

**Universidad Tecnológica**

**Centroamericana**

Facultad de Ingeniería

**Mini Proyecto 2.**

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**Asignatura:**

Sistemas Inteligentes.

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# Introducción.

El dengue es una enfermedad viral transmitida por el mosquito Aedes aegypti, misma cuya incidencia, según La organización Mundial de la Salud (OMS) ha estado en aumento durante las ultimas décadas. (OMS, 2020).

En Honduras, en julio del año 2020 el sistema nacional de Gestión de Riesgos (SINAGER) declaró emergencia nacional dentro del territorio hondureño debido a el aumento de la incidencia de casos de dengue, cabe destacar que según (Criterio, 2020), Honduras registraba para octubre de 2020 más de 20,000 casos de dengue.

Si bien no existe un tratamiento específico para el dengue (OMS,2020), la detección temprana del mismo puede ayudar a disminuir el riesgo es por ello que mecanismos automatizados que puedan servir de aporte para la detección de padecimientos como estos son tan importantes hoy en día.

Por ello, el presente trabajo contiene información obtenida mediante la implementación de diferentes métodos de clasificación con la finalidad de producir modelos predictivos capaces de emitir juicio sobre el padecimiento del dengue en las personas.

## Descripción de la implementación.

* Comandos y recomendaciones para la ejecución:
  1. Puesto que el programa requiere de librerías específicas que necesitan instalarse, se preparó un script llamado “***septup.py***” el cual encontrará en la carpeta principal del proyecto. Ejecute el archivo “***setup.py***” sin ningún parámetro en la línea de comando para instalar las librerías necesarias.
  2. Todas las estadísticas, graficas e información similar se generará automáticamente en la carpeta “estadísticas”. Por ello, es necesario que dicha carpeta exista en el directorio principal del proyecto.
  3. La carpeta “*confs*” contiene los archivos configuraciones necesarias para el entrenamiento de los modelos de la parte *parte 2 y parte 3*.
  4. Los parámetros necesarios para la ejecución de cada archivo son los mismos que los especificados en la descripción del proyecto.
  5. Para evitar posibles errores y molestias para el usuario, los scripts de la forma “mp\_2\_parte\_X\_train.py” y mp\_2\_parte\_X\_test.py, agregan ***automáticamente*** la extensión del archivo del cual se leerá/escribirá l modelo entrenado.
  6. Para la ejecución de la parte 4, los tipos se representan mediante números, la codificación es la siguiente: 1 (Categorical), 2 (Bernoulli), 3 (Gausiano).
* librerías especificas utilizadas:
  + Generales:
    1. *Pandas*: Para el manejo de archivos en general.
    2. *Numpy*: Para dar soporte a la creación de vectores/matrices.
    3. *Pickle:* Para el manejo de archivos binarios.
    4. *train\_test\_split*: Para uso en crossvalidation y crear diferentes subsets de un dataset.
  + Parte1:

1. *xlsxwriter,xlrd,openpyxl*: Perteneciente a la librería Pandas, se utiliza para la gestión de archivos en Excel, este fue utilizado para reportar los resultados de las estadísticas de la parte 1 en un documento con extensión .xls.
2. *matplotlib.pyplot*: Para la generación de graficas.

* Parte 2:
  1. RandomForestClassifier: Para la creación, entrenamiento y obtención de resultados de los random Forest.
* Parte3:
  1. SVC: Para la creación, entrenamiento y obtención de resultados de las SVC.
* Parte4:
  1. GaussianNB, BernoulliNB,OrdinalEncoder: Para la creación, entrenamiento y obtención de resultados de los diferentes tipos de Naive Bayes.

# Resultados y Estadísticas: Parte 1.

*Clasificación de los atributos.*

|  |  |  |
| --- | --- | --- |
| Tipo de Atributo | Cantidad | Descripción |
| Continuo | 4 | Por su naturaleza se clasificaron como discretos los atributos:   * Plaquetas * Linfocitos * Hematocritos * Leucocitos |
| Discreto | 17 | Se consideran discretos los demás atributos no listados en el inciso anterior. |

1. *Estadísticas para valores discretos.*

*Nota: Los valores a continuación presentados fueron obtenidos del dataset completo\_train\_synth\_dengue.csv”*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **sexo** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| M | 2914 | 1028 | 510 | 502 |
| F | 3068 | 952 | 532 | 494 |

Tabla 1. Resultados estadísticos Sexo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **nauseas** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| Si | 1755 | 427 | 218 | 610 |
| No | 4227 | 1553 | 824 | 386 |

Tabla 2. Resultados estadísticos Nauseas

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **vomitos** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 3670 | 1697 | 625 | 241 |
| Si | 1835 | 103 | 35 | 10 |
| Persistente | 477 | 180 | 382 | 745 |

Tabla 3. Resultados estadísticos vomitos

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **rash** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| Si | 323 | 501 | 265 | 465 |
| No | 5659 | 1479 | 777 | 531 |

Tabla 4. Resultados estadísticos rash

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **artralgias** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| Si | 2441 | 1583 | 851 | 792 |
| No | 3541 | 397 | 191 | 204 |

Tabla 5. Resultados estadísticos artralgias

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **mialgias** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| Si | 3604 | 1585 | 831 | 818 |
| No | 2378 | 395 | 211 | 178 |

Tabla 6. Resultados estadísticos mialgias

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **dias\_fiebre** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| 4 | 858 | 389 | 187 | 361 |
| 3 | 1095 | 1211 | 674 | 324 |
| 1 | 2419 | 0 | 0 | 0 |
| 5 | 0 | 380 | 181 | 311 |
| 2 | 1610 | 0 | 0 | 0 |

Tabla 7. Resultados estadísticos días con fiebre

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **dias\_ultima\_fiebre** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| 1 | 1144 | 305 | 158 | 222 |
| 0 | 1753 | 1116 | 575 | 252 |
| 2 | 931 | 285 | 142 | 258 |
| 4 | 0 | 82 | 57 | 83 |
| 3 | 2154 | 192 | 110 | 181 |

Tabla 8. Resultados estadísticos días desde la última fiebre

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **prueba\_torniquete** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| Positiva | 194 | 421 | 222 | 741 |
| NA | 5067 | 497 | 262 | 244 |
| Negativa | 721 | 1062 | 558 | 11 |

Tabla 9. Resultados estadísticos prueba torniquete

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **dolor\_abdominal** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 3638 | 1799 | 671 | 273 |
| Si | 2344 | 181 | 371 | 723 |

