

TAREA 2 (10 puntos)
REDES NEURONALES ARTIFICIALES

- La tarea se realizará individualmente de forma autónoma y no presencial. Aunque la tarea se presenta individualmente, os animo a intercambiar ideas con los compañeros. Asegúrate de escribir TUS propias opiniones de manera clara, coherente y completa. Si utilizas material proveniente de otras fuentes (libro, página web, artículo, ...) tienes que identificarlo.
 - Los alumnos subirán su resolución al espacio habilitado en el Aula Digital **en formato Rmd y html**. No se corregirán aquellas entregas presentadas en otro formato, sin nombre o que no se puedan abrir.
 - **Fecha límite de entrega:** 21 de marzo de 2021 a las 23.55 h. NO SE ADMITIRÁN ENTREGAS FUERA DEL PLAZO ESTABLECIDO.
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1. The following videos give insights on the behavior of neural networks:

- What is Backpropagation really doing: <https://www.youtube.com/watch?v=Ilg3gGewQ5U>
- Backpropagation calculus: <https://www.youtube.com/watch?v=tIeHLnjs5U8>

View them and comment on the most amazing aspects of neural nets and how they learn. MAXIMUM 1 page.

2.- **The Data:** We will use Haberman's Survival data set from UCI's Machine Learning Repository. Haberman's data set contains cases from a 1958 and 1970 study conducted at the University of Chicago's Billings Hospital on the survival of 306 patients who had undergone surgery for breast cancer. The data set and data names are available at <http://archive.ics.uci.edu/ml/machine-learning-databases/haberman/>.

Consider the following **research question**: Use the data set and construct several models to predict a patient's 5-year survival as a function of their age at date of operation, year of the operation, and the number of positive axillary nodes detected. Compare the results of the ANN classification models obtained. Which model is the "best"?

To answer this question you will consider different artificial neural networks architectures. Tune the learning rate, initial weights, the number of epochs and data preparation to get an improved score on correctly classified examples of the dataset.

The document you turn in should explain: data loading and analysis, data preprocessing, application of several learning models, comparison of model's results and a conclusion.