

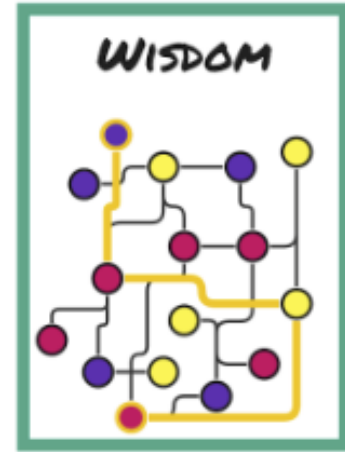
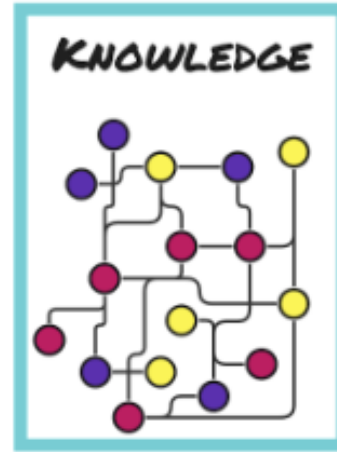
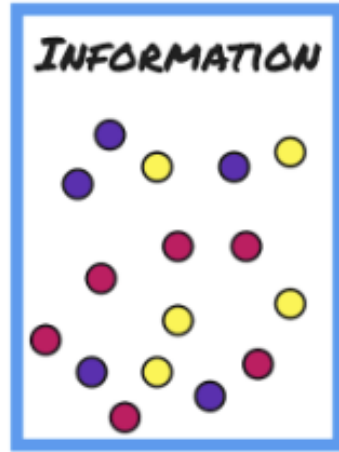
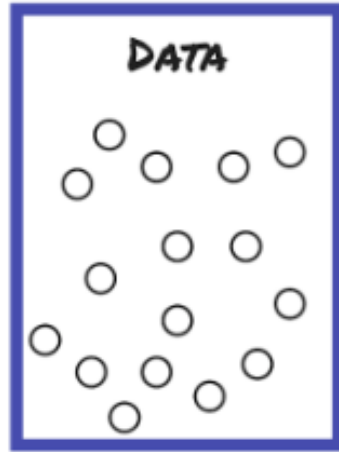
NutriFoum25

Gestión de la información con y sin inteligencia artificial: aplicaciones básicas para nutrición de precisión

Carlos Fernández

Catedrático Universidad

Universitat Politècnica de Valencia, ES



- cifras carentes de significado



- datos que han sufrido algún tipo de organización

- información que la persona ha internalizado de manera que pueda utilizarla

- Permite observar patrones y su estructura

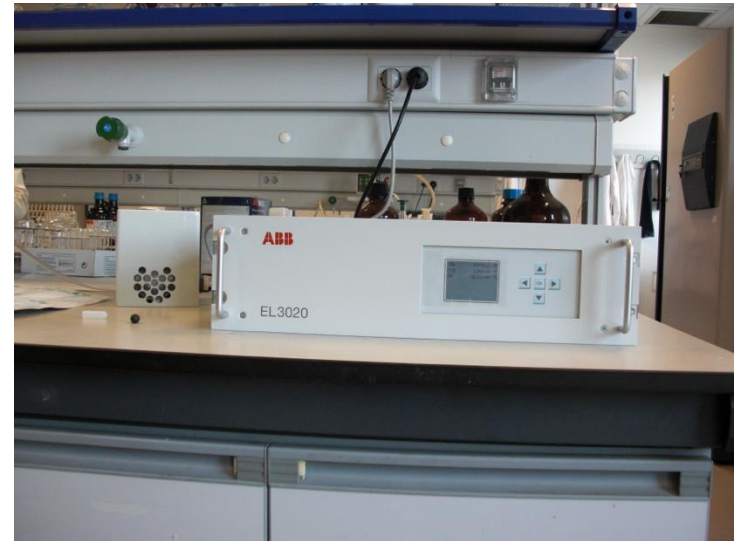


Ejemplo de emisiones de METANO



MÁSCARA RESPIRATORIA

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MÁSC

im25

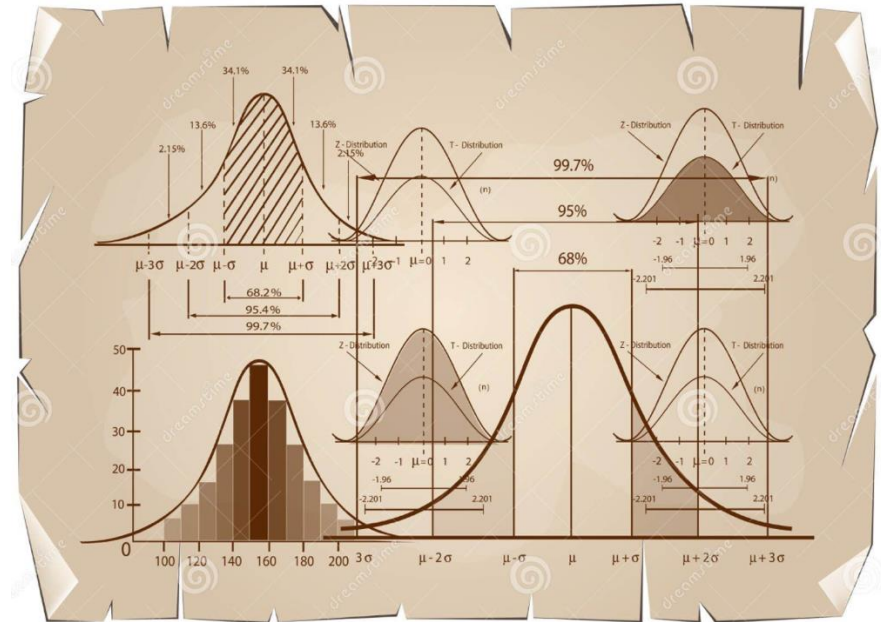


ANÁLISIS DE LA VARIANZA

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Ronald Fisher, en 1913.



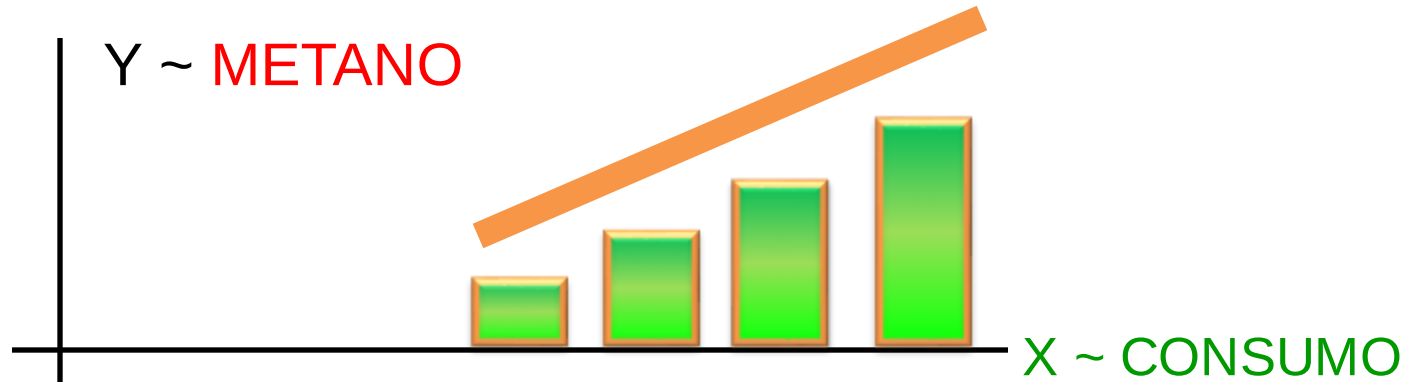
REUTILIZAR & RECICLAR RESIDUOS
REDUCIR LA QUEMA & REDUCIR CH₄

NutriForum25



AUMENTO EL CONSUMO DE MS

NutriForum25



REGRESIÓN LINEAL

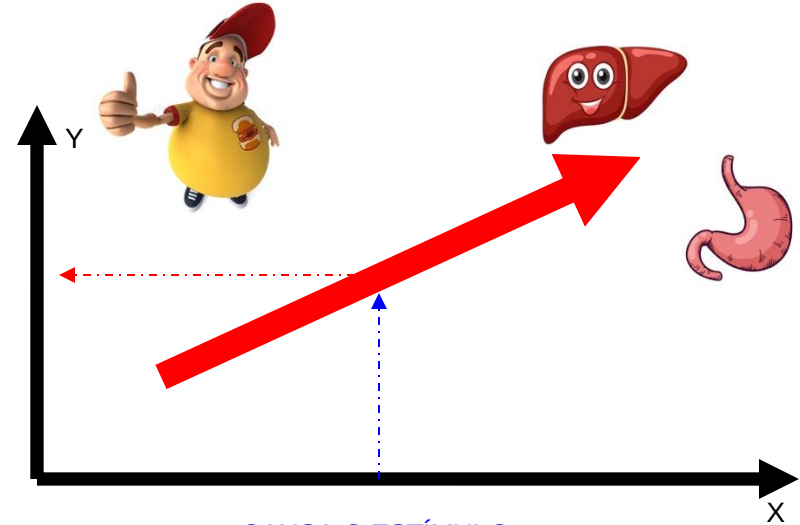
NutriForum25



Karl Gauss



EFFECTO O RESPUESTA
OUTPUT
engordo

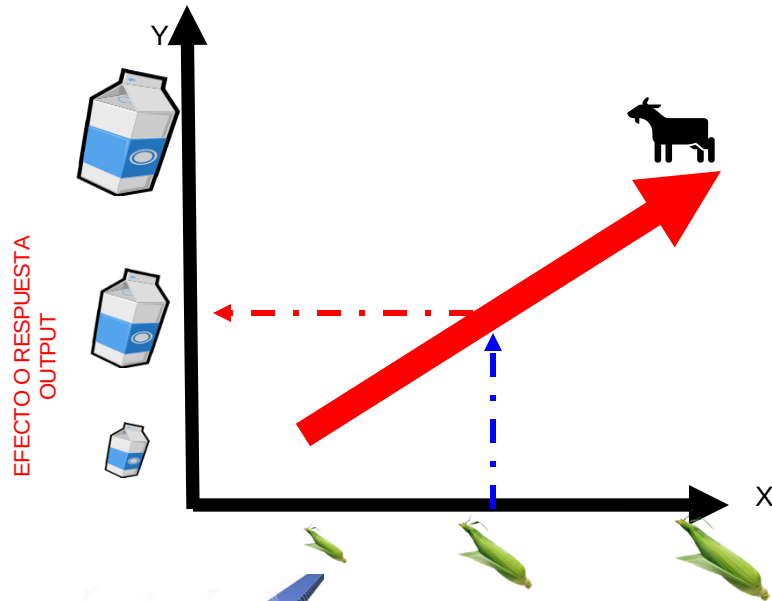
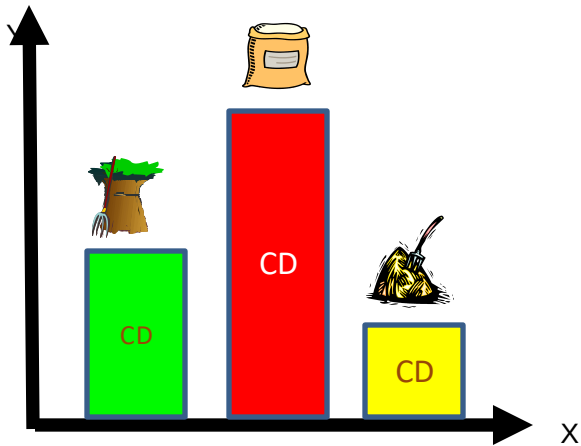


CAUSA O ESTÍMULO
INPUT
como consecuencia de comer



SISTEMAS DE ALIMENTACIÓN; ESTÁTICO Y EMPÍRICO NutriForum25

Hasta conseguir unas condiciones de estado estables



Consumo de una ración por un periodo de tiempo

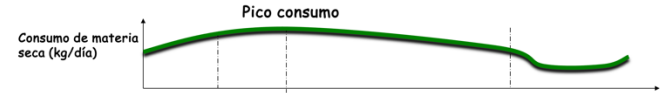
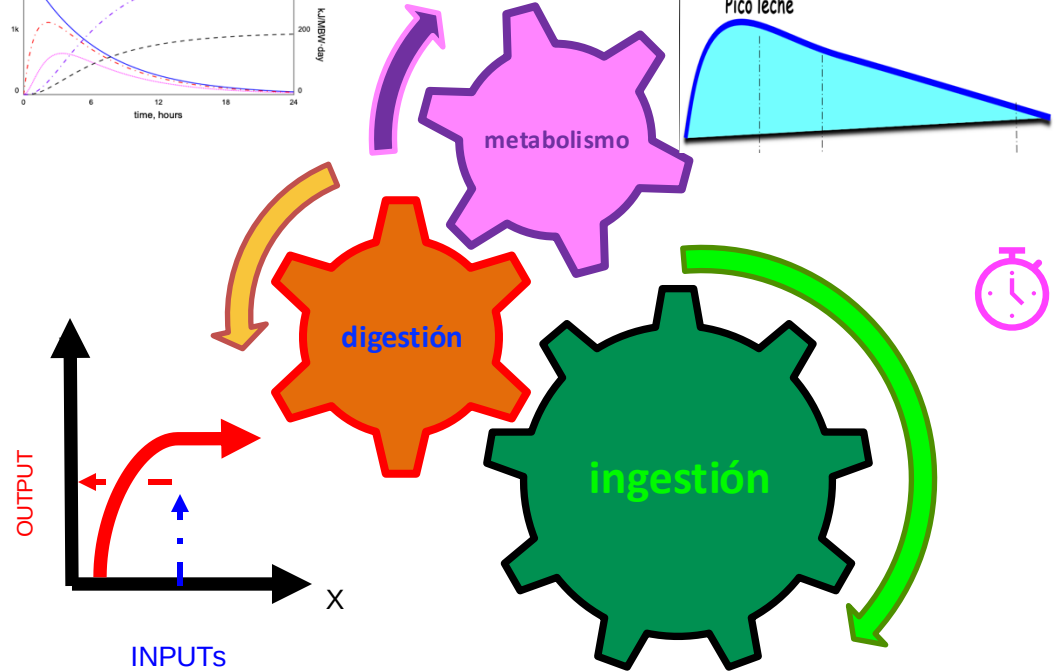
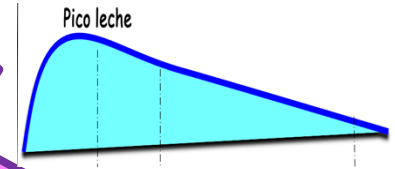
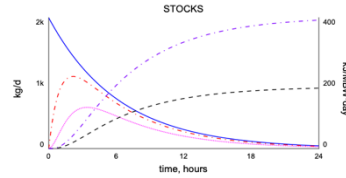
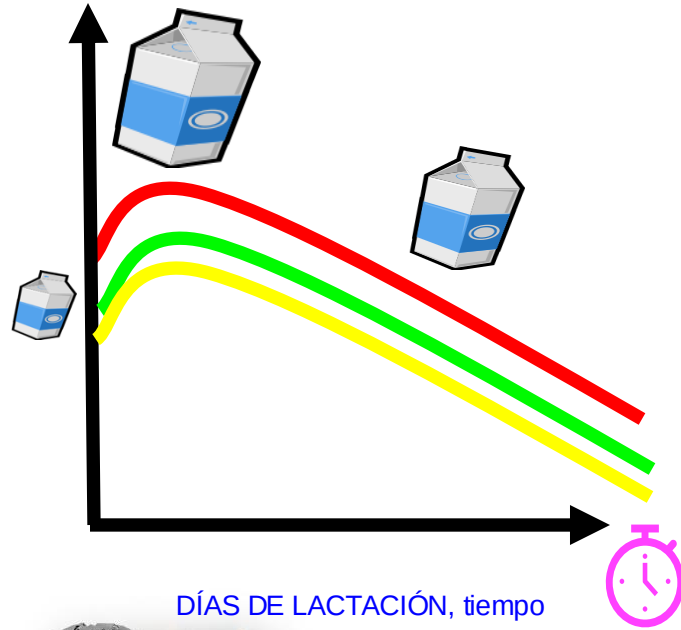


