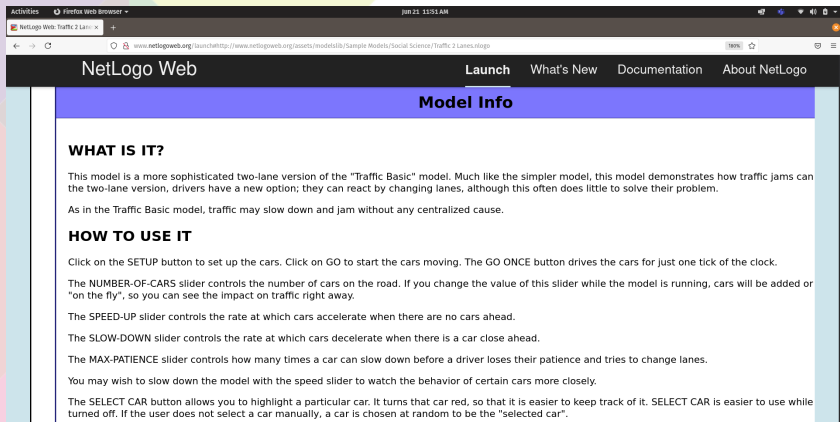
The screenshot shows the NetLogo Web interface in a Firefox browser. The main window displays the 'Traffic 2 Lanes' model. At the top, there's a search bar for the Models Library and an 'Upload a Model' button. The interface is divided into several sections:

- Top Bar:** Includes 'Launch', 'What's New', 'Documentation', and 'About NetLogo' links.
- Search Bar:** Contains the text 'Search the Models Library: Sample Models/Social Science/Traffic 2 Lanes' and an 'Upload a Model: Browse...' button.
- Model Title:** 'Traffic 2 Lanes' is displayed in the center.
- Mode:** A dropdown menu is set to 'Interactive'. Below it, 'Commands and Code: Bottom' is selected.
- Buttons:** On the left, there are 'setup', 'go once', and 'go' buttons. The 'go' button is highlighted with a yellow border.
- Sliders:** Below the buttons are sliders for 'number of cars' (set to 40), 'acceleration' (set to 0.005), 'deceleration' (set to 0.02), and 'max-patience' (set to 50).
- Model View:** The central area shows a top-down view of a two-lane road with cars represented as small blue and red icons. A 'model speed' slider is at the top of this view, and a 'ticks: 121' counter is below it.
- Monitors:** At the bottom left, there are two monitors: 'selected car speed' showing 0.65 and 'mean speed' showing 0.14.
- Plots:** At the bottom, there are three plots: 'Cars Per Lane' (showing the number of cars in each lane over time), 'Car Speeds' (showing the speed of individual cars over time), and 'Driver Patience' (showing the patience level of individual cars over time).



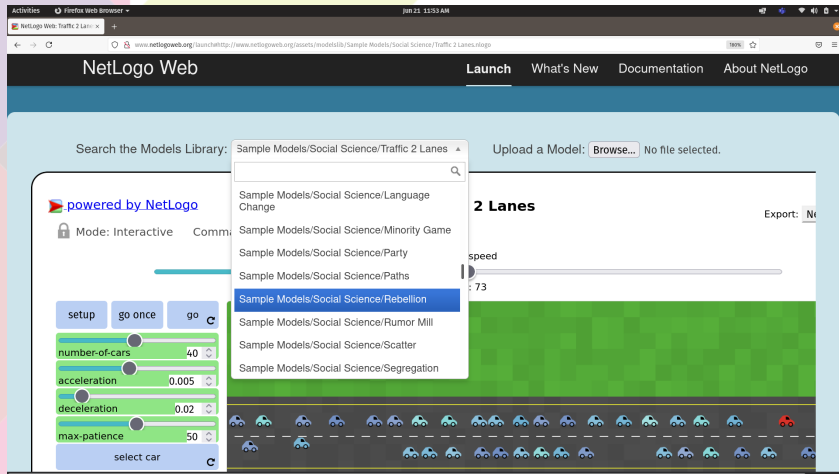
NetLogo Web: Paso 4

Lea la información del modelo (qué es, cómo usarlo, cosas por observar, cosas por intentar, extensión del modelo).



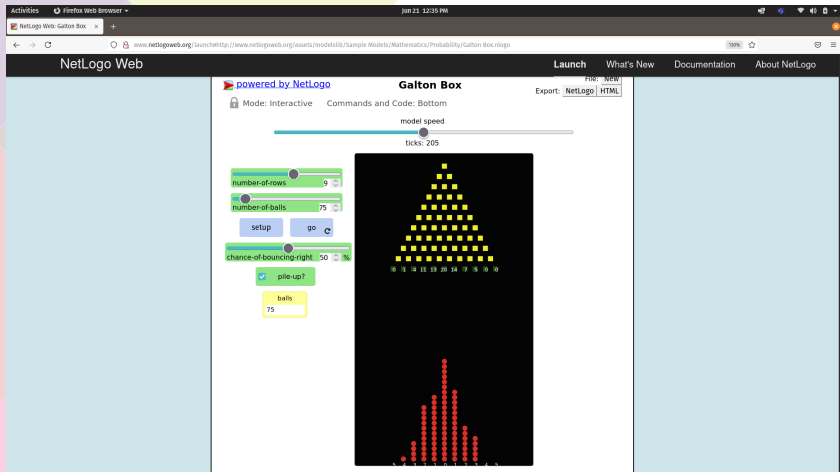
NetLogo Web: Paso 5

Explore otros modelos



NetLogo Web: Paso 6

Explore el modelo de la caja de Galton para explicar el concepto de distribución estadística.