Tabla 10. Resultados estadísticos dolor abdominal

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **acumulacion\_fluidos** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 5680 | 1785 | 658 | 251 |
| Si | 302 | 195 | 384 | 745 |

Tabla 11. Resultados estadísticos acumulación fluidos

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **sangrado\_mucosas** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 5918 | 1867 | 887 | 197 |
| Si | 64 | 113 | 155 | 799 |

Tabla 12. Resultados estadísticos sangrado en la mucosa

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **hemorragia** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 4987 | 1980 | 1042 | 197 |
| Si | 995 | 0 | 0 | 799 |

Tabla 13.Resultados estadísticos hemorragia

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **shock** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 5521 | 1980 | 1042 | 592 |
| Si | 461 | 0 | 0 | 404 |

Tabla 14.Resultados estadísticos shock

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **letargia** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 5658 | 1797 | 652 | 307 |
| Si | 324 | 183 | 390 | 689 |

Tabla 15.Resultados estadísticos letargia

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **irritabilidad** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 5682 | 1969 | 1011 | 923 |
| Si | 300 | 11 | 31 | 73 |

Tabla 16.Resultados estadísticos irritabilidad

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **hepatomegalia** | **No Dengue** | **No signos Alerta** | **Signos Alerta** | **Dengue Grave** |
| No | 5796 | 1832 | 652 | 265 |
| Si | 186 | 148 | 390 | 731 |

Tabla 17.Resultados estadísticos hepatomegalia

1. *Estadísticas para valores continuos:*

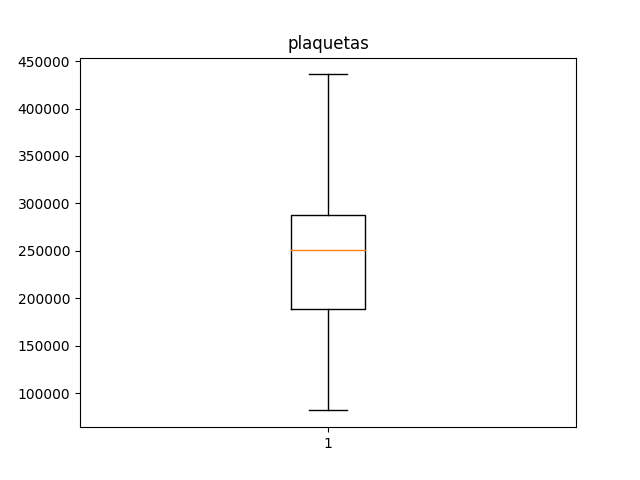


Ilustración 1Grafica de caja para prueba de laboratorio de plaquetas

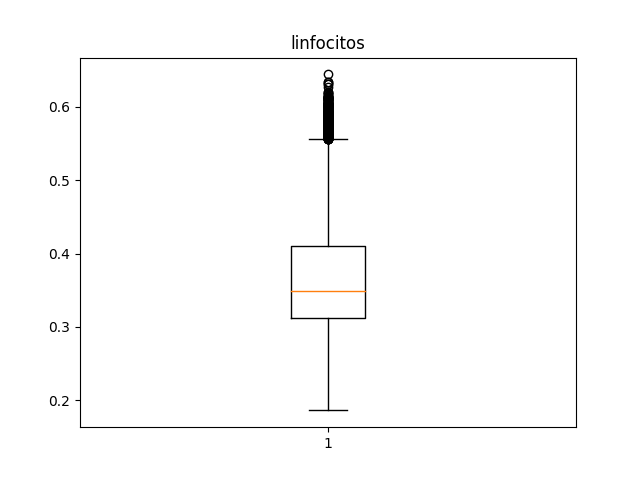


Ilustración 2Grafica de caja para prueba de laboratorio de linfocitos

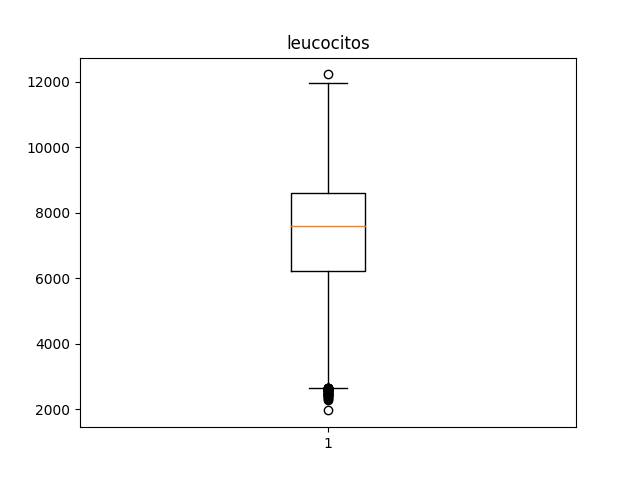


Ilustración 3. Grafica de caja para prueba de laboratorio de Leucocitos

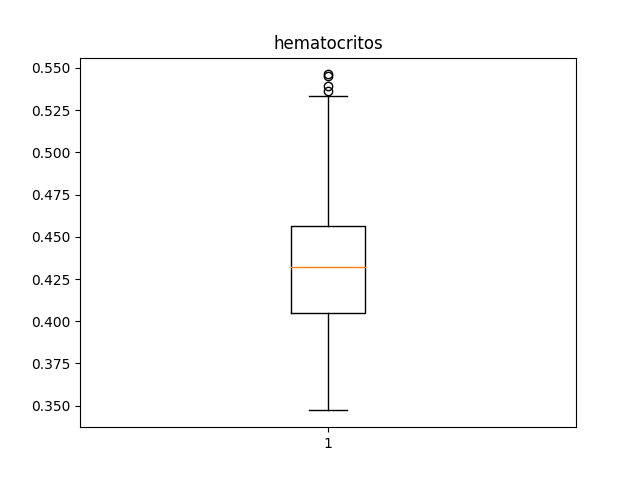


Ilustración 4Grafica de caja para prueba de laboratorio de hematocritos

1. *Análisis de resultados:*

Luego del análisis de los datos obtenidos de la generación de tablas y graficas de los atributos discretos y continuos, se observó un patrón de comportamiento en los datos de prueba, donde si bien la clase mayoritaria era “No dengue”, las clases minoritarias “dengue no grave y sin signos de alarma”, “dengue no grave con signos de alarma” y “dengue grave” tienen gran importancia al momento del diagnóstico médico.