CAUSA O ESTÍMULO INPUT



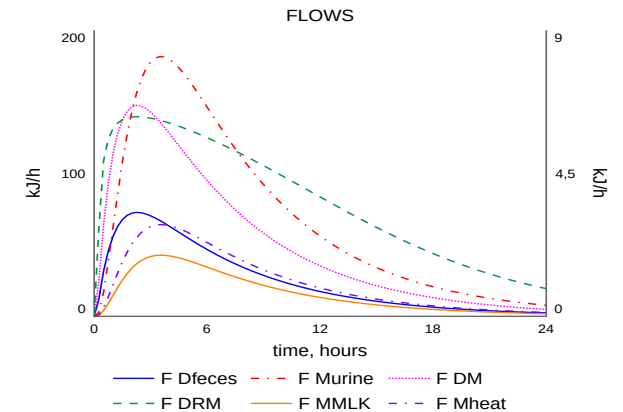
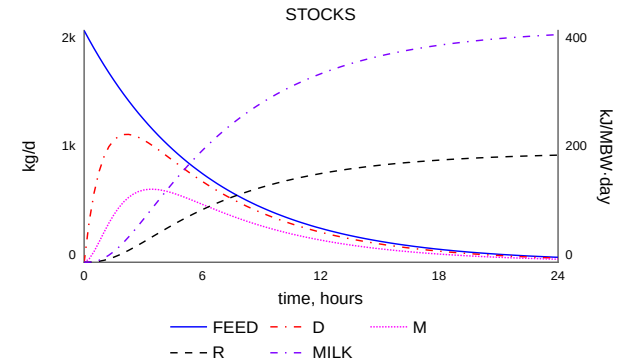
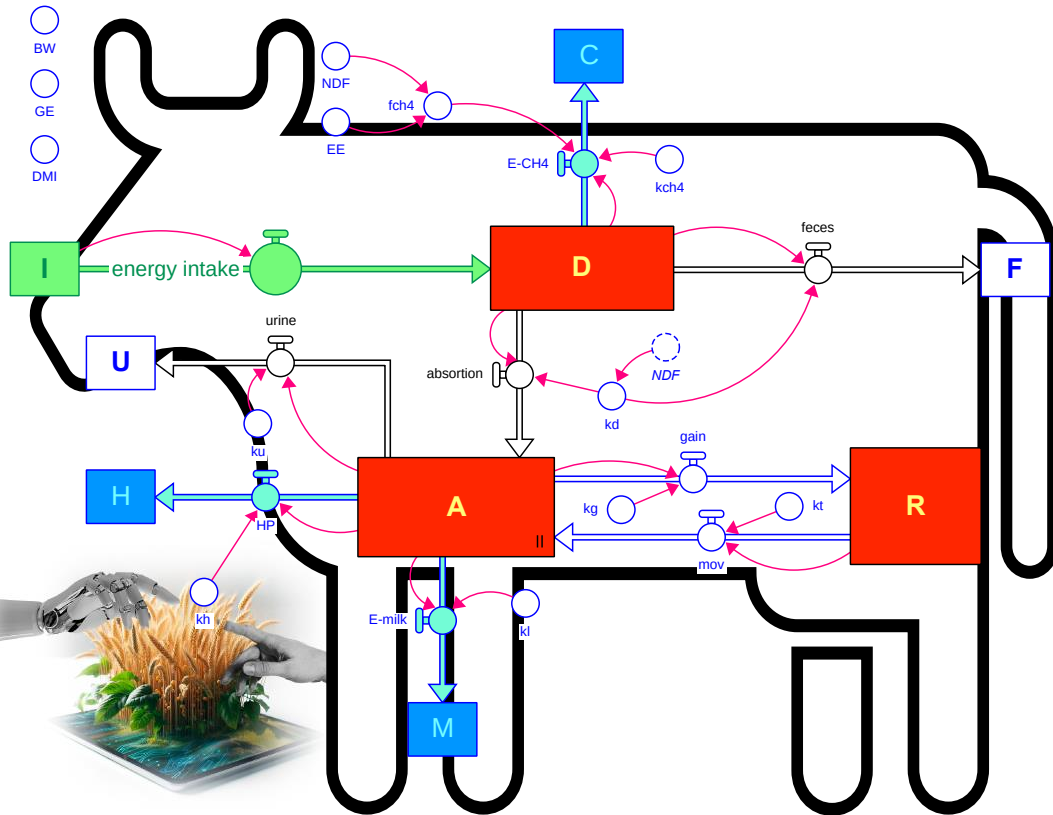
MODELOS DE INVESTIGACIÓN EN NUTRICIÓN ANIMAL; DINÁMICOS Y MECANÍSTICOS

NutriForum25



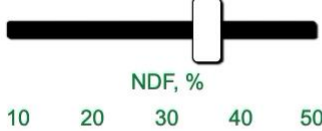
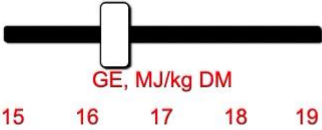
MODELO DINÁMICO

NutriForum25

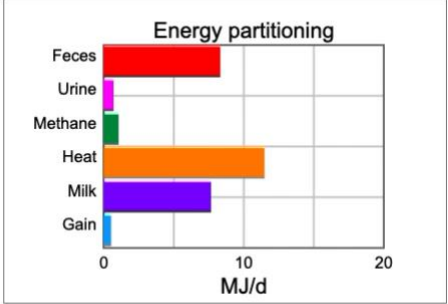
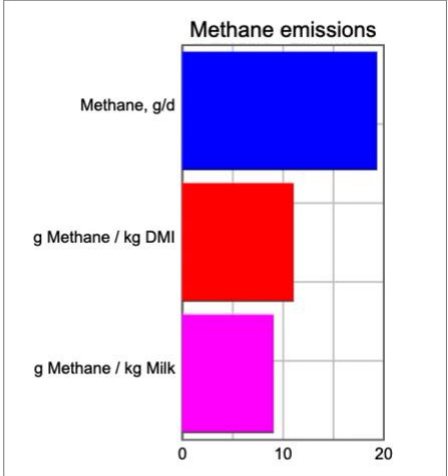
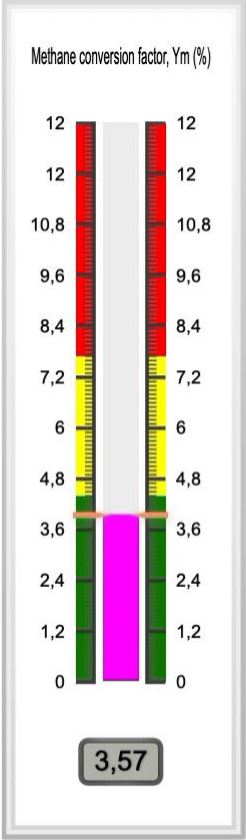
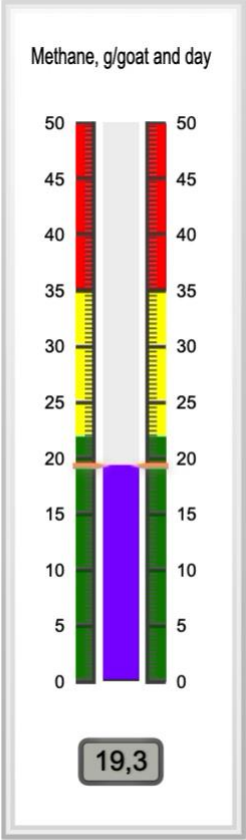


CLIMATE CHANGE MITIGATION THROUGH AN INNOVATIVE GOAT FEED BASED ON AGRICULTURAL WASTE RECYCLING

BW, kg
25 37 49 61 73 85



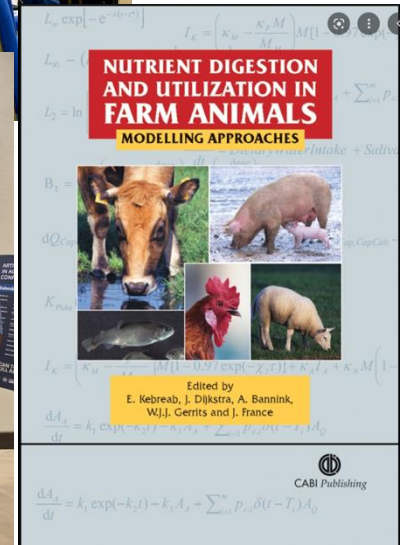
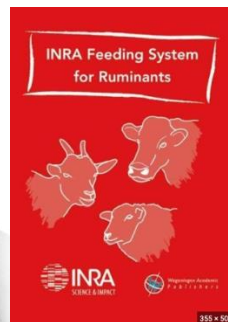
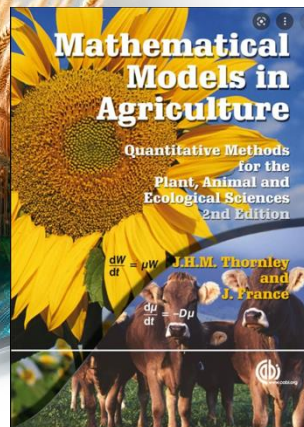
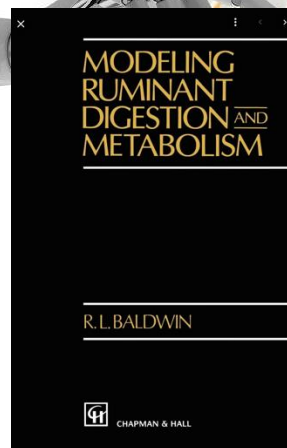
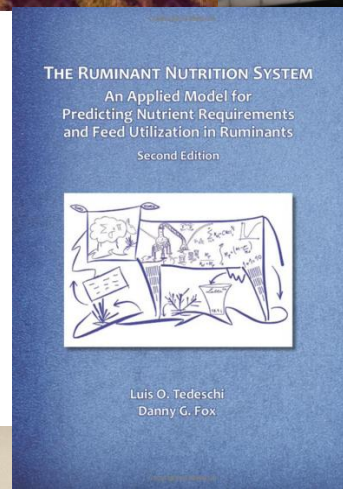
Click here,
RUN



sources

MODELOS DE INVESTIGACIÓN EN NUTRICIÓN ANIMAL; DINÁMICOS Y MECANÍSTICOS

NutriForum25



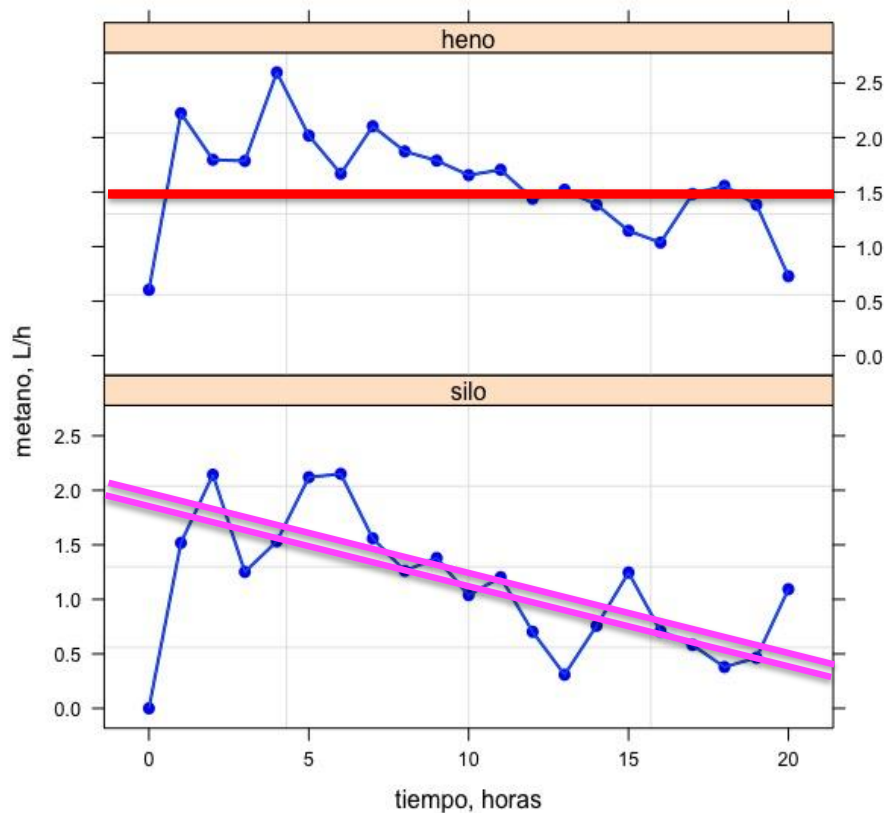
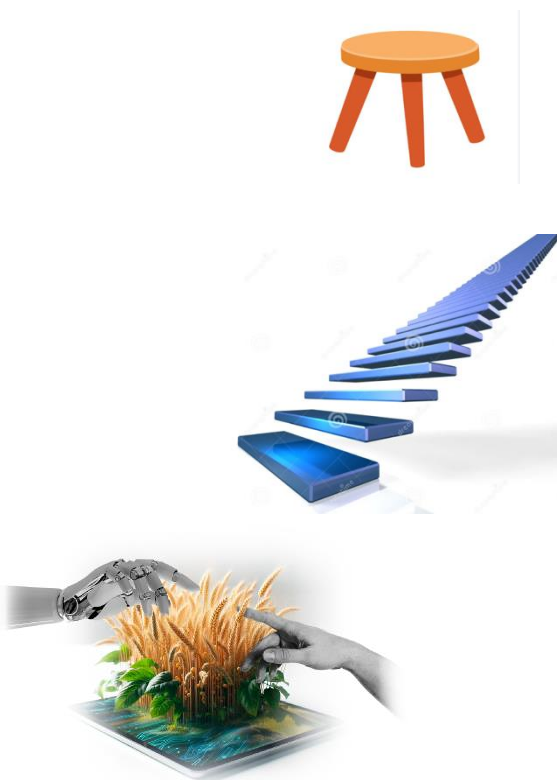
ANALIZADORES EN CONTÍNUO ... MÁS DATOS!!!

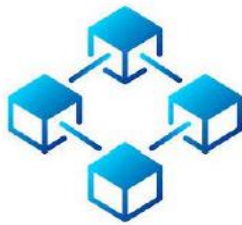
NutriForum25



METANO en continuo; 2 CABRAS; silo vs heno

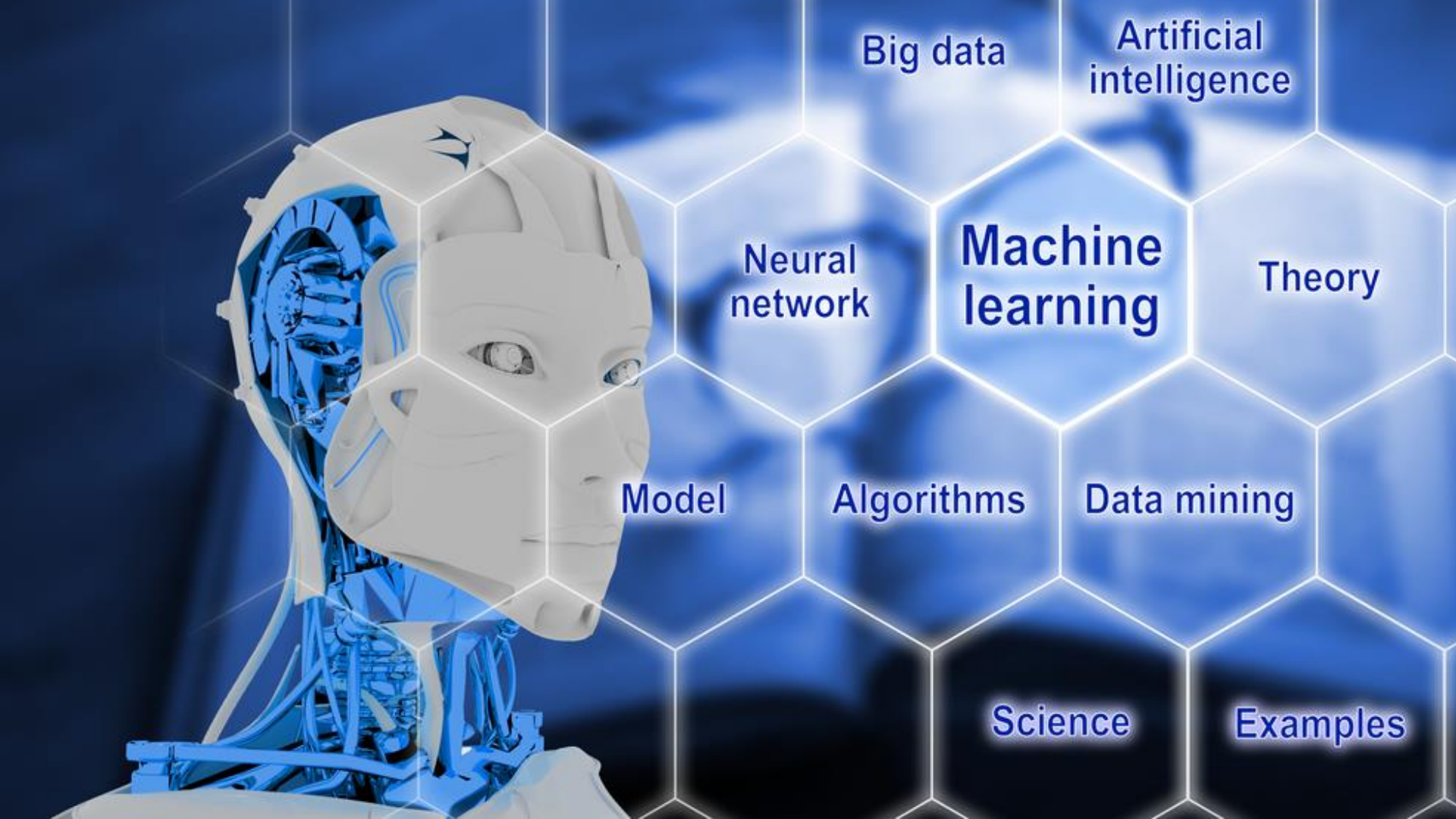
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0.10
0.08
0.06
0.04
0.02