En psicología clínica se ha usado para comprender la estructura de la psicopatología.



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Network Analysis: An Integrative Approach to the Structure of Psychopathology

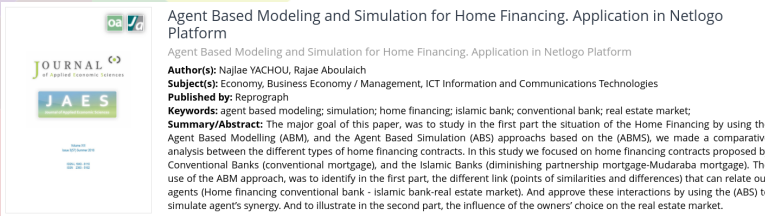
Denny Borsboom and Angélique O.J. Cramer

Department of Psychology, University of Amsterdam, Amsterdam 1018 XA, The Netherlands;
email: D.Borsboom@uva.nl

(Borsboom y Cramer, 2013) <https://youtu.be/AIaBkAwLd4Q>



En finanzas NetLogo ha servido para entender algunos aspectos asociados con el financiamiento de hogares.



Agent Based Modeling and Simulation for Home Financing. Application in Netlogo Platform

Agent Based Modeling and Simulation for Home Financing. Application in Netlogo Platform


Author(s): Najlae YACHOU, Rajae Aboulaich

Subject(s): Economy, Business Economy / Management, ICT Information and Communications Technologies

Published by: Reprograph

Keywords: agent based modeling; simulation; home financing; islamic bank; conventional bank; real estate market;

Summary/Abstract: The major goal of this paper, was to study in the first part the situation of the Home Financing by using the Agent Based Modelling (ABM), and the Agent Based Simulation (ABS) approaches based on the (ABMS), we made a comparative analysis between the different types of home financing contracts. In this study we focused on home financing contracts proposed by Conventional Banks (conventional mortgage), and the Islamic Banks (diminishing partnership mortgage-Mudaraba mortgage). The use of the ABM approach, was to identify in the first part, the different link (points of similarities and differences) that can relate our agents (Home financing conventional bank - islamic bank-real estate market). And approve these interactions by using the (ABS) to simulate agent's synergy. And to illustrate in the second part, the influence of the owners' choice on the real estate market.

Download 

Details Contents

(Yachou y Aboulaich, 2018)



NetLogo se ha usado también para entender la propagación de información falsa en redes sociales.

Simulation of misinformation spreading processes in social networks: an application with NetLogo

Publisher: IEEE

[Cite This](#)



Emilio Sulis ; Marcella Tambuscio [All Authors](#)

(Sulis y Tambuscio, 2020)



Recomendaciones

Explorar los recursos de la Sociedad Internacional para las Ciencias del Aprendizaje



The screenshot shows the homepage of The International Society of the Learning Sciences (ISLS). The header is dark purple with the ISLS logo on the left and navigation links (About, Members, Publications, Conferences, Education, News & Events) in the center. On the right of the header are search and login options (Sign in, Sign up). The main content area has a light purple background with a network diagram. It features a large title 'The International Society of the Learning Sciences' and a subtitle 'An interdisciplinary society dedicated to the research of learning in all of its forms'. Below this are three columns: 'Membership' with a person icon, 'Explore Resources' with a graduation cap icon, and 'Support ISLS' with a donation icon. Each column contains a brief description of the respective service.

WELCOME TO

The International Society of the Learning Sciences

An interdisciplinary society dedicated to the research of learning in all of its forms



Membership

Become an ISLS member to access JLS and IJCSCL online journal subscriptions, ISLS Annual Meeting registration, and to collaborate with ISLS members from all around the world.



Explore Resources

Explore our rich selection of interdisciplinary research and resources across educational psychology, collaboration, data science, information sciences, design studies, and more.



Support ISLS

Make a personal donation to support the ISLS Annual Meeting.



Desarrollar modelos reproducibles con NetLogo, aprovechando la diversidad de modelos ya disponibles.

DOI: 10.1111/2041-210X.13286

APPLICATION

Methods in Ecology and Evolution



The NLRX R package: A next-generation framework for reproducible NetLogo model analyses

Jan Salecker¹  | Marco Sciaini¹  | Katrin M. Meyer¹  | Kerstin Wiegand^{1,2} 

(Salecker, Sciaini, Meyer, y Wiegand, 2019)



Referencias I

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