Algunos atributos mostraban tener importancia dentro del diagnóstico al tomar determinados valores, esto se afirma puesto que en ellos se podía observar una considerable diferencia entre la cantidad de personas que no tenían dengue contra los que si tenían algún tipo de dengue independientemente de la gravedad de este. Algunos ejemplos de estos casos y por lo cual se consideran como atributos de mayor importancia son:

|  |  |  |
| --- | --- | --- |
| Atributo | Valor | Porcentaje de diferencia |
| Prueba Torniquete | Positiva | 87.71% de las personas que dieron “positivo” a la prueba del torniquete tenían algún tipo de dengue. |
| Acumulación de fluidos | Si | 81.43% de las personas que si habían tenido retención de líquidos tenían algún tipo de dengue. |
| Días con fiebre | 3 | 66.86% de las personas que respondieron habían tenido 3 días de fiebre tenían algún tipo de dengue. |
| Hepatomegalia | Si | 87.21% de las personas que si habían sufrido alteraciones en el tamaño del hígado tenían algún tipo de dengue. |
| Sangrado en las mucosas | Si | 94.34% de las personas que tenían sangrado en la mucosidad tenían algún tipo de dengue.  Nota: La mayoría de las personas no presentaba sangrado en la mucosidad |

Estos resultados son en base a los atributos discretos, de los atributos continuos se deduce que el más importantes son las plaquetas porque el diagrama de caja y bigote se encuentra mejor distribuido.

En general y en base a el análisis del grupo se menciona que los atributos más importantes son: Las plaquetas, prueba del torniquete, sangrado en las mucosas, Hepatomegalia y la acumulación de fluidos.

Por otro lado, los atributos que se consideran menos relevantes ya que no muestran información concluyente son: irritabilidad, schock, hemorragia y el sexo.