Big data

Artificial
intelligence

Neural
network

**Machine
learning**

Theory

Model

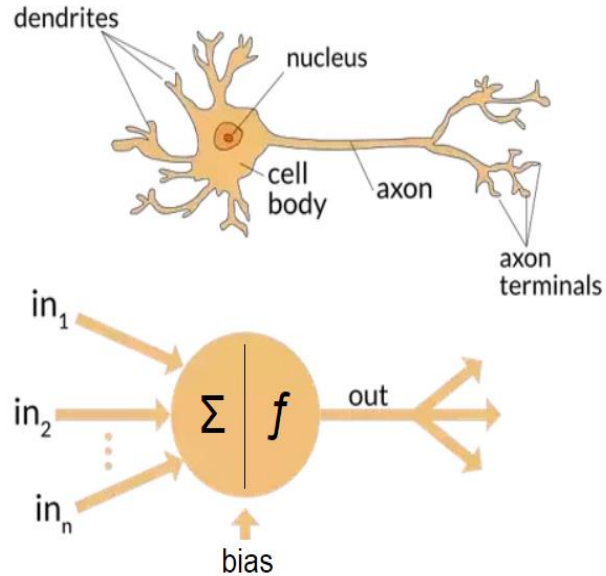
Algorithms

Data mining

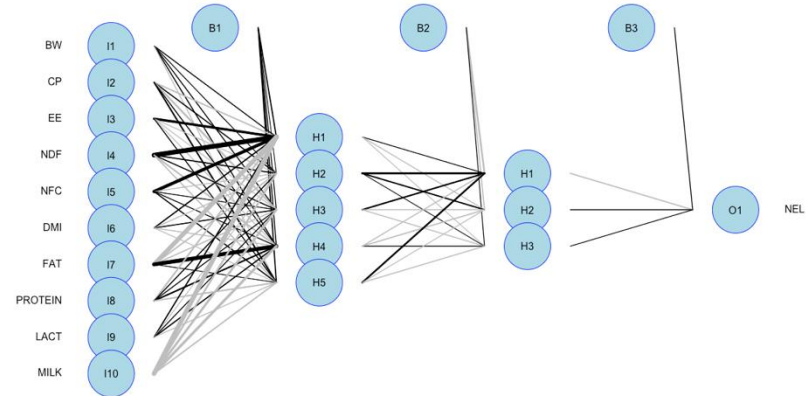
Science

Examples

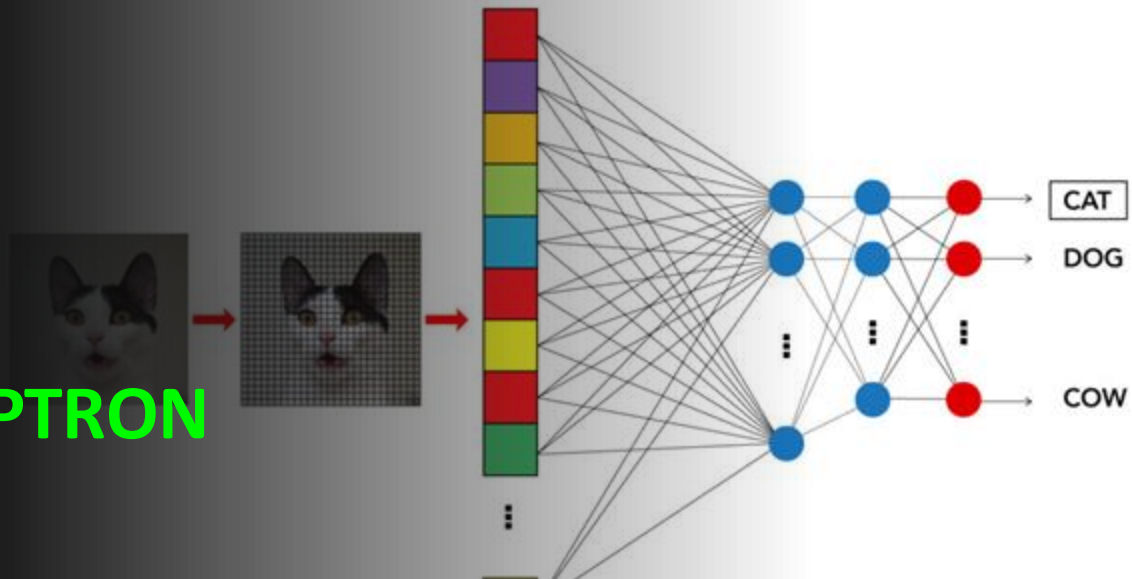
PRIMERA RED NEURONAL ARTIFICIAL: MCCULLOCH Y PITTS (~ 1950) [ON VS OFF]



Rosenblatt (~1960) RED NEURONAL ARTIFICIAL CON APRENDIZAJE: PERCEPTRON MULTICAPA [aprendizaje por imitación]



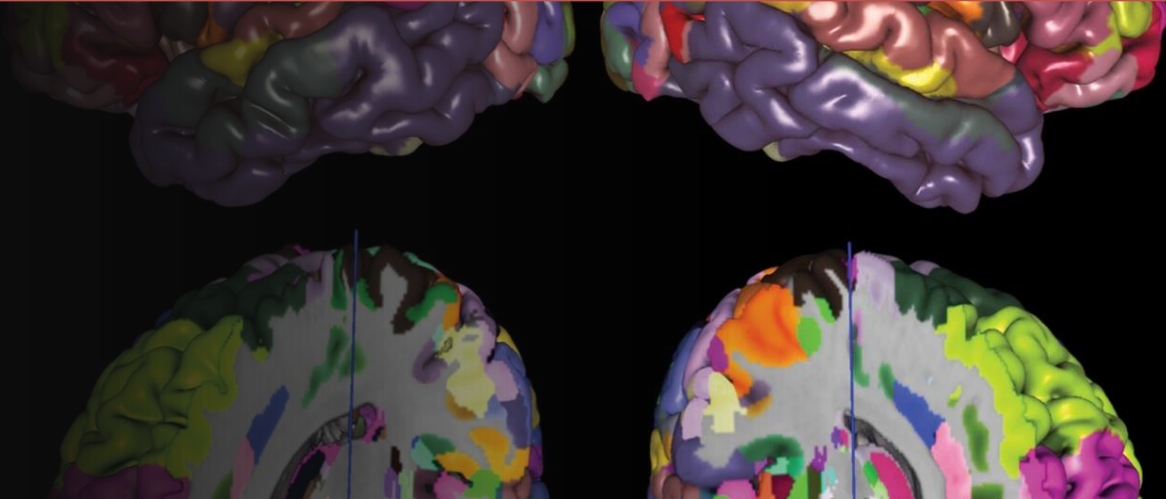
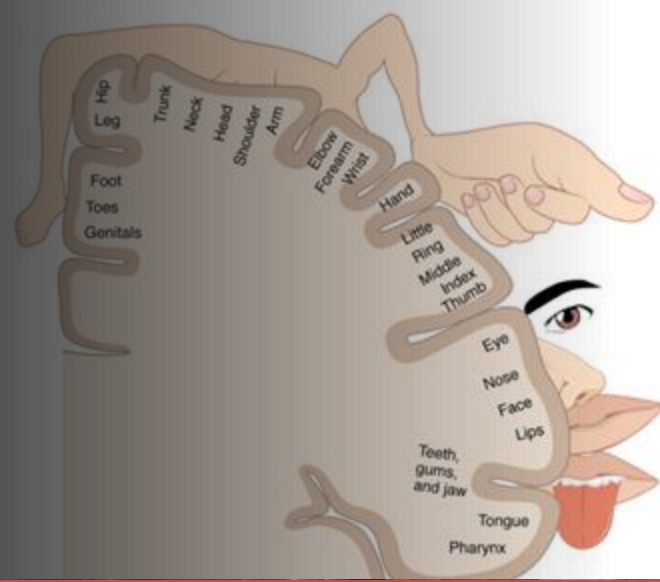
RED NEURONAL ARTIFICIAL; PERCEPTRON MULTICAPA



¡¡¡HOY ANALIZAN IMÁGENES, SONIDOS,
TEXTO!!!!

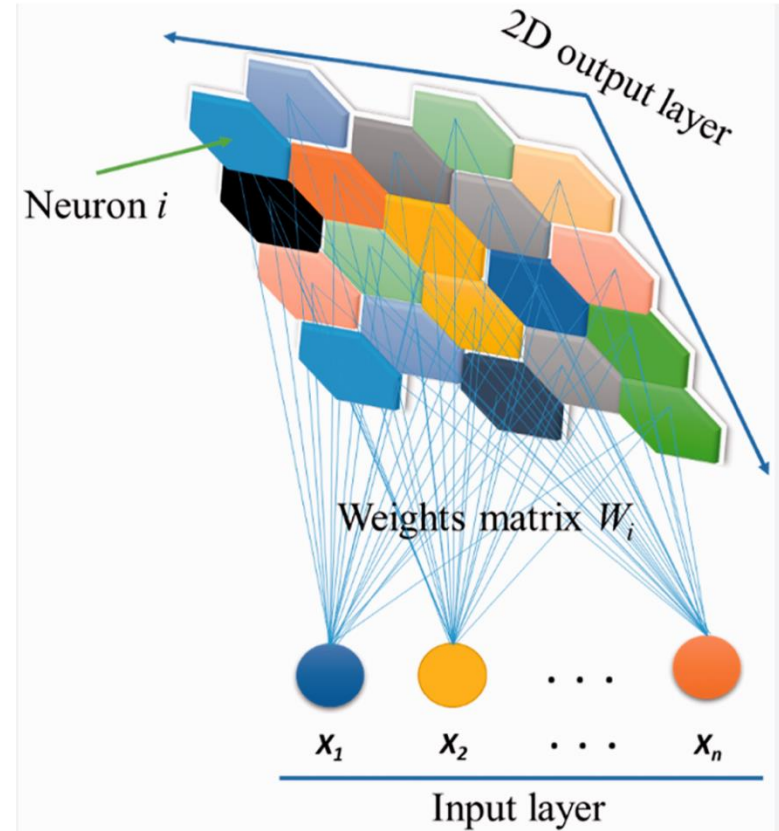


RED NEURONAL ARTIFICIAL; MAPAS AUTOORGANIZADOS

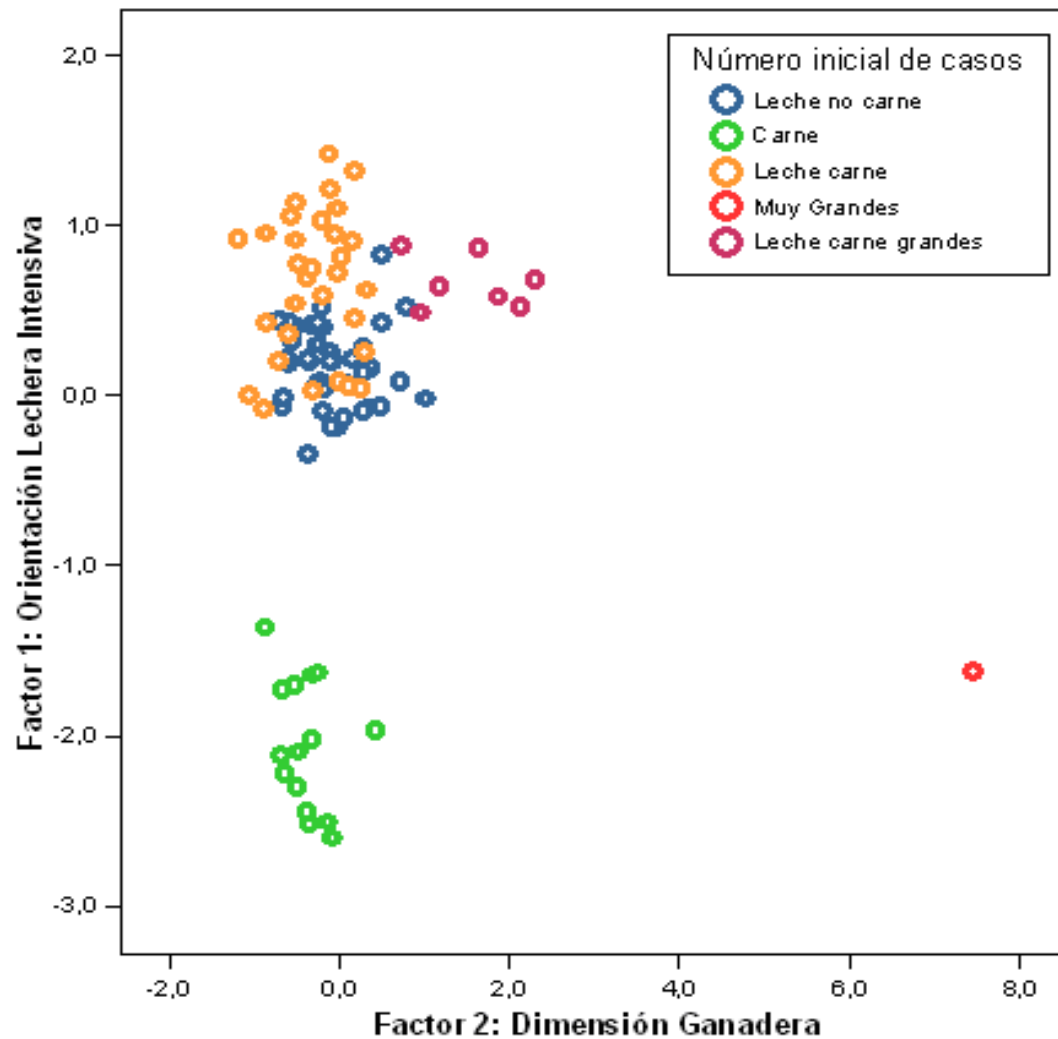


REDES NEURONALES; MAPAS AUTOORGANIZADOS (SOM) (Teuvo Kohonen -> 1980)

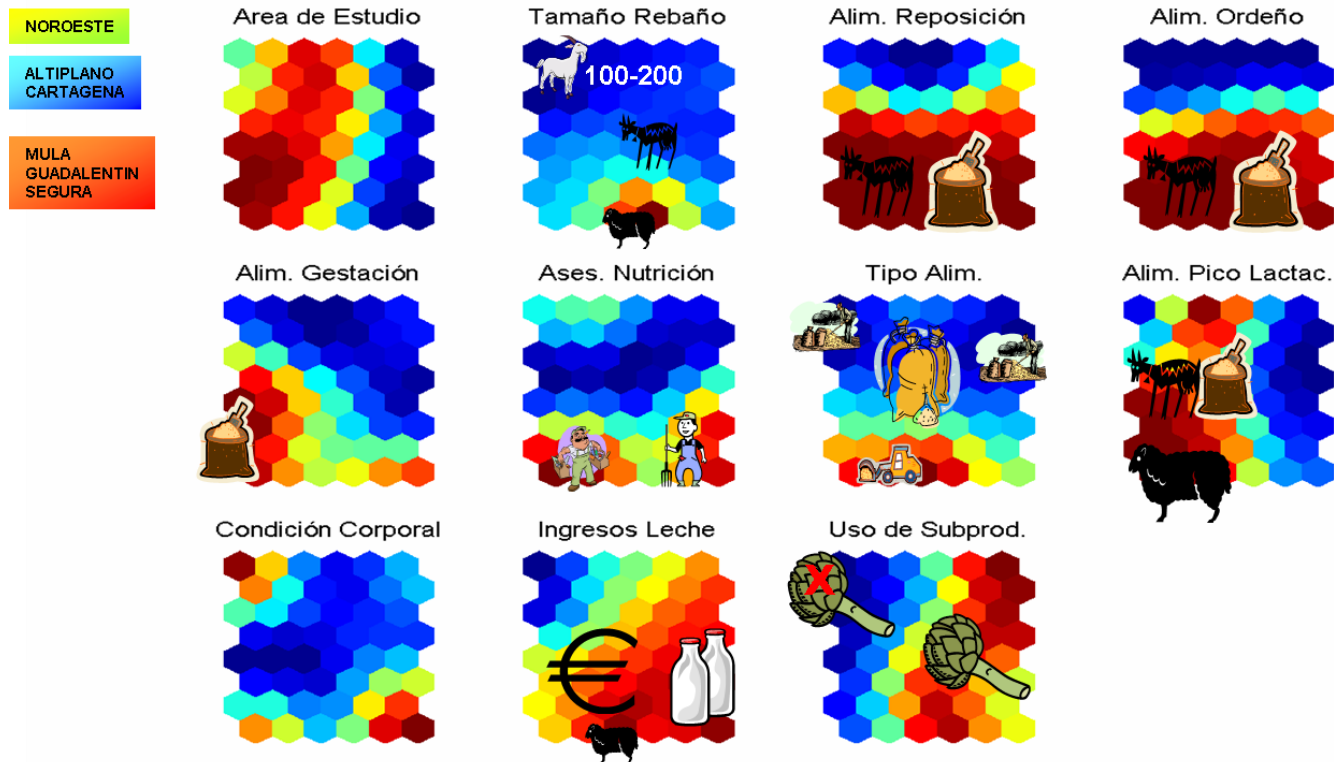
NutriForum25



COMPONENT



RED NEURONAL; SOM



AZUL= valor bajo o negativo

ROJO = valor alto o positivo



Variables 13+	
GANADERÍA	Proteína
AÑOS; 2020 - 21 - 22 – 23-(4303)	Lactosa
CONTROL; 5	Sólidos totales
ORDEÑO; 1 o 2	Extracto seco magro
TIPO ALIMENTACIÓN; TMR o KOMPLET	Extracto quesero
Producción de Leche	Relación grasa a proteína
Grasa	

CONTROL LECHERO OFICIAL

NutriForum25



LICOVAL-lab. Anàlisi de llet
Institut Ciència i Tecnologia Animal
Universitat Politècnica de València
Cami de Vera, 14 46022 - València



Les activitats marcades amb (B) no
estàn amparades per l'acreditació
d'ENAC.

INFORME DE RESULTATS

Pàgina: 1 de 1

Client:	Ass. Interp. Llet. C.V.	Nº Informe:	20211865
NIF:	G96887052	Data Emisió:	18/11/2021
Adreça:	C/ Passatge Rei En Jaume, 2 pt		
Població:	46120 Alboraya		
Indústria:	CARLOS	Data Entrada:	17/11/2021
Tipus de mostra:	Llet de cabra	Temp. Entrada:	6°C
Origen de la mostra:	Entregades en el LICOVAL per la indústria	Data Inl Anà.:	17/11/2021
		Data Fi Anà.:	17/11/2021

Nº Mostra	Gen/Cla	Datarec	Tipus	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Acid
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
211117077	S/Z	17/11/2021	C=0	A=0	9,10	4,38	4,58	9,94	4205									*
211117078	S/Z	17/11/2021	C=0	A=0	4,52	3,23	4,91	8,88	4104									*

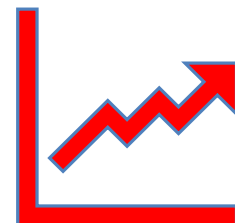
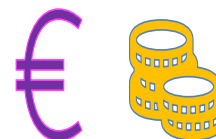
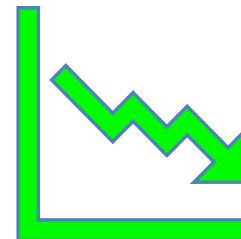
Nº Mostra	Observacions
211117077	Val=1
211117078	Pct=0

DACIS: (1) Tipus de llet: 0=vacua; 1=cabra; 2=ovella; 3=acida; (aciditat); 4=apresentada; 5=absència
(2) Tipus de mostra: 1=raw; 2=Cisterna; 3=Animal; 4=Llet crua; 5=Llet tractada tècnicament
(3) En NIF, Proc. Em. PER/LICOVAL/01
(4) Cal·lules somàtiques/ml x 1000, Proc. Em. PER/LICOVAL/03
(5) Genoma OFCA 1000/ml, Proc. Em. PER/LICOVAL/02
(6) Punt de congelació en m°C, Proc. Em. PER/LICOVAL/04
(7) Inhibidor, PCR-Positiu, HIG-Negatiu, Proc. Em. PER/LICOVAL/05
(8) Mostres marcades amb * tenen observacions específiques al final de l'informe
(9) Esta característiques podria haver afectat als resultats analítics.

La mostra fou facilitada pel propi client. L'anàlisi comés dona fe de la mostra rebuda.
Aquest informe de resultats no es pot reproduir parcialment sense l'aprovació per escrit del Laboratori.
La informació que va entre "Cometes" està aportada pel client.
El Laboratori no es responsabilitza de l'assentament informació.
Els resultats analítics subcontratats seran identificats en observacions.
El càlcul d'incertesa està al Laboratori a disposició del client, que el sol·licita.

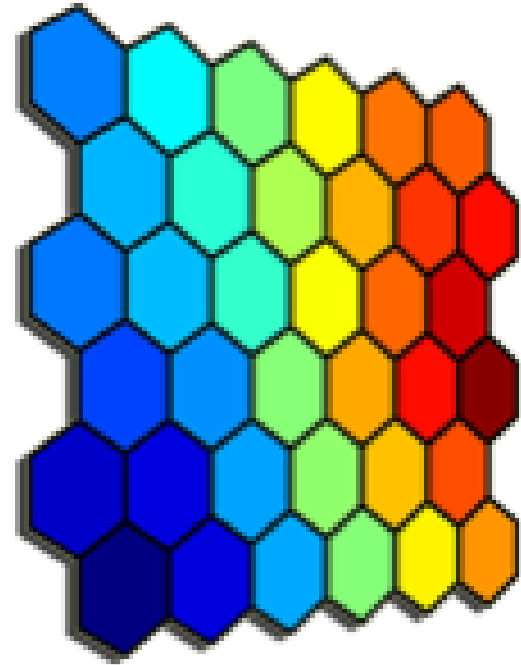
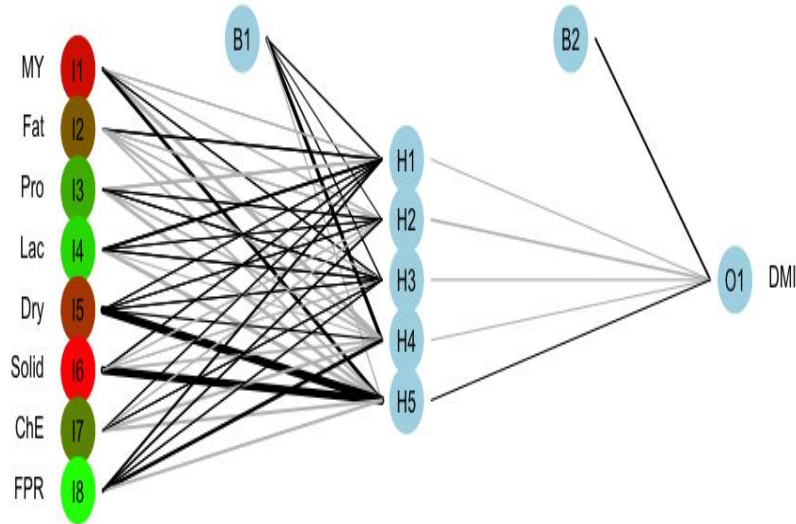
Laboratori LICOVAL
Document tipus digital

Directora Tècnica del Laboratori
Sílvia Escorial Saval



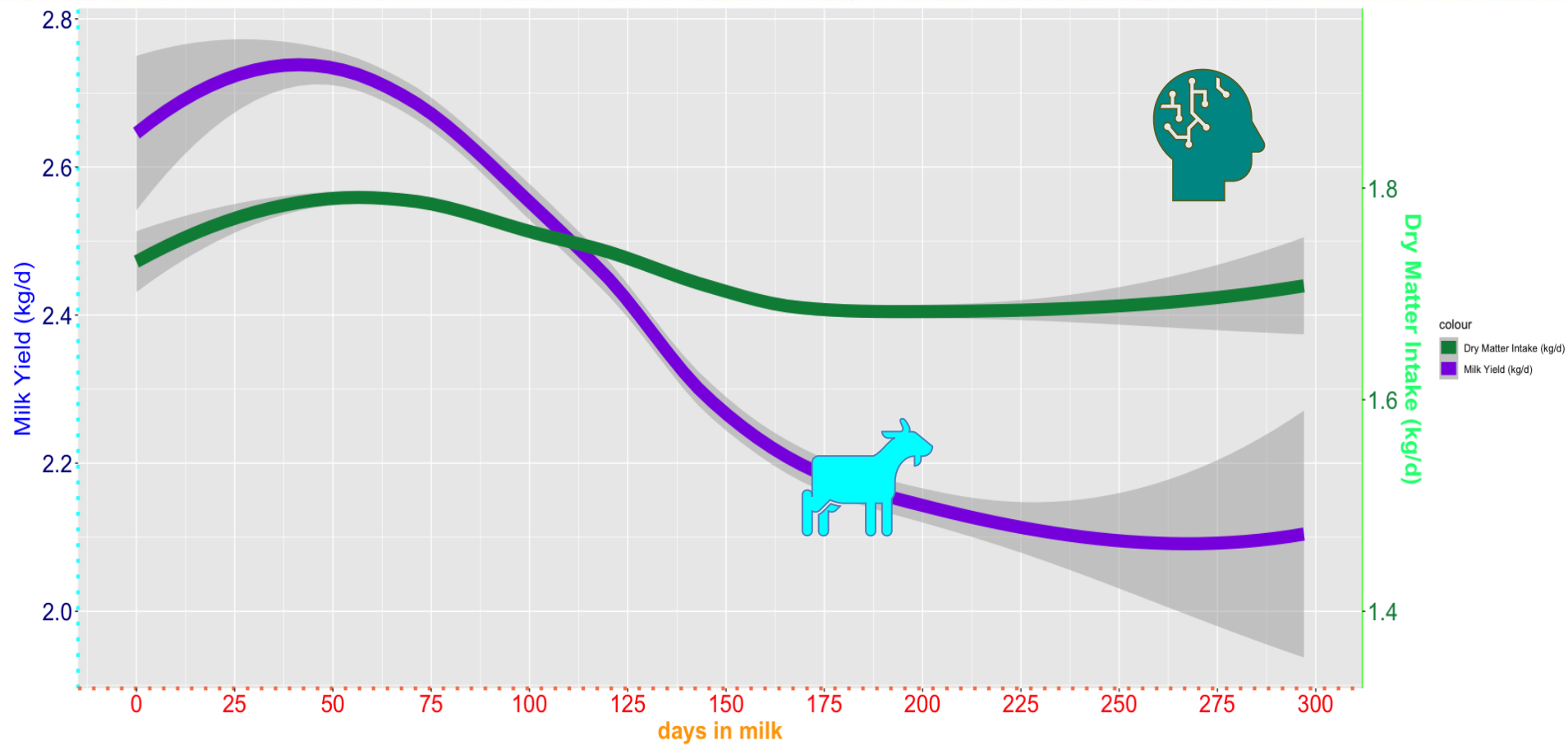
IA; Deep Learning → Redes Neuronales

NutriForum25



PREDICCIÓN MSI CON IA

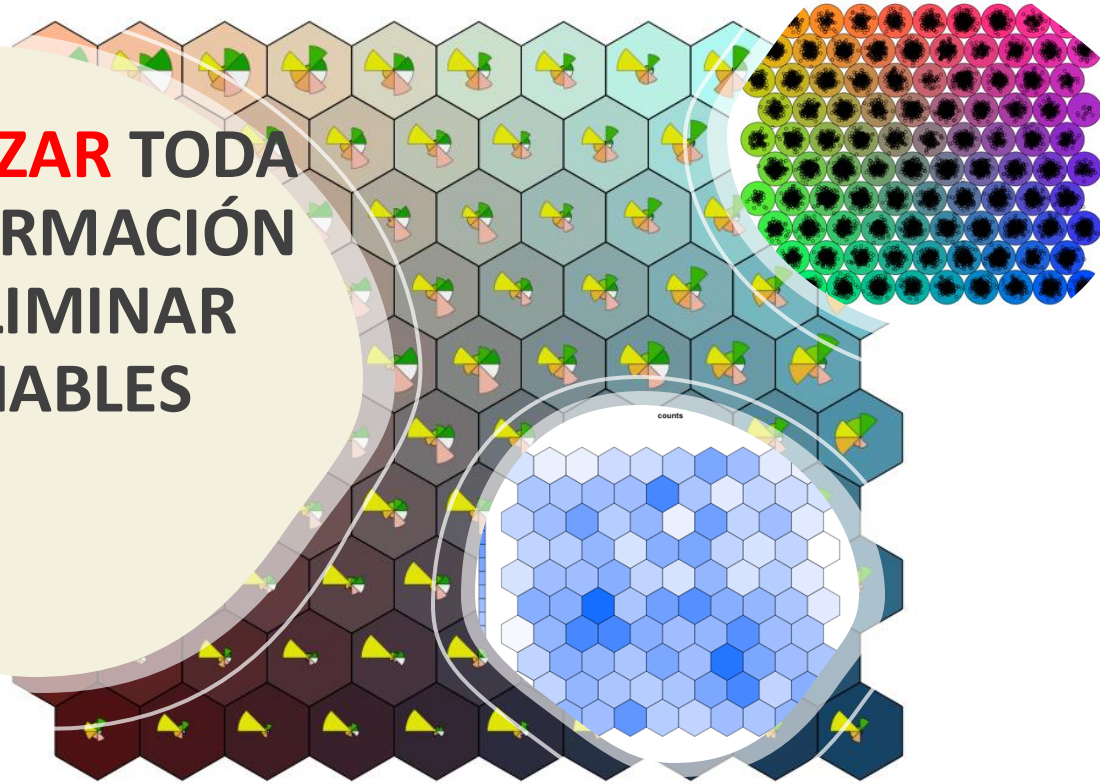
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Codes plot

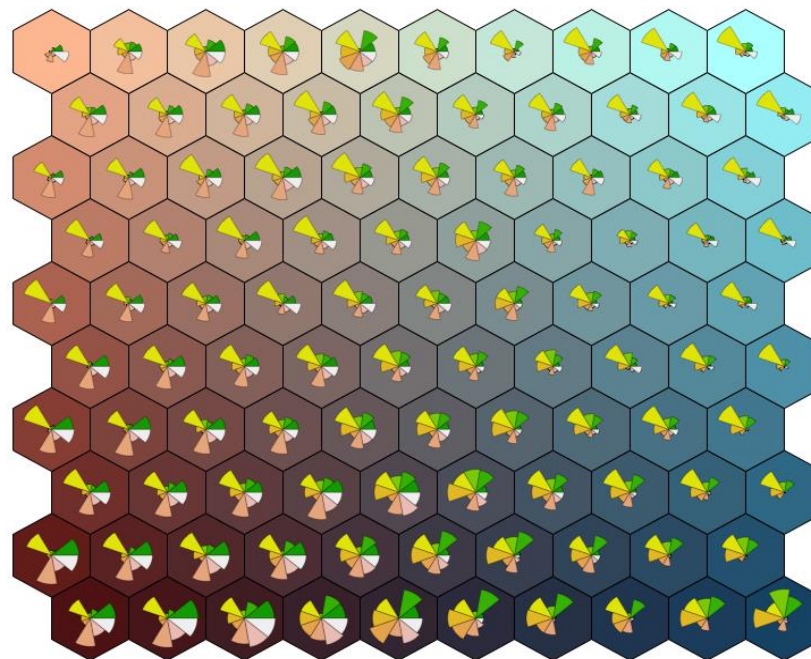
Mapping plot

**VISUALIZAR TODA
LA INFORMACIÓN
SIN ELIMINAR
VARIABLES**



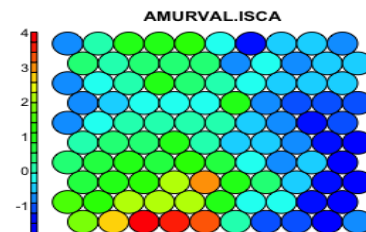
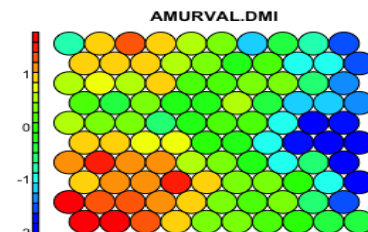
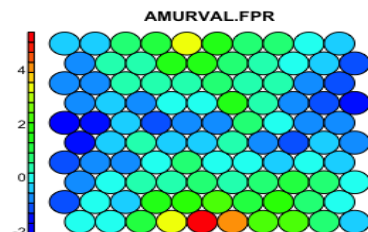
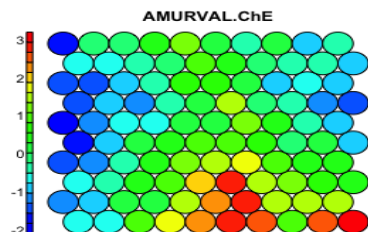
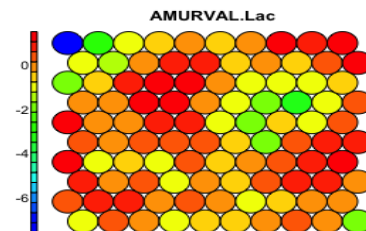
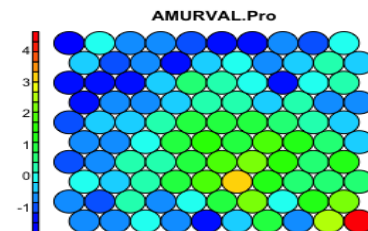
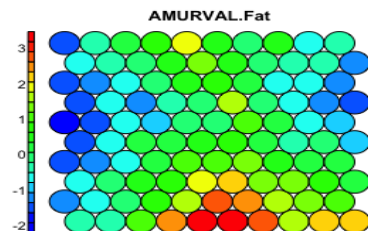
NÚMERO DE OBSERVACIONES POR NEURONA

Codes plot

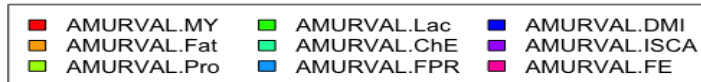
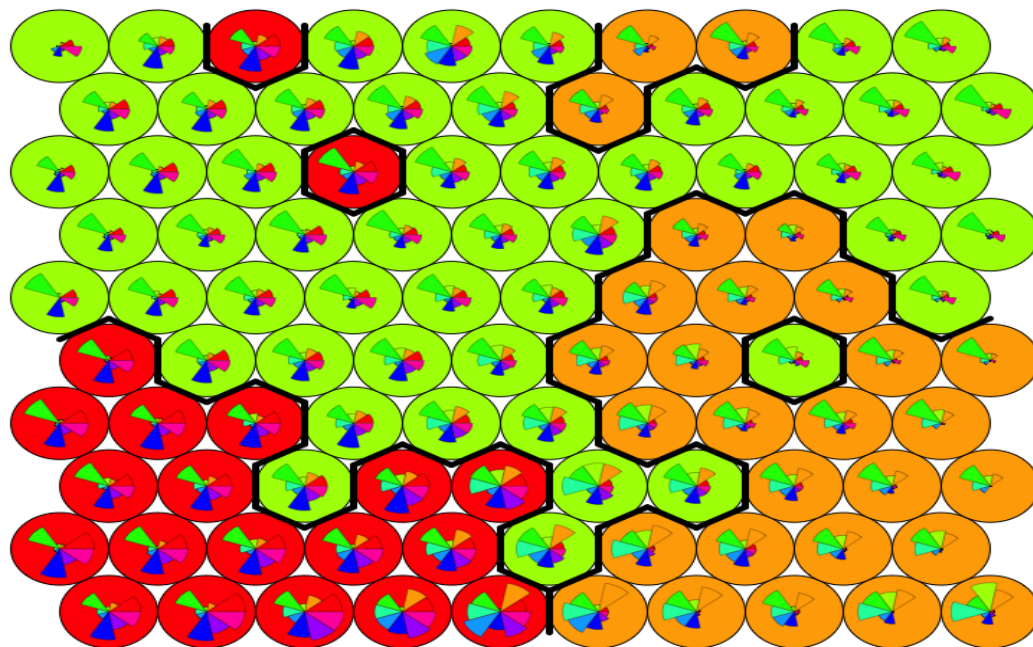