# Resultados y Estadísticas: Parte 2.

**Nota**: Por cuestiones de orden, los números fueron redondeados a 4 décimas.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Id | Dataset | Criterio | Arboles | Prof | Attr | p1 | p2 | p3 | p4 | p5 | Promedio |
| 1 | LAB | entropy | 46 | 10 | auto | 0.6878 | 0.6866 | 0.6893 | 0.6999 | 0.6956 | 0.6918 |
| 2 | LAB | entropy | 46 | 10 | auto | 0.7021 | 0.7013 | 0.6849 | 0.6906 | 0.7058 | 0.6969 |
| 3 | LAB | entropy | 46 | 10 | auto | 0.7085 | 0.7003 | 0.6971 | 0.7054 | 0.6925 | 0.7008 |
| 4 | LAB | entropy | 46 | 10 | auto | 0.6967 | 0.6957 | 0.6973 | 0.6997 | 0.706 | 0.6991 |
| 5 | LAB | entropy | 46 | 10 | auto | 0.6893 | 0.693 | 0.6977 | 0.7053 | 0.7054 | 0.6981 |
| 6 | LAB | gini | 125 | 10 | log2 | 0.6858 | 0.691 | 0.6837 | 0.6888 | 0.6961 | 0.6891 |
| 7 | LAB | gini | 125 | 10 | log2 | 0.6999 | 0.6916 | 0.6965 | 0.6921 | 0.693 | 0.6946 |
| 8 | LAB | gini | 125 | 10 | log2 | 0.6968 | 0.6936 | 0.706 | 0.6953 | 0.7052 | 0.6994 |
| 9 | LAB | gini | 125 | 10 | log2 | 0.708 | 0.6955 | 0.6918 | 0.6949 | 0.6951 | 0.6971 |
| 10 | LAB | gini | 125 | 10 | log2 | 0.697 | 0.7048 | 0.7001 | 0.6977 | 0.696 | 0.6991 |
| 11 | LAB | entropy | 167 | 11 | auto | 0.7668 | 0.7558 | 0.7617 | 0.7586 | 0.7626 | 0.7611 |
| 12 | LAB | entropy | 167 | 11 | auto | 0.7594 | 0.7633 | 0.7609 | 0.764 | 0.7541 | 0.7603 |
| 13 | LAB | entropy | 167 | 11 | auto | 0.7559 | 0.7621 | 0.7571 | 0.7575 | 0.7586 | 0.7582 |
| 14 | LAB | entropy | 167 | 11 | auto | 0.7556 | 0.7675 | 0.7642 | 0.7601 | 0.7631 | 0.7621 |
| 15 | LAB | entropy | 167 | 11 | auto | 0.7621 | 0.7605 | 0.7629 | 0.7663 | 0.7601 | 0.7624 |
| 16 | LAB | gini | 63 | 11 | log2 | 0.7544 | 0.7633 | 0.7657 | 0.7548 | 0.758 | 0.7592 |
| 17 | LAB | gini | 63 | 11 | log2 | 0.7502 | 0.7641 | 0.7643 | 0.762 | 0.7505 | 0.7582 |
| 18 | LAB | gini | 63 | 11 | log2 | 0.7609 | 0.7587 | 0.769 | 0.7627 | 0.7675 | 0.7638 |
| 19 | LAB | gini | 63 | 11 | log2 | 0.7616 | 0.7547 | 0.7534 | 0.7596 | 0.7731 | 0.7605 |
| 20 | LAB | gini | 63 | 11 | log2 | 0.7598 | 0.7684 | 0.7656 | 0.7646 | 0.7564 | 0.763 |
| 21 | LAB | entropy | 76 | 13 | auto | 0.8531 | 0.8513 | 0.8532 | 0.863 | 0.8517 | 0.8545 |
| 22 | LAB | entropy | 76 | 13 | auto | 0.8578 | 0.8591 | 0.8626 | 0.8588 | 0.8643 | 0.8605 |
| 23 | LAB | entropy | 76 | 13 | auto | 0.8615 | 0.8544 | 0.8692 | 0.8693 | 0.8653 | 0.8639 |
| 24 | LAB | entropy | 76 | 13 | auto | 0.8682 | 0.8682 | 0.8558 | 0.8621 | 0.8625 | 0.8634 |
| 25 | LAB | entropy | 76 | 13 | auto | 0.8669 | 0.8742 | 0.857 | 0.8722 | 0.8631 | 0.8667 |
| 26 | LAB | gini | 29 | 14 | log2 | 0.8844 | 0.8886 | 0.883 | 0.8847 | 0.8914 | 0.8864 |
| 27 | LAB | gini | 29 | 14 | log2 | 0.8981 | 0.9 | 0.8918 | 0.887 | 0.8856 | 0.8925 |
| 28 | LAB | gini | 29 | 14 | log2 | 0.892 | 0.8962 | 0.8993 | 0.8871 | 0.8987 | 0.8947 |
| 29 | LAB | gini | 29 | 14 | log2 | 0.8886 | 0.899 | 0.8845 | 0.8985 | 0.8905 | 0.8922 |
| 30 | LAB | gini | 29 | 14 | log2 | 0.893 | 0.8995 | 0.8955 | 0.8866 | 0.8904 | 0.893 |
| 31 | LAB | entropy | 186 | 15 | log2 | 0.9284 | 0.9284 | 0.9331 | 0.9284 | 0.9368 | 0.931 |
| 32 | LAB | entropy | 186 | 15 | log2 | 0.9303 | 0.9301 | 0.9302 | 0.9327 | 0.9287 | 0.9304 |
| 33 | LAB | entropy | 186 | 15 | log2 | 0.9363 | 0.9404 | 0.9389 | 0.9407 | 0.9362 | 0.9385 |
| 34 | LAB | entropy | 186 | 15 | log2 | 0.9372 | 0.9358 | 0.928 | 0.9367 | 0.9336 | 0.9343 |
| 35 | LAB | entropy | 186 | 15 | log2 | 0.9399 | 0.9366 | 0.9414 | 0.9389 | 0.9379 | 0.9389 |
| 36 | LAB | gini | 33 | 16 | log2 | 0.9432 | 0.9454 | 0.9328 | 0.9385 | 0.9352 | 0.939 |
| 37 | LAB | gini | 33 | 16 | log2 | 0.936 | 0.9418 | 0.9444 | 0.932 | 0.9289 | 0.9366 |
| 38 | LAB | gini | 33 | 16 | log2 | 0.9447 | 0.9432 | 0.9411 | 0.9414 | 0.9437 | 0.9428 |
| 39 | LAB | gini | 33 | 16 | log2 | 0.9494 | 0.9448 | 0.9406 | 0.9392 | 0.9425 | 0.9433 |
| 40 | LAB | gini | 33 | 16 | log2 | 0.946 | 0.9396 | 0.9415 | 0.9392 | 0.9438 | 0.942 |
| 41 | LAB | entropy | 54 | 16 | auto | 0.9501 | 0.9471 | 0.9559 | 0.9459 | 0.9496 | 0.9497 |
| 42 | LAB | entropy | 54 | 16 | auto | 0.9428 | 0.944 | 0.9431 | 0.9501 | 0.9476 | 0.9455 |
| 43 | LAB | entropy | 54 | 16 | auto | 0.948 | 0.9541 | 0.952 | 0.9467 | 0.9504 | 0.9502 |
| 44 | LAB | entropy | 54 | 16 | auto | 0.9516 | 0.9534 | 0.9471 | 0.9526 | 0.9509 | 0.9511 |