PUEDO VISUALIZAR TODAS LAS VARIABLES A LA VEZ

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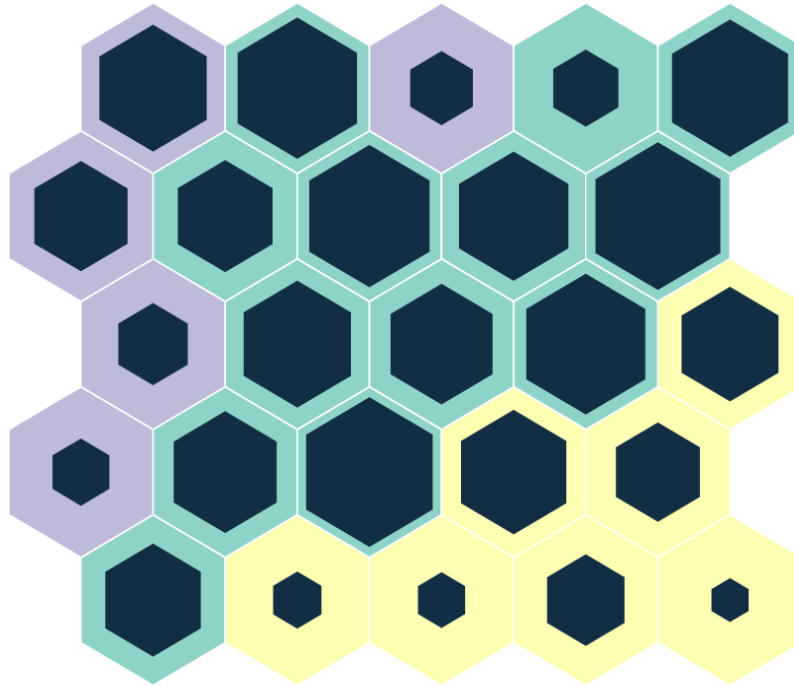
Clusters



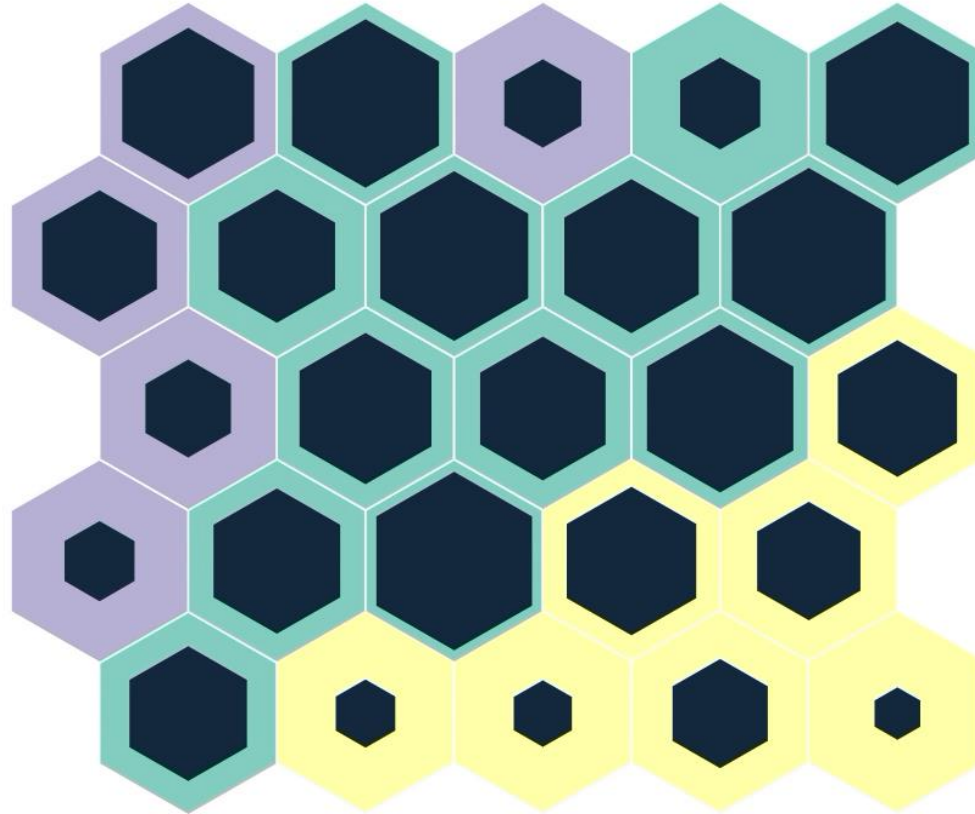
AMURVAL; 2023 con 4270 observaciones

NutriForum25

Hover over the plot for information.



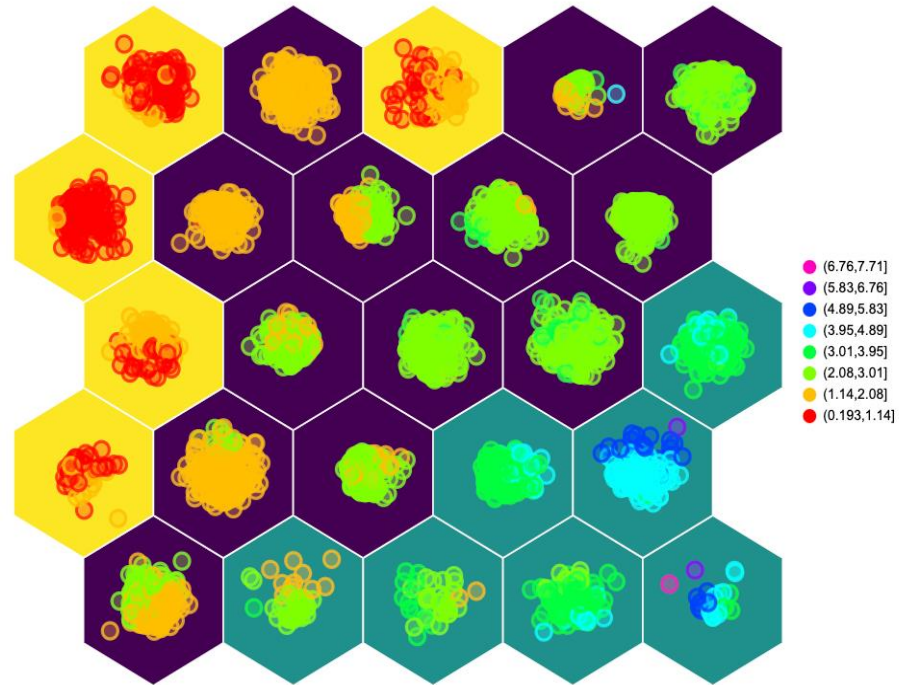
Hover over the plot for information.



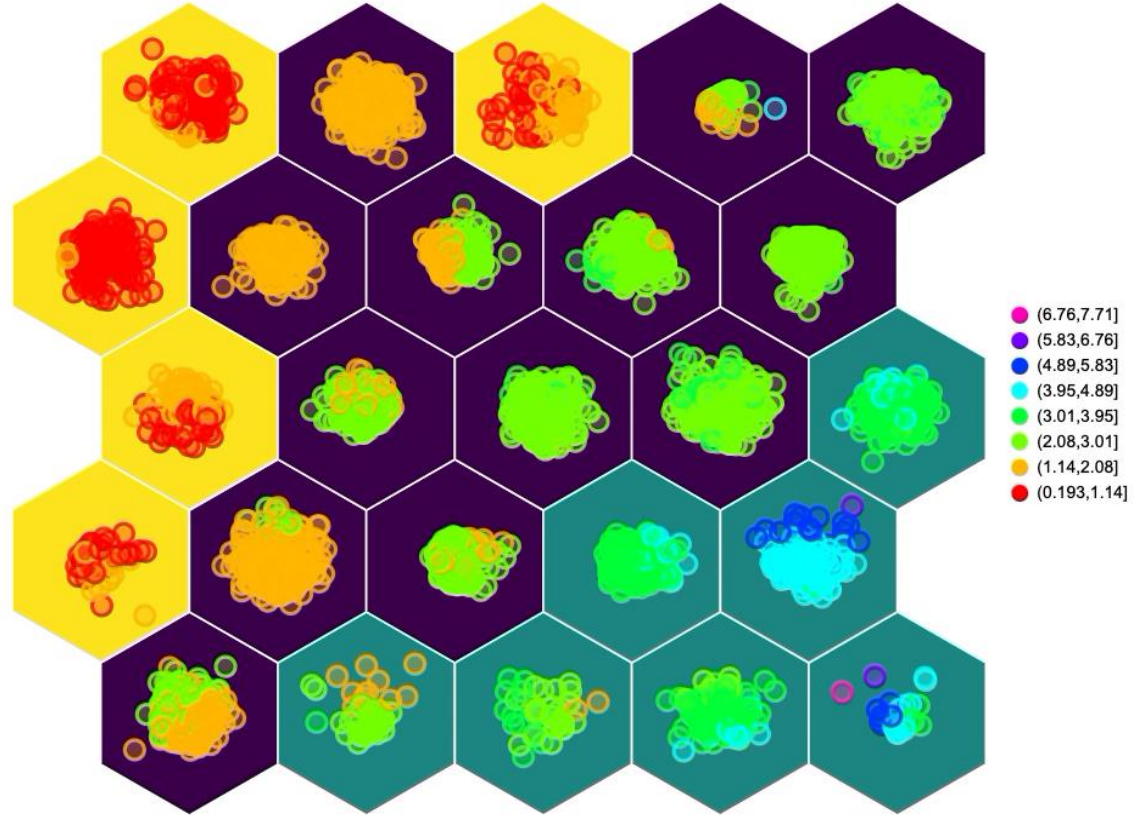
PRODUCCIÓN DE LECHE, kg/d

NutriForum25

Hover over the plot for information.



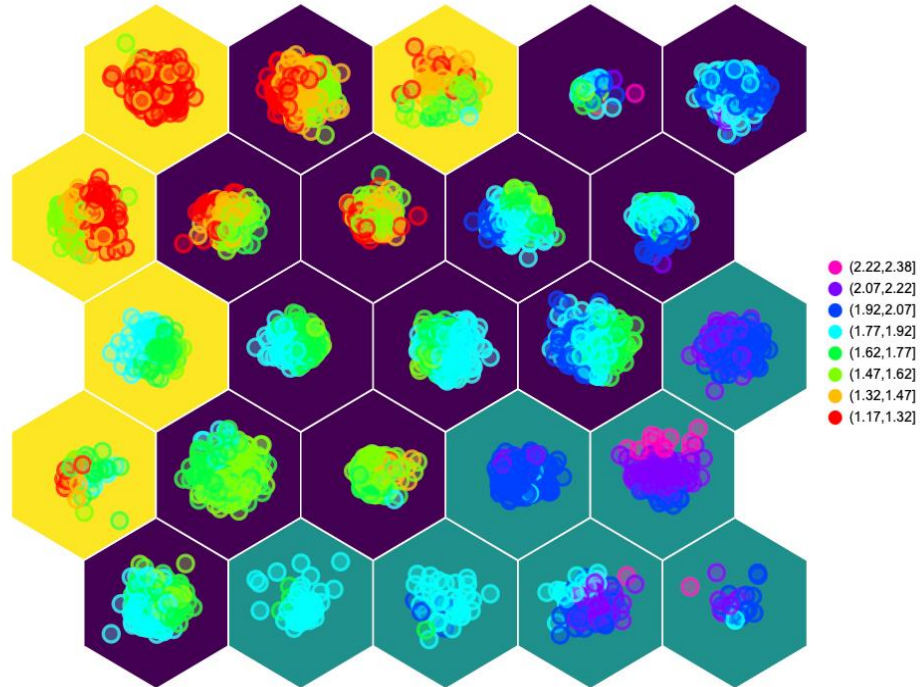
Hover over the plot for information.



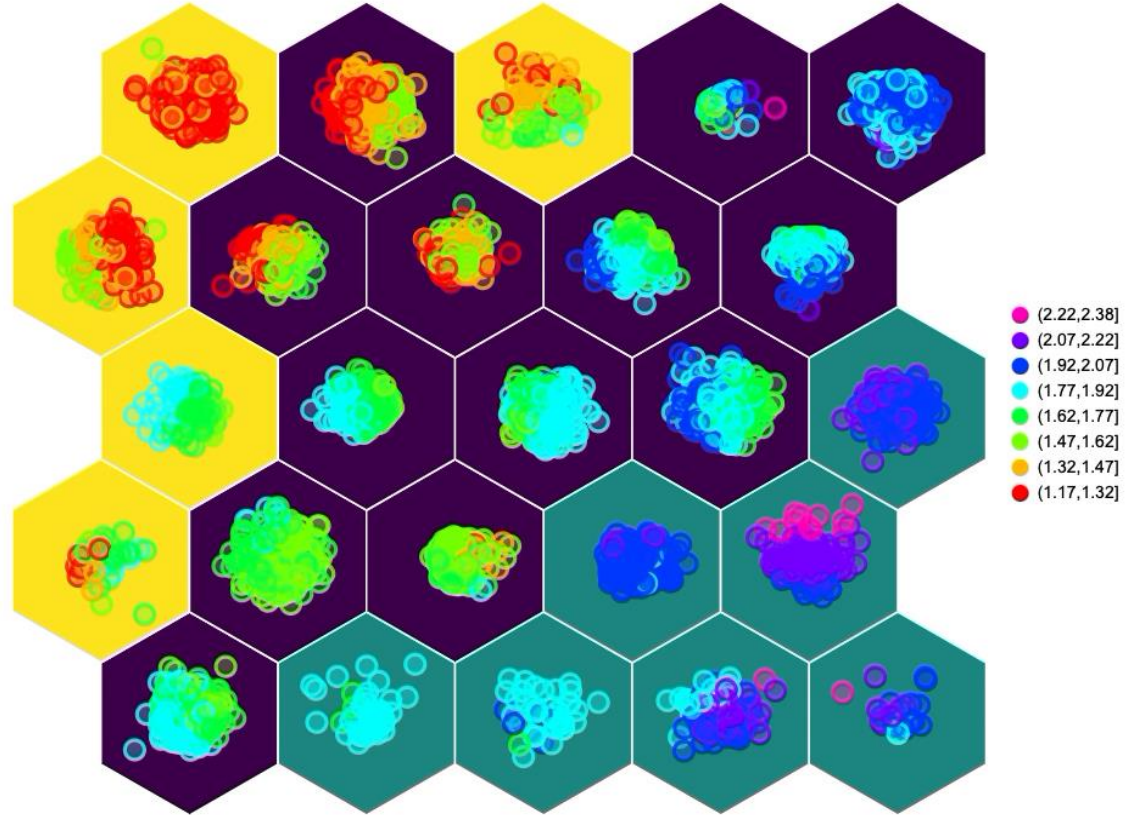
INGESTIÓN DE MATERIA SECA, kg/d

NutriForum25

Hover over the plot for information.



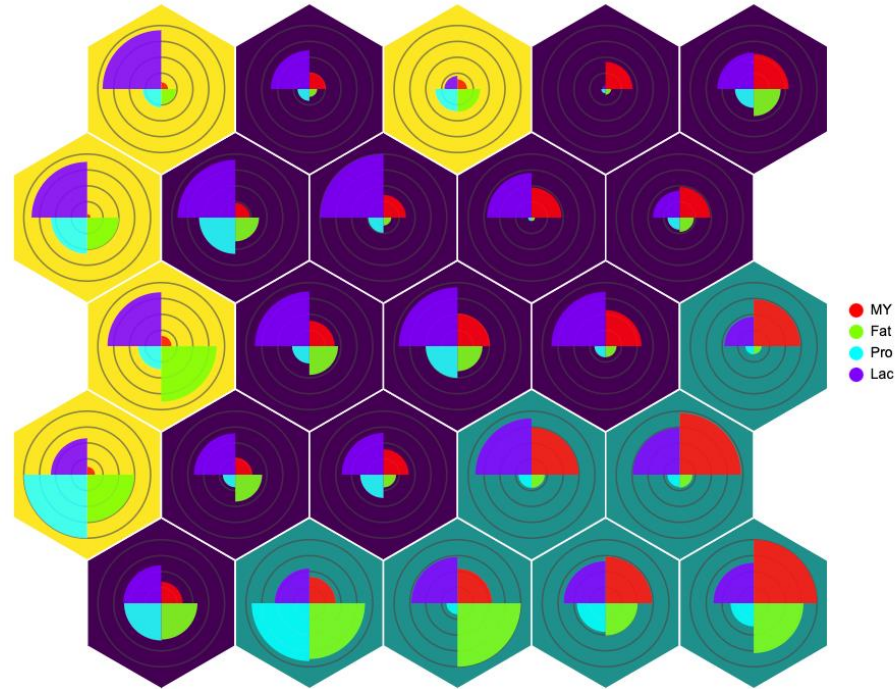
Hover over the plot for information.