| 45 | LAB | entropy | 54 | 16 | auto | 0.9518 | 0.9509 | 0.9516 | 0.954 | 0.9585 | 0.9534 |
| 46 | LAB | gini | 191 | 18 | auto | 0.9703 | 0.9697 | 0.9706 | 0.9698 | 0.9693 | 0.9699 |
| 47 | LAB | gini | 191 | 18 | auto | 0.9675 | 0.9678 | 0.9669 | 0.9682 | 0.9641 | 0.9669 |
| 48 | LAB | gini | 191 | 18 | auto | 0.971 | 0.9705 | 0.9722 | 0.9714 | 0.9678 | 0.9706 |
| 49 | LAB | gini | 191 | 18 | auto | 0.9714 | 0.971 | 0.9697 | 0.9702 | 0.9719 | 0.9708 |
| 50 | LAB | gini | 191 | 18 | auto | 0.9715 | 0.9704 | 0.9705 | 0.9717 | 0.9699 | 0.9708 |
| 51 | LAB | gini | 31 | 20 | auto | 0.9776 | 0.9752 | 0.9754 | 0.9784 | 0.9784 | 0.977 |
| 52 | LAB | gini | 31 | 20 | auto | 0.9774 | 0.9783 | 0.9755 | 0.9765 | 0.9759 | 0.9767 |
| 53 | LAB | gini | 31 | 20 | auto | 0.9788 | 0.9812 | 0.9779 | 0.9767 | 0.9769 | 0.9783 |
| 54 | LAB | gini | 31 | 20 | auto | 0.9811 | 0.98 | 0.9834 | 0.9745 | 0.9763 | 0.9791 |
| 55 | LAB | gini | 31 | 20 | auto | 0.9794 | 0.9748 | 0.981 | 0.9792 | 0.9796 | 0.9788 |
| 56 | LAB | gini | 154 | 21 | auto | 0.9864 | 0.9864 | 0.9831 | 0.9871 | 0.9854 | 0.9857 |
| 57 | LAB | gini | 154 | 21 | auto | 0.9847 | 0.9862 | 0.9839 | 0.9861 | 0.9842 | 0.985 |
| 58 | LAB | gini | 154 | 21 | auto | 0.9883 | 0.9866 | 0.9889 | 0.987 | 0.9885 | 0.9879 |
| 59 | LAB | gini | 154 | 21 | auto | 0.9885 | 0.9853 | 0.9858 | 0.986 | 0.9881 | 0.9867 |
| 60 | LAB | gini | 154 | 21 | auto | 0.988 | 0.9869 | 0.985 | 0.9865 | 0.9888 | 0.987 |
| 61 | LAB | entropy | 35 | 21 | auto | 0.9912 | 0.9922 | 0.988 | 0.9935 | 0.9895 | 0.9909 |
| 62 | LAB | entropy | 35 | 21 | auto | 0.9934 | 0.9908 | 0.9912 | 0.9902 | 0.9896 | 0.991 |
| 63 | LAB | entropy | 35 | 21 | auto | 0.9898 | 0.9904 | 0.9955 | 0.9923 | 0.9893 | 0.9915 |
| 64 | LAB | entropy | 35 | 21 | auto | 0.9919 | 0.9898 | 0.9866 | 0.9926 | 0.9927 | 0.9907 |
| 65 | LAB | entropy | 35 | 21 | auto | 0.9943 | 0.9904 | 0.9899 | 0.9928 | 0.995 | 0.9925 |
| 66 | LAB | gini | 95 | 21 | auto | 0.9868 | 0.9867 | 0.9868 | 0.9853 | 0.9838 | 0.9859 |
| 67 | LAB | gini | 95 | 21 | auto | 0.9852 | 0.9861 | 0.9844 | 0.9833 | 0.9851 | 0.9848 |
| 68 | LAB | gini | 95 | 21 | auto | 0.9858 | 0.9865 | 0.9871 | 0.9852 | 0.9855 | 0.986 |
| 69 | LAB | gini | 95 | 21 | auto | 0.9856 | 0.9881 | 0.9875 | 0.9888 | 0.9861 | 0.9872 |
| 70 | LAB | gini | 95 | 21 | auto | 0.9877 | 0.9875 | 0.9864 | 0.9875 | 0.9893 | 0.9877 |
| 71 | LAB | gini | 38 | 21 | auto | 0.9839 | 0.9847 | 0.9844 | 0.9857 | 0.987 | 0.9851 |
| 72 | LAB | gini | 38 | 21 | auto | 0.984 | 0.9859 | 0.9818 | 0.9816 | 0.981 | 0.9829 |
| 73 | LAB | gini | 38 | 21 | auto | 0.9834 | 0.9875 | 0.9863 | 0.9872 | 0.9821 | 0.9853 |
| 74 | LAB | gini | 38 | 21 | auto | 0.9868 | 0.9811 | 0.9878 | 0.9845 | 0.9832 | 0.9847 |
| 75 | LAB | gini | 38 | 21 | auto | 0.9875 | 0.9881 | 0.9872 | 0.9872 | 0.9858 | 0.9872 |
| 1 | Clinica | entropy | 46 | 10 | auto | 0.9477 | 0.9543 | 0.9492 | 0.9483 | 0.9471 | 0.9493 |
| 2 | Clinica | entropy | 46 | 10 | auto | 0.9491 | 0.9497 | 0.9572 | 0.9496 | 0.9492 | 0.951 |
| 3 | Clinica | entropy | 46 | 10 | auto | 0.9502 | 0.9462 | 0.9469 | 0.948 | 0.9474 | 0.9477 |
| 4 | Clinica | entropy | 46 | 10 | auto | 0.9523 | 0.9497 | 0.9472 | 0.949 | 0.9484 | 0.9493 |
| 5 | Clinica | entropy | 46 | 10 | auto | 0.9482 | 0.9516 | 0.9458 | 0.9479 | 0.9531 | 0.9493 |
| 6 | Clinica | gini | 125 | 10 | log2 | 0.9536 | 0.9542 | 0.9535 | 0.9543 | 0.9507 | 0.9533 |
| 7 | Clinica | gini | 125 | 10 | log2 | 0.9555 | 0.9548 | 0.9559 | 0.9532 | 0.9518 | 0.9542 |
| 8 | Clinica | gini | 125 | 10 | log2 | 0.9503 | 0.9554 | 0.9551 | 0.9488 | 0.9543 | 0.9528 |
| 9 | Clinica | gini | 125 | 10 | log2 | 0.9543 | 0.9556 | 0.9554 | 0.9544 | 0.954 | 0.9547 |
| 10 | Clinica | gini | 125 | 10 | log2 | 0.9545 | 0.9518 | 0.9535 | 0.9524 | 0.9554 | 0.9535 |
| 11 | Clinica | entropy | 167 | 11 | auto | 0.9568 | 0.9574 | 0.9564 | 0.9567 | 0.9574 | 0.9569 |
| 12 | Clinica | entropy | 167 | 11 | auto | 0.9564 | 0.9593 | 0.9584 | 0.9582 | 0.9595 | 0.9584 |
| 13 | Clinica | entropy | 167 | 11 | auto | 0.9568 | 0.9578 | 0.9585 | 0.9538 | 0.9565 | 0.9567 |
| 14 | Clinica | entropy | 167 | 11 | auto | 0.9565 | 0.9581 | 0.9574 | 0.9564 | 0.9565 | 0.957 |
| 15 | Clinica | entropy | 167 | 11 | auto | 0.9579 | 0.9577 | 0.9575 | 0.9561 | 0.9572 | 0.9573 |
| 16 | Clinica | gini | 63 | 11 | log2 | 0.9595 | 0.9597 | 0.9575 | 0.963 | 0.9601 | 0.96 |
| 17 | Clinica | gini | 63 | 11 | log2 | 0.9608 | 0.9594 | 0.9616 | 0.9592 | 0.9609 | 0.9604 |
| 18 | Clinica | gini | 63 | 11 | log2 | 0.9583 | 0.9587 | 0.9601 | 0.9597 | 0.9594 | 0.9592 |
| 19 | Clinica | gini | 63 | 11 | log2 | 0.959 | 0.9611 | 0.9593 | 0.958 | 0.9603 | 0.9595 |
| 20 | Clinica | gini | 63 | 11 | log2 | 0.9603 | 0.9565 | 0.9597 | 0.9578 | 0.9585 | 0.9586 |
| 21 | Clinica | entropy | 76 | 13 | auto | 0.9673 | 0.967 | 0.9672 | 0.9665 | 0.9684 | 0.9673 |
| 22 | Clinica | entropy | 76 | 13 | auto | 0.9684 | 0.9692 | 0.9689 | 0.97 | 0.9689 | 0.9691 |
| 23 | Clinica | entropy | 76 | 13 | auto | 0.9673 | 0.9661 | 0.966 | 0.9679 | 0.9651 | 0.9665 |
| 24 | Clinica | entropy | 76 | 13 | auto | 0.9677 | 0.9667 | 0.9644 | 0.9671 | 0.9664 | 0.9665 |
| 25 | Clinica | entropy | 76 | 13 | auto | 0.9659 | 0.9674 | 0.9676 | 0.9665 | 0.9677 | 0.967 |
| 26 | Clinica | gini | 29 | 14 | log2 | 0.9729 | 0.9713 | 0.9723 | 0.9727 | 0.9739 | 0.9726 |
| 27 | Clinica | gini | 29 | 14 | log2 | 0.9737 | 0.974 | 0.9741 | 0.973 | 0.9745 | 0.9739 |
| 28 | Clinica | gini | 29 | 14 | log2 | 0.972 | 0.9707 | 0.9726 | 0.9722 | 0.9701 | 0.9715 |
| 29 | Clinica | gini | 29 | 14 | log2 | 0.9736 | 0.9706 | 0.9699 | 0.9703 | 0.9709 | 0.9711 |
| 30 | Clinica | gini | 29 | 14 | log2 | 0.9719 | 0.9713 | 0.971 | 0.9724 | 0.9721 | 0.9717 |
| 31 | Clinica | entropy | 186 | 15 | log2 | 0.9769 | 0.9768 | 0.9766 | 0.9769 | 0.9771 | 0.9769 |
| 32 | Clinica | entropy | 186 | 15 | log2 | 0.9775 | 0.9767 | 0.9775 | 0.9773 | 0.9782 | 0.9774 |
| 33 | Clinica | entropy | 186 | 15 | log2 | 0.9758 | 0.9757 | 0.9765 | 0.9753 | 0.9757 | 0.9758 |
| 34 | Clinica | entropy | 186 | 15 | log2 | 0.9758 | 0.9757 | 0.9763 | 0.9756 | 0.9758 | 0.9758 |
| 35 | Clinica | entropy | 186 | 15 | log2 | 0.9755 | 0.9752 | 0.9752 | 0.9755 | 0.9753 | 0.9753 |
| 36 | Clinica | gini | 33 | 16 | log2 | 0.9796 | 0.9791 | 0.98 | 0.9797 | 0.9783 | 0.9793 |
| 37 | Clinica | gini | 33 | 16 | log2 | 0.9798 | 0.9795 | 0.9817 | 0.9812 | 0.9808 | 0.9806 |
| 38 | Clinica | gini | 33 | 16 | log2 | 0.9787 | 0.9788 | 0.9786 | 0.9788 | 0.9792 | 0.9788 |
| 39 | Clinica | gini | 33 | 16 | log2 | 0.9788 | 0.9801 | 0.9794 | 0.9781 | 0.9794 | 0.9792 |
| 40 | Clinica | gini | 33 | 16 | log2 | 0.9789 | 0.9778 | 0.9774 | 0.9783 | 0.9783 | 0.9781 |
| 41 | Clinica | entropy | 54 | 16 | auto | 0.9799 | 0.9795 | 0.98 | 0.9786 | 0.9803 | 0.9797 |
| 42 | Clinica | entropy | 54 | 16 | auto | 0.9798 | 0.9792 | 0.9798 | 0.9807 | 0.9806 | 0.98 |
| 43 | Clinica | entropy | 54 | 16 | auto | 0.9784 | 0.9782 | 0.9784 | 0.9786 | 0.9773 | 0.9782 |
| 44 | Clinica | entropy | 54 | 16 | auto | 0.9787 | 0.9782 | 0.9784 | 0.9794 | 0.9781 | 0.9786 |
| 45 | Clinica | entropy | 54 | 16 | auto | 0.9776 | 0.9781 | 0.9794 | 0.9792 | 0.9792 | 0.9787 |
| 46 | Clinica | gini | 191 | 18 | auto | 0.9825 | 0.9827 | 0.9826 | 0.9828 | 0.9829 | 0.9827 |
| 47 | Clinica | gini | 191 | 18 | auto | 0.9843 | 0.984 | 0.9843 | 0.9841 | 0.984 | 0.9841 |
| 48 | Clinica | gini | 191 | 18 | auto | 0.9829 | 0.983 | 0.983 | 0.9827 | 0.9827 | 0.9829 |
| 49 | Clinica | gini | 191 | 18 | auto | 0.9824 | 0.9824 | 0.9828 | 0.9829 | 0.9829 | 0.9827 |
| 50 | Clinica | gini | 191 | 18 | auto | 0.983 | 0.9828 | 0.9827 | 0.9825 | 0.983 | 0.9828 |
| 51 | Clinica | gini | 31 | 20 | auto | 0.9841 | 0.9853 | 0.9841 | 0.9846 | 0.9834 | 0.9843 |
| 52 | Clinica | gini | 31 | 20 | auto | 0.9862 | 0.986 | 0.9862 | 0.9864 | 0.986 | 0.9862 |
| 53 | Clinica | gini | 31 | 20 | auto | 0.9837 | 0.9845 | 0.9836 | 0.9832 | 0.984 | 0.9838 |
| 54 | Clinica | gini | 31 | 20 | auto | 0.9841 | 0.9844 | 0.9842 | 0.9845 | 0.9839 | 0.9842 |
| 55 | Clinica | gini | 31 | 20 | auto | 0.9845 | 0.9839 | 0.9843 | 0.9847 | 0.9852 | 0.9845 |
| 56 | Clinica | gini | 154 | 21 | auto | 0.9856 | 0.9849 | 0.9852 | 0.985 | 0.985 | 0.9851 |
| 57 | Clinica | gini | 154 | 21 | auto | 0.9865 | 0.9868 | 0.9868 | 0.9871 | 0.9863 | 0.9867 |
| 58 | Clinica | gini | 154 | 21 | auto | 0.9845 | 0.9853 | 0.9845 | 0.985 | 0.9845 | 0.9848 |
| 59 | Clinica | gini | 154 | 21 | auto | 0.9848 | 0.9847 | 0.9848 | 0.985 | 0.985 | 0.9849 |
| 60 | Clinica | gini | 154 | 21 | auto | 0.9847 | 0.9843 | 0.9852 | 0.9847 | 0.9845 | 0.9847 |
| 61 | Clinica | entropy | 35 | 21 | auto | 0.9851 | 0.984 | 0.9849 | 0.9853 | 0.9845 | 0.9848 |
| 62 | Clinica | entropy | 35 | 21 | auto | 0.9878 | 0.9866 | 0.9867 | 0.9867 | 0.9863 | 0.9868 |