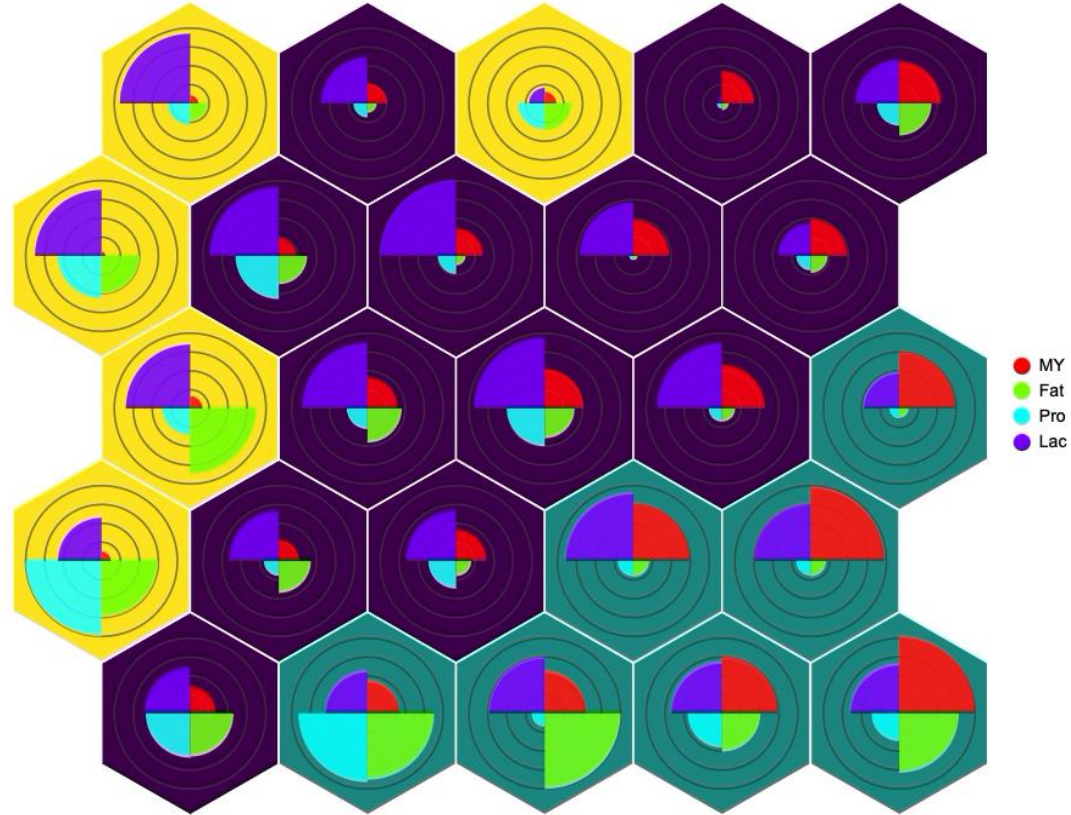
PRODUCCIÓN Y CALIDAD LECHE

NutriForum25

Hover over the plot for information.



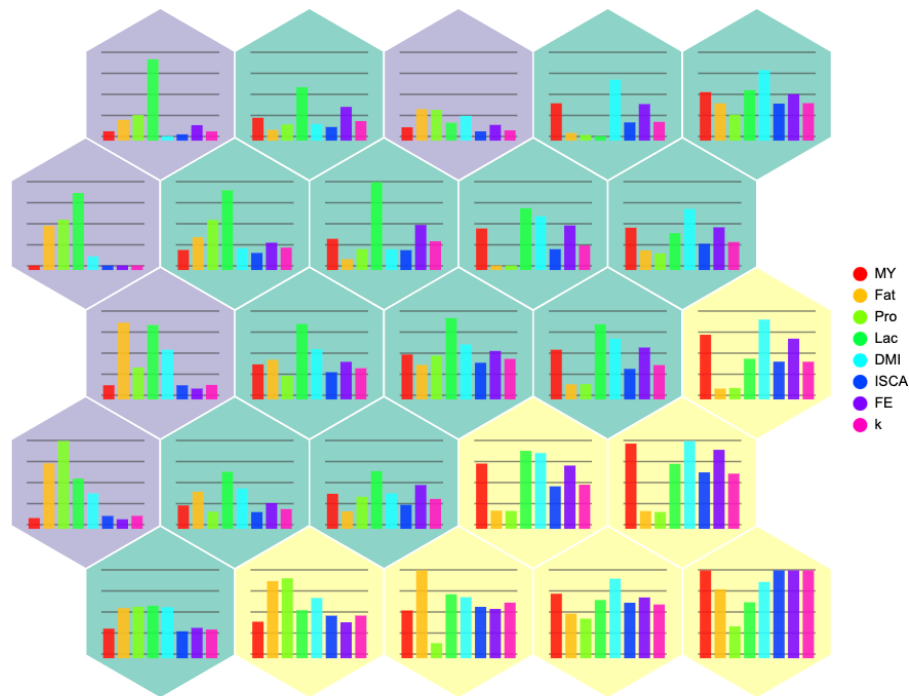
Hover over the plot for information.



TODAS LAS VARIABLES

NutriForum25

Hover over the plot for information.



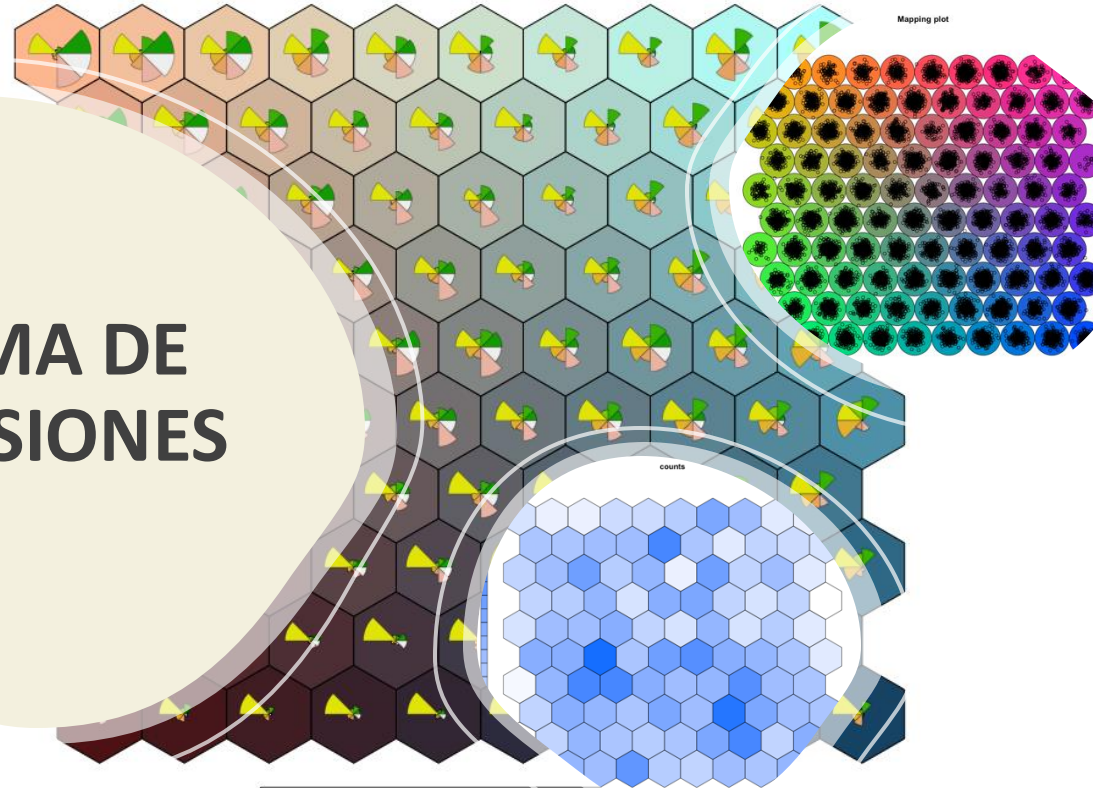
Hover over the plot for information.



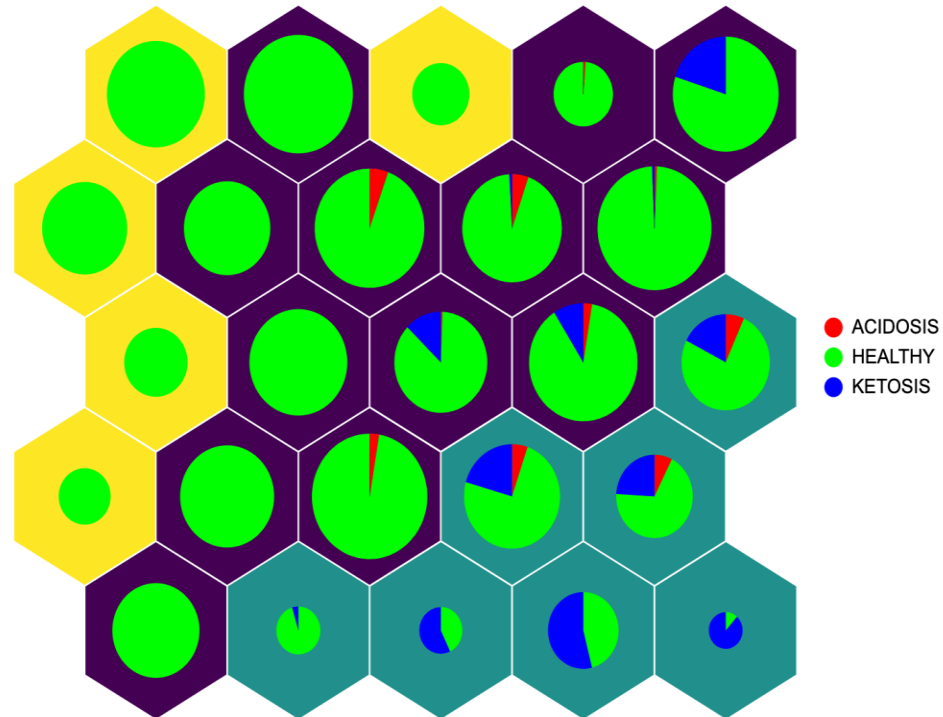
Codes plot

Mapping plot

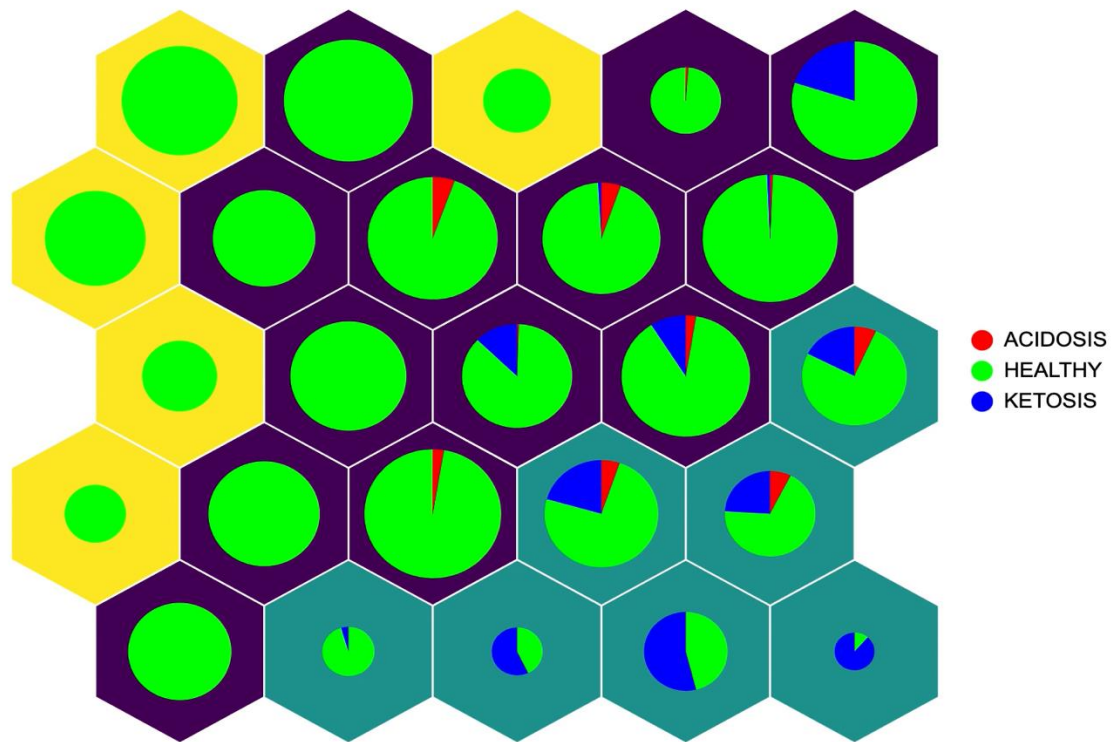
TOMA DE DECISIONES



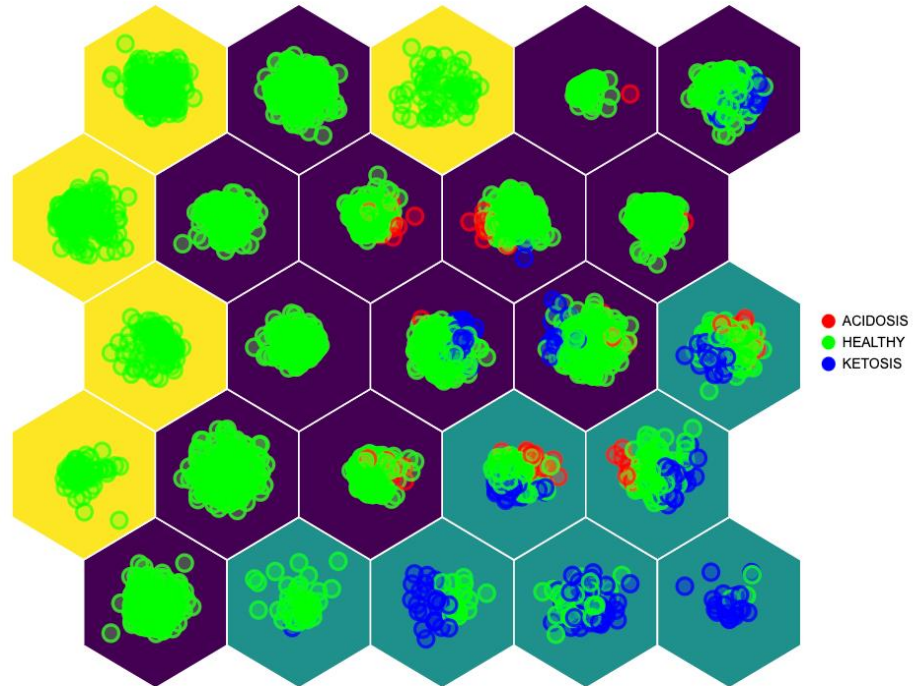
Hover over the plot for information.



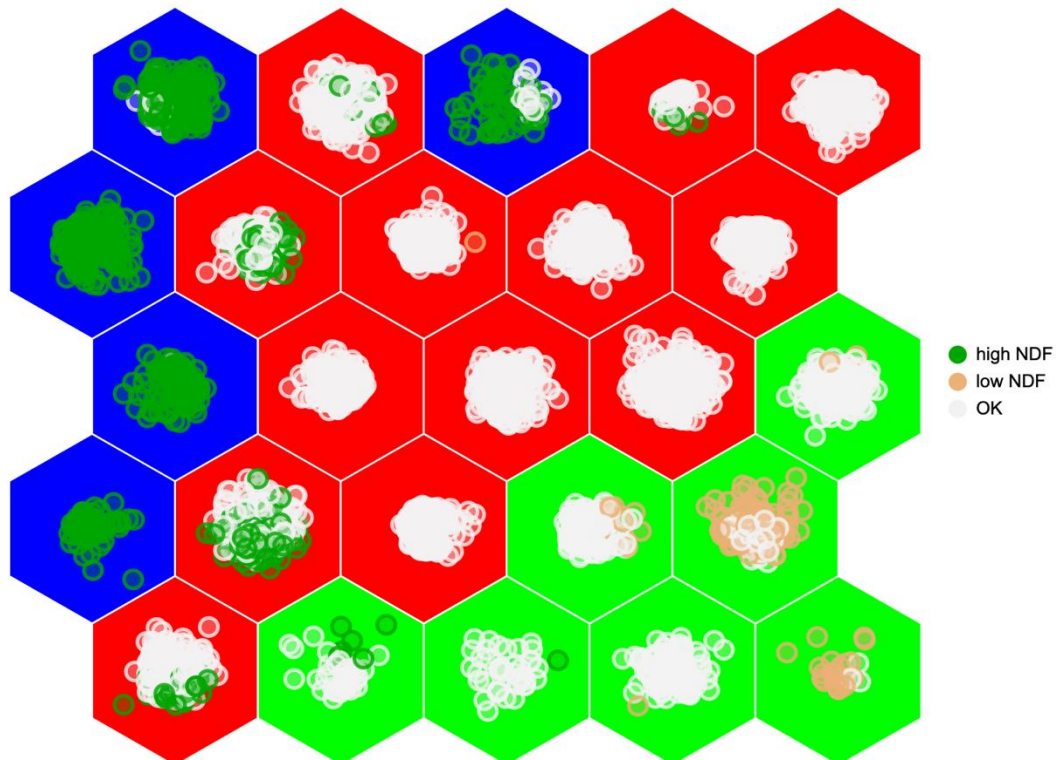
Hover over the plot for information.



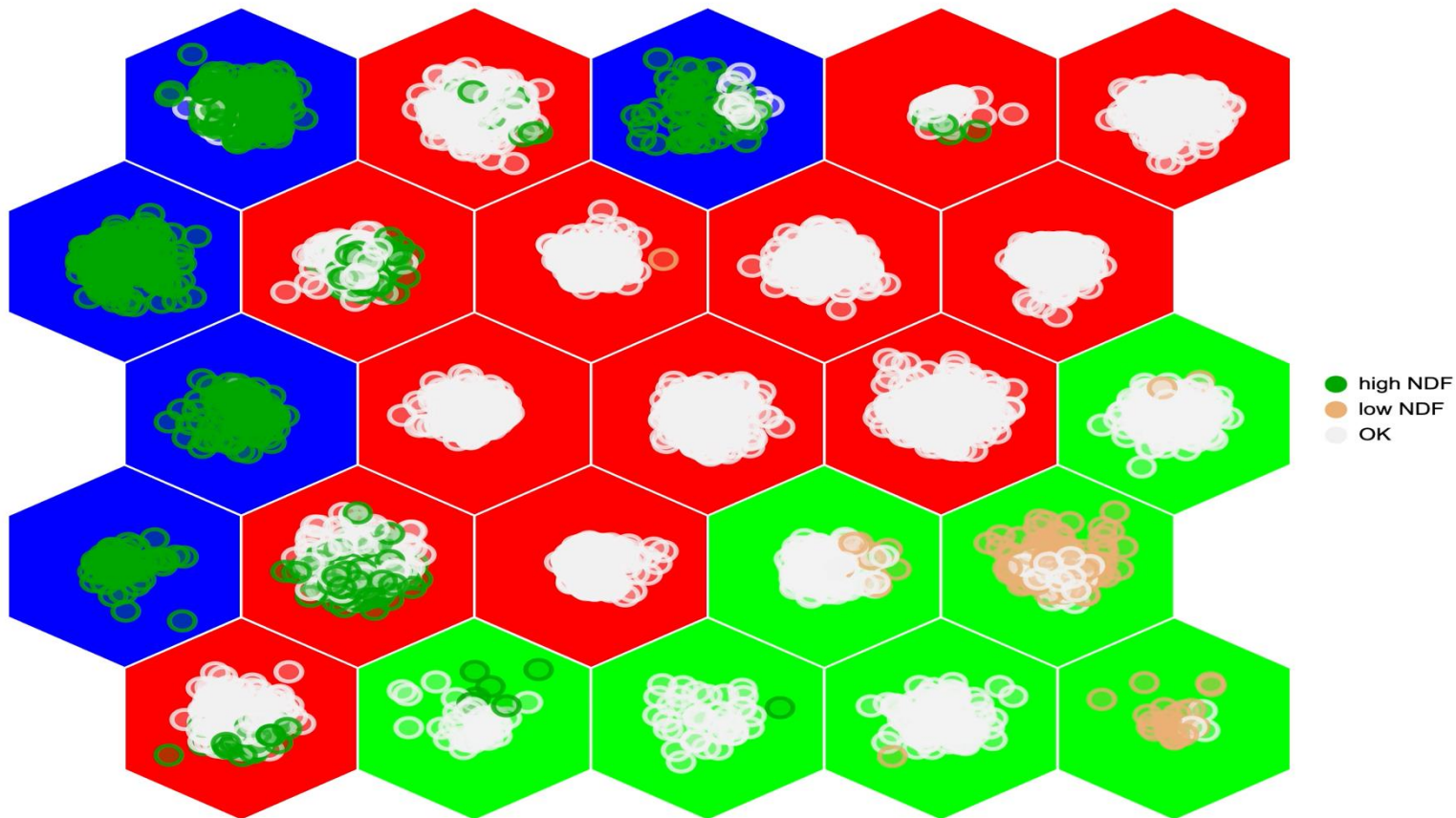
Hover over the plot for information.



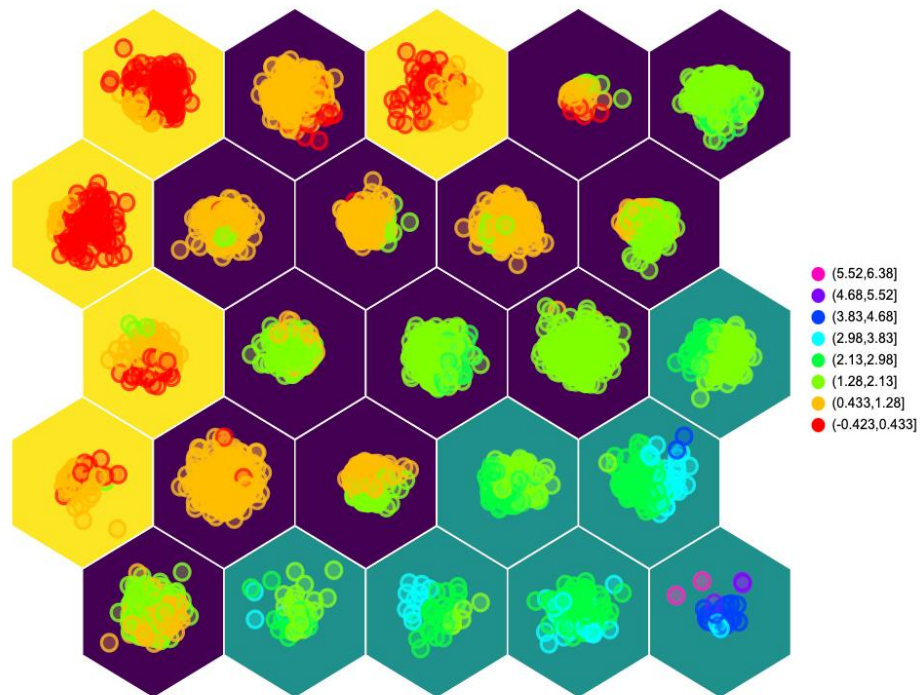
Hover over the plot for information.



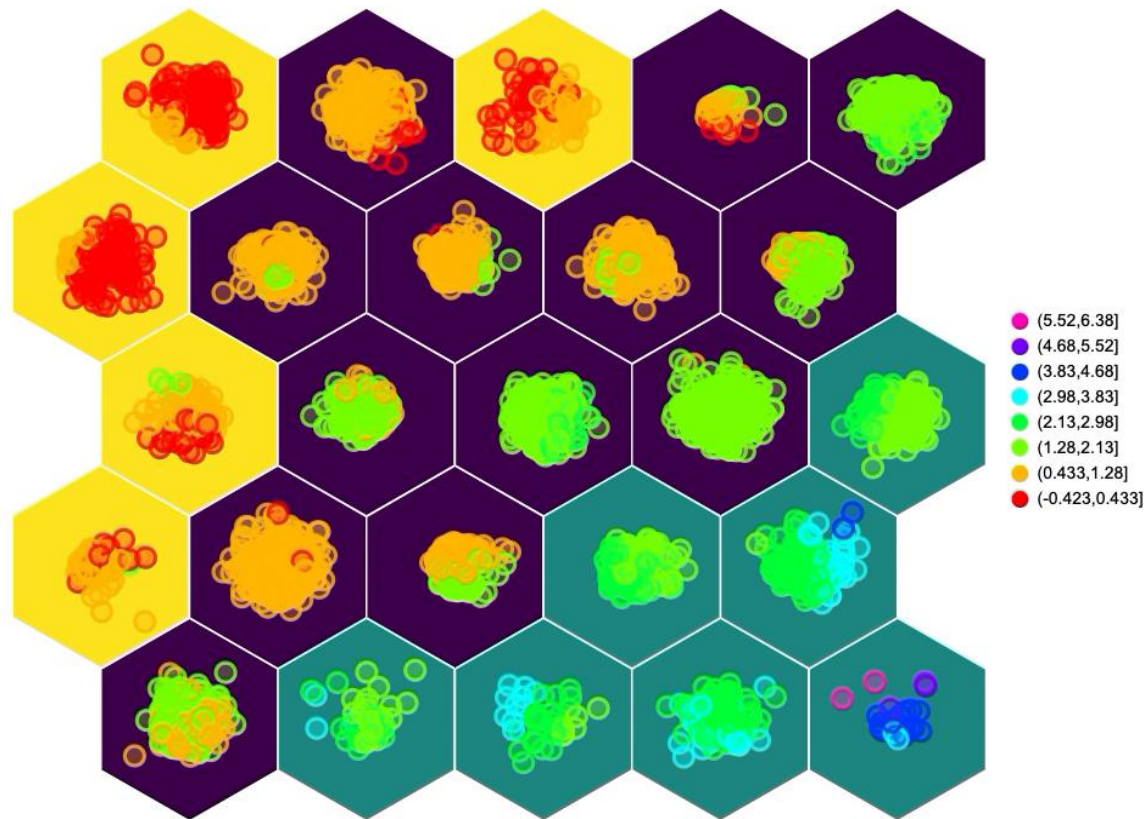
Hover over the plot for information.



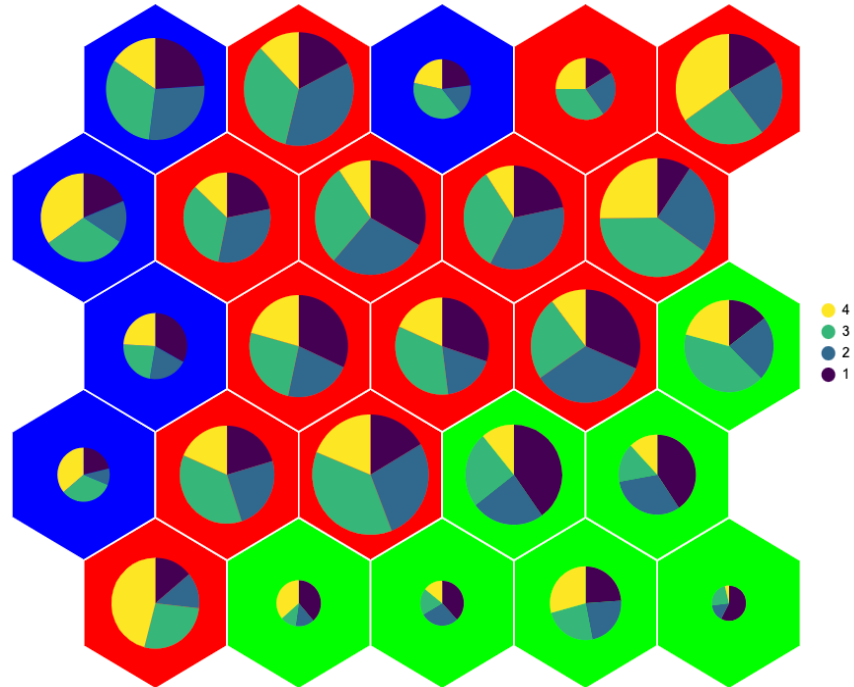
Hover over the plot for information.



Hover over the plot for information.



Hover over the plot for information.



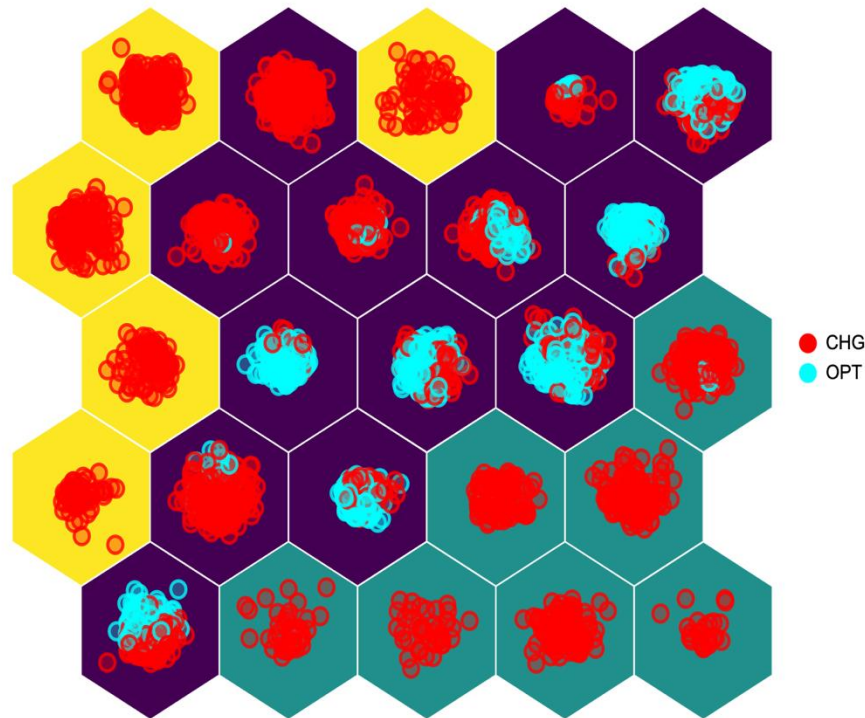
VALORES ÓPTIMOS

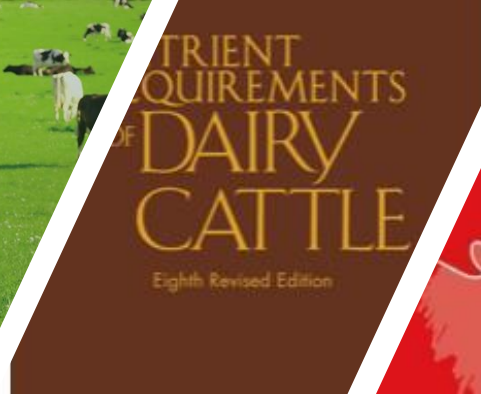
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variable	rango
Producción Leche, kg/d	2 - 3
Extracto Quesero, %	8 - 10
Ingestión, kg MS/d	1,6 - 2
Eficiencia Alimentación	1,2 -1,5
ISCA, €/cabra y día	1 - 2



Hover over the plot for information.

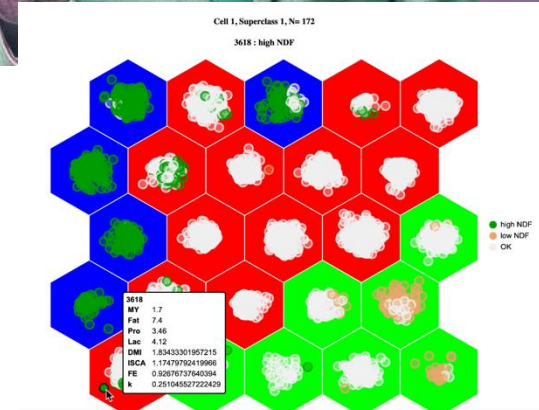
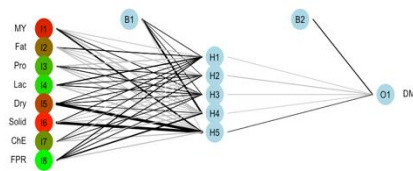
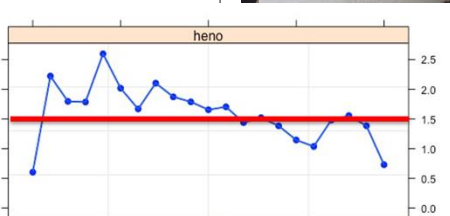
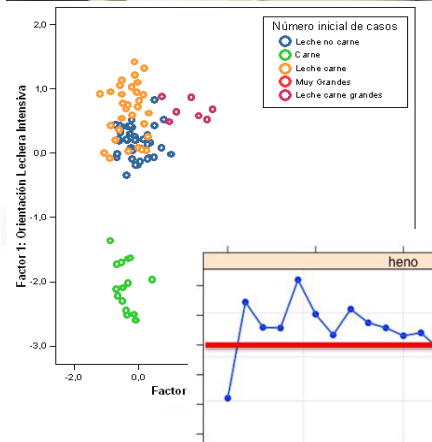




¿CÓMO EXTRAPOLAMOS
LOS SISTEMAS DE
ALIMENTACIÓN “CLÁSICOS”
AL REBAÑO?