| 63 | Clinica | entropy | 35 | 21 | auto | 0.9842 | 0.9842 | 0.9841 | 0.9847 | 0.9846 | 0.9844 |
| 64 | Clinica | entropy | 35 | 21 | auto | 0.985 | 0.985 | 0.9842 | 0.9841 | 0.9847 | 0.9846 |
| 65 | Clinica | entropy | 35 | 21 | auto | 0.984 | 0.9847 | 0.984 | 0.9856 | 0.9853 | 0.9847 |
| 66 | Clinica | gini | 95 | 21 | auto | 0.9846 | 0.9849 | 0.985 | 0.985 | 0.9848 | 0.9849 |
| 67 | Clinica | gini | 95 | 21 | auto | 0.9871 | 0.986 | 0.9865 | 0.9866 | 0.9864 | 0.9865 |
| 68 | Clinica | gini | 95 | 21 | auto | 0.9846 | 0.9845 | 0.9842 | 0.9845 | 0.9847 | 0.9845 |
| 69 | Clinica | gini | 95 | 21 | auto | 0.9853 | 0.9845 | 0.9845 | 0.9844 | 0.9852 | 0.9848 |
| 70 | Clinica | gini | 95 | 21 | auto | 0.9845 | 0.9852 | 0.9847 | 0.9845 | 0.9847 | 0.9847 |
| 71 | Clinica | gini | 38 | 21 | auto | 0.985 | 0.9854 | 0.9856 | 0.9848 | 0.9854 | 0.9852 |
| 72 | Clinica | gini | 38 | 21 | auto | 0.9865 | 0.9872 | 0.9863 | 0.986 | 0.9854 | 0.9863 |
| 73 | Clinica | gini | 38 | 21 | auto | 0.9847 | 0.9852 | 0.9851 | 0.9842 | 0.9843 | 0.9847 |
| 74 | Clinica | gini | 38 | 21 | auto | 0.9853 | 0.9853 | 0.985 | 0.9842 | 0.9847 | 0.9849 |
| 75 | Clinica | gini | 38 | 21 | auto | 0.9844 | 0.9846 | 0.9842 | 0.9844 | 0.9848 | 0.9845 |
| 1 | Completo | entropy | 46 | 10 | auto | 0.9745 | 0.9768 | 0.9784 | 0.9787 | 0.98 | 0.9777 |
| 2 | Completo | entropy | 46 | 10 | auto | 0.9802 | 0.9765 | 0.9774 | 0.9768 | 0.9798 | 0.9781 |
| 3 | Completo | entropy | 46 | 10 | auto | 0.9752 | 0.9799 | 0.9776 | 0.9779 | 0.9771 | 0.9775 |
| 4 | Completo | entropy | 46 | 10 | auto | 0.9774 | 0.9759 | 0.9783 | 0.9758 | 0.9798 | 0.9774 |
| 5 | Completo | entropy | 46 | 10 | auto | 0.9774 | 0.9763 | 0.9798 | 0.9789 | 0.9758 | 0.9776 |
| 6 | Completo | gini | 125 | 10 | log2 | 0.9776 | 0.9779 | 0.9785 | 0.9791 | 0.9768 | 0.978 |
| 7 | Completo | gini | 125 | 10 | log2 | 0.9778 | 0.9778 | 0.9768 | 0.9796 | 0.9787 | 0.9781 |
| 8 | Completo | gini | 125 | 10 | log2 | 0.9768 | 0.9773 | 0.9772 | 0.9769 | 0.9785 | 0.9773 |
| 9 | Completo | gini | 125 | 10 | log2 | 0.979 | 0.9776 | 0.978 | 0.9765 | 0.9779 | 0.9778 |
| 10 | Completo | gini | 125 | 10 | log2 | 0.9779 | 0.9782 | 0.9775 | 0.9773 | 0.9789 | 0.978 |
| 11 | Completo | entropy | 167 | 11 | auto | 0.9837 | 0.9828 | 0.9849 | 0.984 | 0.9835 | 0.9838 |
| 12 | Completo | entropy | 167 | 11 | auto | 0.9848 | 0.9847 | 0.9851 | 0.9848 | 0.984 | 0.9847 |
| 13 | Completo | entropy | 167 | 11 | auto | 0.9826 | 0.9863 | 0.9859 | 0.9834 | 0.9855 | 0.9847 |
| 14 | Completo | entropy | 167 | 11 | auto | 0.9836 | 0.9843 | 0.9855 | 0.9855 | 0.9858 | 0.9849 |
| 15 | Completo | entropy | 167 | 11 | auto | 0.9828 | 0.9851 | 0.9845 | 0.9836 | 0.9844 | 0.9841 |
| 16 | Completo | gini | 63 | 11 | log2 | 0.9826 | 0.9819 | 0.9839 | 0.9841 | 0.9832 | 0.9831 |
| 17 | Completo | gini | 63 | 11 | log2 | 0.9849 | 0.9829 | 0.9833 | 0.9847 | 0.982 | 0.9836 |
| 18 | Completo | gini | 63 | 11 | log2 | 0.9817 | 0.9829 | 0.9841 | 0.983 | 0.9845 | 0.9832 |
| 19 | Completo | gini | 63 | 11 | log2 | 0.9833 | 0.9844 | 0.9823 | 0.9832 | 0.9846 | 0.9836 |
| 20 | Completo | gini | 63 | 11 | log2 | 0.9828 | 0.9828 | 0.9834 | 0.9831 | 0.983 | 0.983 |
| 21 | Completo | entropy | 76 | 13 | auto | 0.9912 | 0.9906 | 0.99 | 0.9902 | 0.99 | 0.9904 |
| 22 | Completo | entropy | 76 | 13 | auto | 0.9924 | 0.9917 | 0.9924 | 0.9923 | 0.9908 | 0.9919 |
| 23 | Completo | entropy | 76 | 13 | auto | 0.9901 | 0.9916 | 0.9921 | 0.9921 | 0.9904 | 0.9913 |
| 24 | Completo | entropy | 76 | 13 | auto | 0.9921 | 0.9917 | 0.9919 | 0.9924 | 0.9918 | 0.992 |
| 25 | Completo | entropy | 76 | 13 | auto | 0.9921 | 0.9923 | 0.9922 | 0.992 | 0.9913 | 0.992 |
| 26 | Completo | gini | 29 | 14 | log2 | 0.9927 | 0.9923 | 0.9909 | 0.9916 | 0.9916 | 0.9918 |
| 27 | Completo | gini | 29 | 14 | log2 | 0.9939 | 0.9931 | 0.9934 | 0.9932 | 0.9929 | 0.9933 |
| 28 | Completo | gini | 29 | 14 | log2 | 0.993 | 0.9924 | 0.9931 | 0.993 | 0.9929 | 0.9929 |
| 29 | Completo | gini | 29 | 14 | log2 | 0.9931 | 0.9936 | 0.9919 | 0.9929 | 0.9923 | 0.9928 |
| 30 | Completo | gini | 29 | 14 | log2 | 0.9918 | 0.9927 | 0.992 | 0.9928 | 0.9932 | 0.9925 |
| 31 | Completo | entropy | 186 | 15 | log2 | 0.9949 | 0.9953 | 0.9945 | 0.9945 | 0.9948 | 0.9948 |
| 32 | Completo | entropy | 186 | 15 | log2 | 0.9949 | 0.9954 | 0.995 | 0.9954 | 0.9953 | 0.9952 |