1. ADAPTAR LOS SISTEMAS DE ALIMENTACIÓN TRADICIONALES A NUESTRO REBAÑO

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2. NUTRICIÓN DE PRECISIÓN - CAMPO MULTIDISCIPLINAR



- Sensores
- Robots
- Cámaras

Ingeniero
Electrónico

- Animales
- Alimentación
- Contaminación

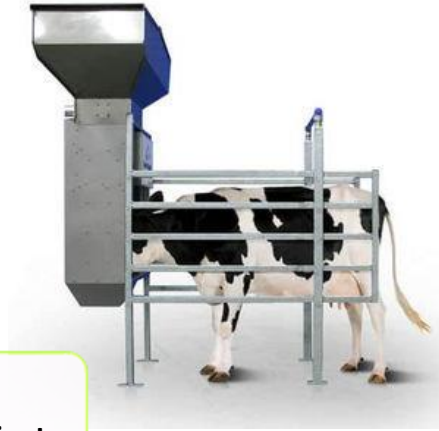
Sistemas
Ganaderos,
Zootecnistas,
Veterinarios,
Ing. Agrónomos

Estadísticos

Ingeniero
Informático

- Diseño
- ANOVA
- Regresión

- Almacenamiento
- Visualización
- IA



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MUCHAS gracias

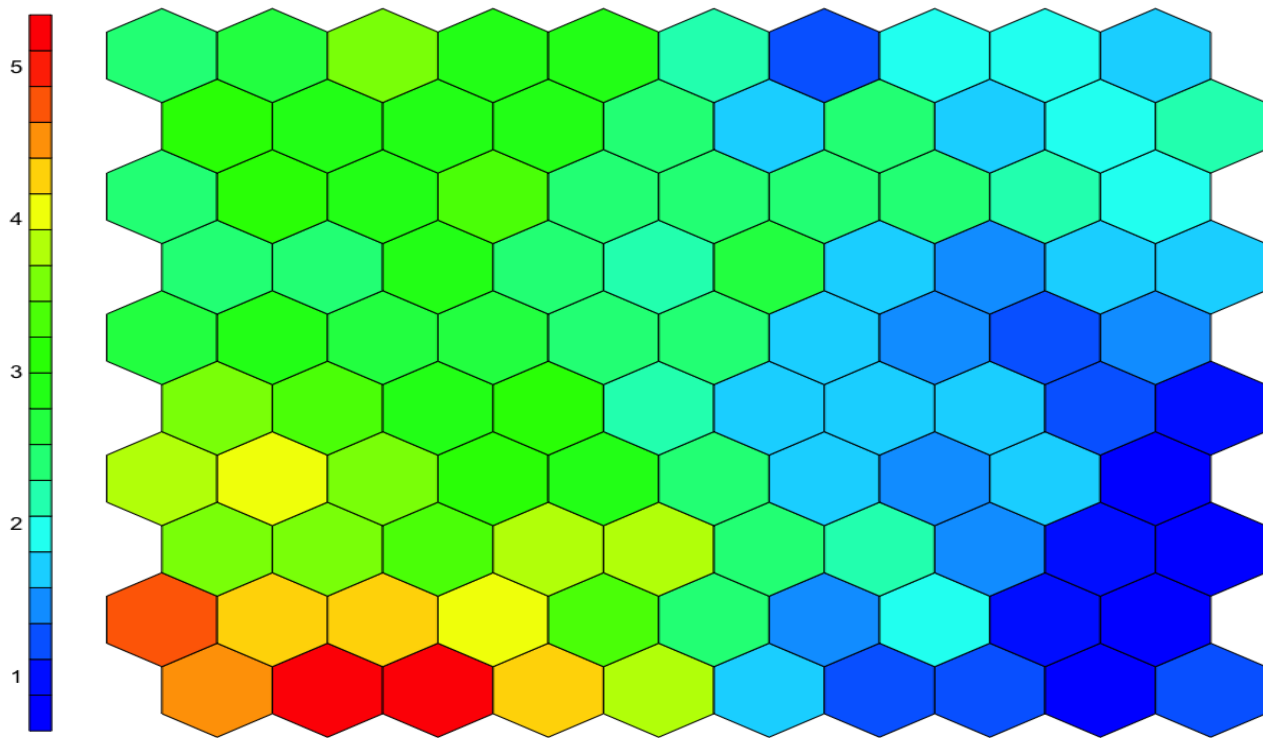
cjfernandez@dca.upv.es



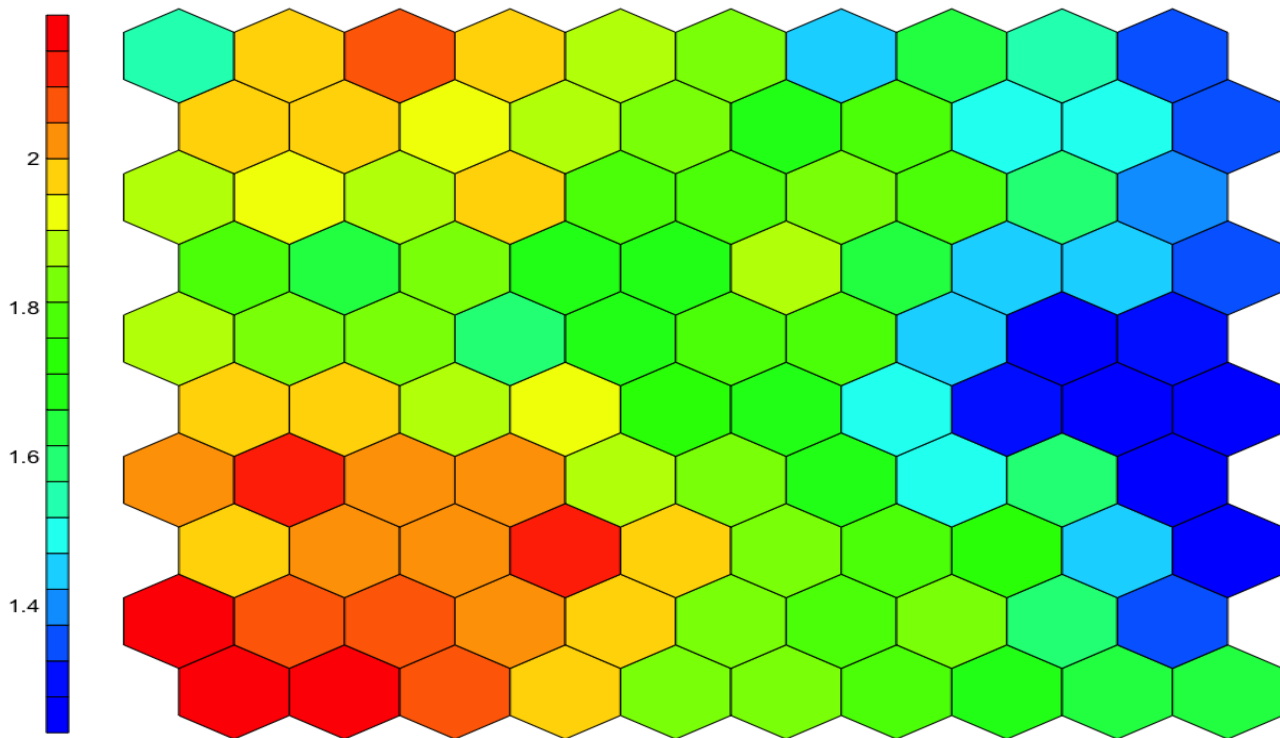
PRODUCCIÓN DE LECHE

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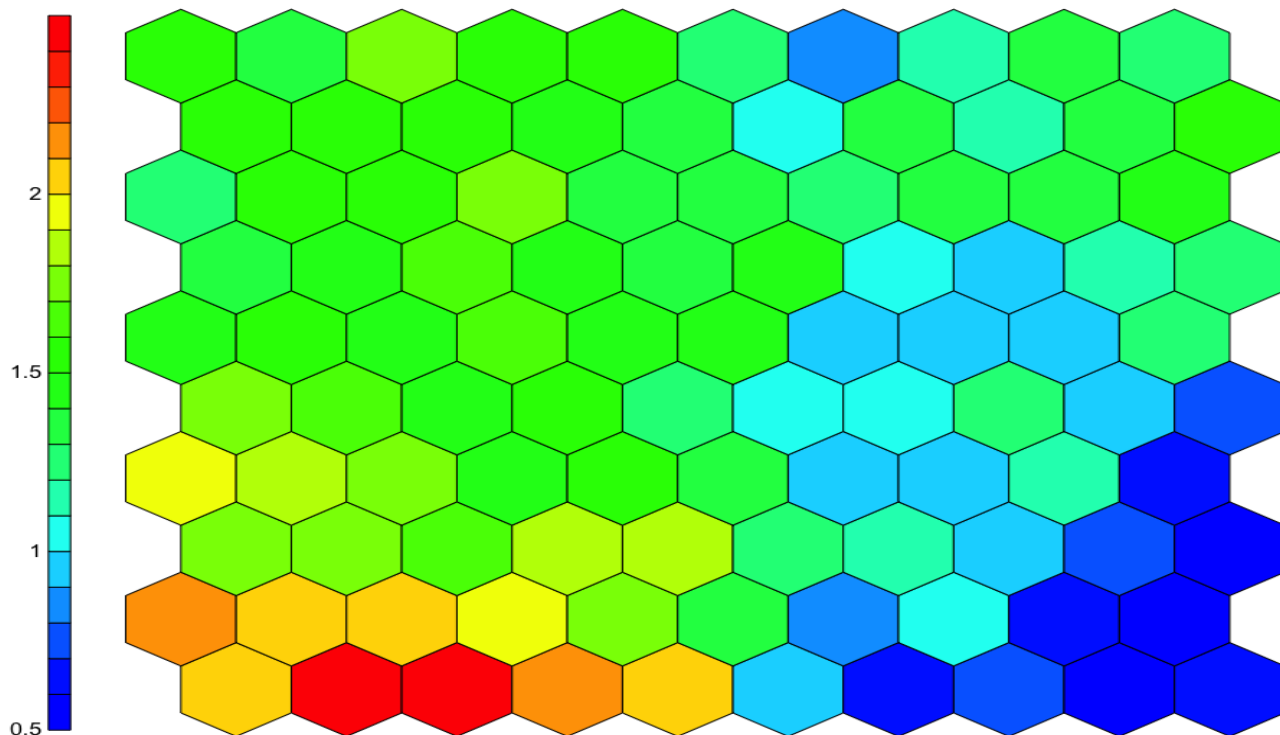
Milk Yield



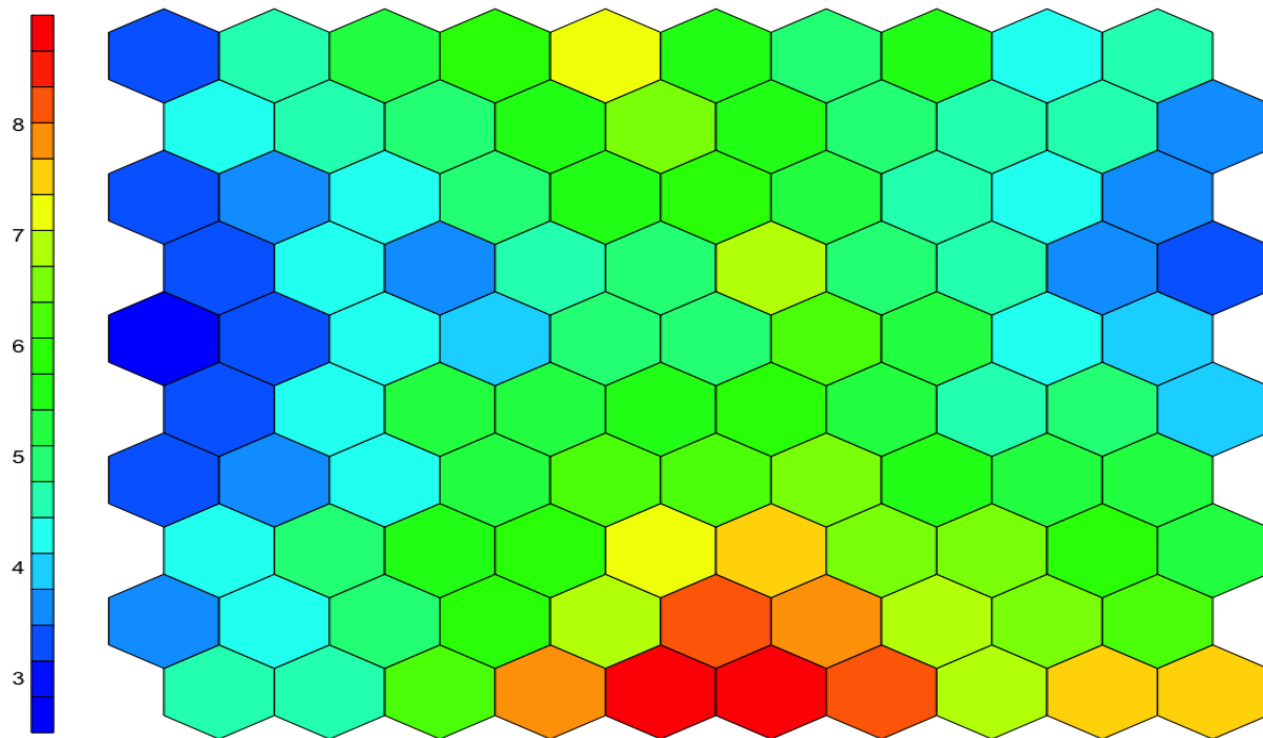
DRY MATTER INTAKE



Feed Efficiency



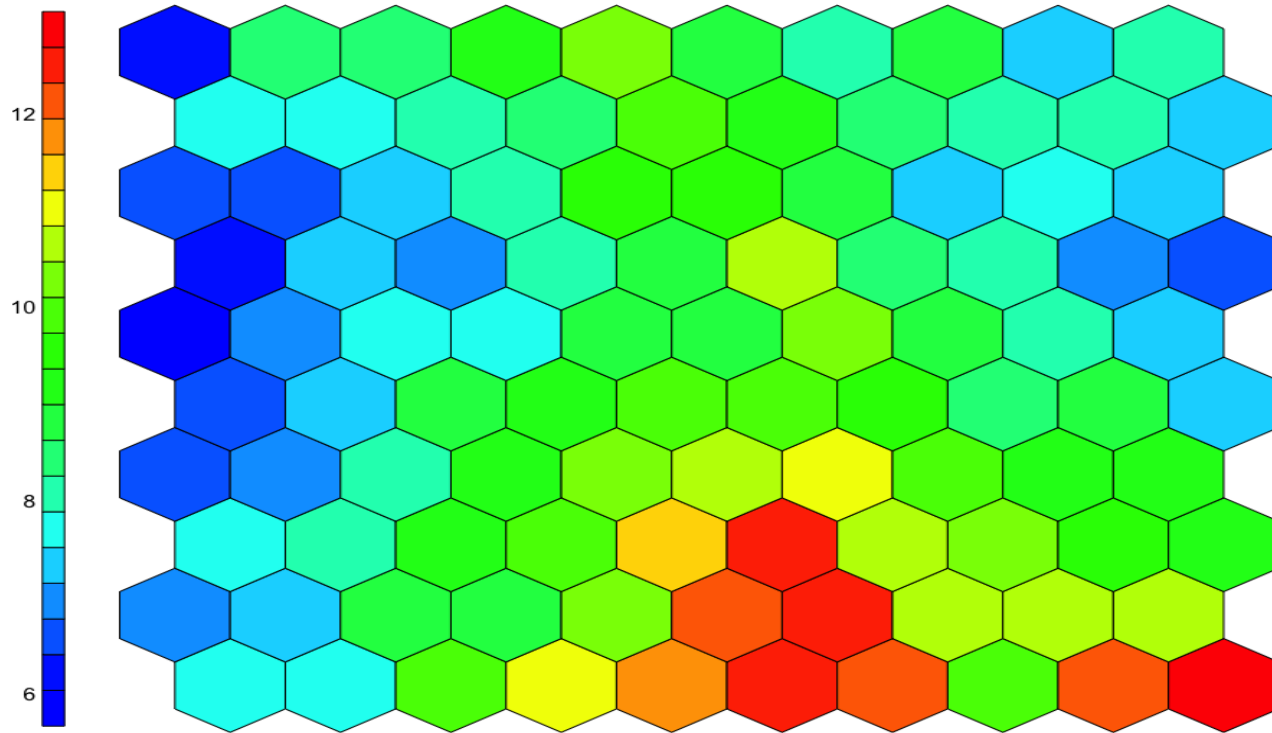
Fat



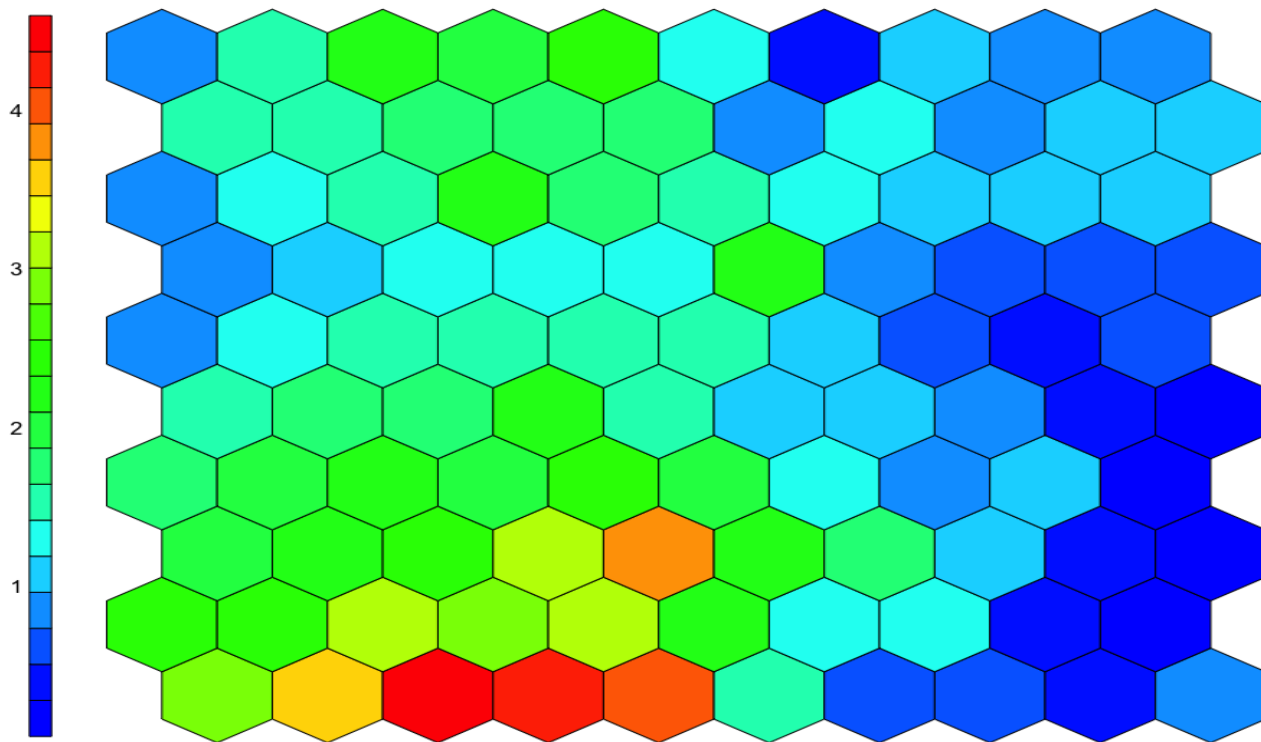
EXTRACTO QUESERO

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Cheese Extract



Ingresos Sobre Costes Alimentación



Visión tradicional

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