| 33 | Completo | entropy | 186 | 15 | log2 | 0.9955 | 0.9951 | 0.9948 | 0.9953 | 0.9948 | 0.9951 |
| 34 | Completo | entropy | 186 | 15 | log2 | 0.9943 | 0.9953 | 0.995 | 0.9953 | 0.9949 | 0.995 |
| 35 | Completo | entropy | 186 | 15 | log2 | 0.9956 | 0.9953 | 0.9958 | 0.9948 | 0.9951 | 0.9953 |
| 36 | Completo | gini | 33 | 16 | log2 | 0.9947 | 0.9953 | 0.9943 | 0.9943 | 0.9946 | 0.9946 |
| 37 | Completo | gini | 33 | 16 | log2 | 0.9966 | 0.9961 | 0.9963 | 0.9957 | 0.9959 | 0.9961 |
| 38 | Completo | gini | 33 | 16 | log2 | 0.9955 | 0.996 | 0.9948 | 0.9958 | 0.9958 | 0.9956 |
| 39 | Completo | gini | 33 | 16 | log2 | 0.996 | 0.996 | 0.9956 | 0.996 | 0.9966 | 0.996 |
| 40 | Completo | gini | 33 | 16 | log2 | 0.9957 | 0.9962 | 0.9955 | 0.9962 | 0.9968 | 0.9961 |
| 41 | Completo | entropy | 54 | 16 | auto | 0.9967 | 0.9974 | 0.9968 | 0.9962 | 0.9965 | 0.9967 |
| 42 | Completo | entropy | 54 | 16 | auto | 0.9974 | 0.9971 | 0.9974 | 0.9976 | 0.9974 | 0.9974 |
| 43 | Completo | entropy | 54 | 16 | auto | 0.9975 | 0.9978 | 0.9973 | 0.9971 | 0.9968 | 0.9973 |
| 44 | Completo | entropy | 54 | 16 | auto | 0.9975 | 0.998 | 0.998 | 0.998 | 0.9975 | 0.9978 |
| 45 | Completo | entropy | 54 | 16 | auto | 0.9976 | 0.9968 | 0.9971 | 0.9968 | 0.9978 | 0.9972 |
| 46 | Completo | gini | 191 | 18 | auto | 0.9993 | 0.9988 | 0.9984 | 0.999 | 0.9991 | 0.9989 |
| 47 | Completo | gini | 191 | 18 | auto | 0.9993 | 0.999 | 0.9991 | 0.9991 | 0.9991 | 0.9991 |
| 48 | Completo | gini | 191 | 18 | auto | 0.9992 | 0.9995 | 0.9993 | 0.999 | 0.999 | 0.9992 |
| 49 | Completo | gini | 191 | 18 | auto | 0.999 | 0.999 | 0.9988 | 0.999 | 0.9993 | 0.999 |
| 50 | Completo | gini | 191 | 18 | auto | 0.9997 | 0.9992 | 0.9998 | 0.999 | 0.9993 | 0.9994 |
| 51 | Completo | gini | 31 | 20 | auto | 0.9998 | 0.9993 | 0.9995 | 0.9998 | 0.9997 | 0.9996 |
| 52 | Completo | gini | 31 | 20 | auto | 0.9998 | 0.9997 | 0.9995 | 0.9991 | 0.9995 | 0.9995 |
| 53 | Completo | gini | 31 | 20 | auto | 0.9995 | 1 | 0.9997 | 0.9993 | 0.9995 | 0.9996 |
| 54 | Completo | gini | 31 | 20 | auto | 0.9998 | 0.9992 | 0.9998 | 0.9997 | 0.9997 | 0.9996 |
| 55 | Completo | gini | 31 | 20 | auto | 0.9997 | 0.9998 | 0.9995 | 0.9997 | 0.9998 | 0.9997 |
| 56 | Completo | gini | 154 | 21 | auto | 0.9998 | 1 | 1 | 1 | 1 | 1 |
| 57 | Completo | gini | 154 | 21 | auto | 1 | 1 | 0.9998 | 1 | 1 | 1 |
| 58 | Completo | gini | 154 | 21 | auto | 1 | 1 | 1 | 1 | 1 | 1 |
| 59 | Completo | gini | 154 | 21 | auto | 1 | 1 | 1 | 1 | 1 | 1 |
| 60 | Completo | gini | 154 | 21 | auto | 1 | 1 | 1 | 1 | 1 | 1 |
| 61 | Completo | entropy | 35 | 21 | auto | 0.9998 | 0.9996 | 1 | 1 | 1 | 0.9999 |
| 62 | Completo | entropy | 35 | 21 | auto | 0.9998 | 0.9996 | 0.9998 | 0.9998 | 0.9998 | 0.9998 |
| 63 | Completo | entropy | 35 | 21 | auto | 0.9998 | 1 | 1 | 1 | 0.9998 | 0.9999 |
| 64 | Completo | entropy | 35 | 21 | auto | 1 | 1 | 0.9997 | 0.9998 | 1 | 0.9999 |
| 65 | Completo | entropy | 35 | 21 | auto | 0.9998 | 1 | 0.9998 | 1 | 1 | 0.9999 |
| 66 | Completo | gini | 95 | 21 | auto | 1 | 0.9998 | 1 | 1 | 1 | 1 |
| 67 | Completo | gini | 95 | 21 | auto | 0.9998 | 0.9998 | 0.9998 | 0.9998 | 0.9998 | 0.9998 |
| 68 | Completo | gini | 95 | 21 | auto | 1 | 1 | 1 | 1 | 1 | 1 |
| 69 | Completo | gini | 95 | 21 | auto | 1 | 1 | 1 | 1 | 1 | 1 |
| 70 | Completo | gini | 95 | 21 | auto | 1 | 1 | 1 | 1 | 1 | 1 |
| 71 | Completo | gini | 38 | 21 | auto | 0.9998 | 0.9998 | 0.9998 | 1 | 1 | 0.9999 |
| 72 | Completo | gini | 38 | 21 | auto | 1 | 0.9997 | 0.9997 | 0.9998 | 1 | 0.9998 |
| 73 | Completo | gini | 38 | 21 | auto | 0.9998 | 1 | 1 | 1 | 0.9997 | 0.9999 |
| 74 | Completo | gini | 38 | 21 | auto | 1 | 1 | 0.9998 | 1 | 0.9998 | 0.9999 |
| 75 | Completo | gini | 38 | 21 | auto | 0.9998 | 0.9998 | 1 | 0.9998 | 1 | 0.9999 |

Una de las Configuraciones con los mejores resultados para los tres datasets fue:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Criterio | Arboles | Profundidad | Atributos | F-1 Lab | F-1 Clinic | F-1 Compl |
| gini | 154 | 21 | auto | Aprox 99% | Aprox 99% | 100% |

En general, cuando se utilizaba el criterio Gini se observaba un mejor promedio F1 en las clases a diferencia de la entropia.

***Resultados.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LAB | TN | FP | FN | TP | F1 |
| Dengue\_Grave | 26 | 53 | 9 | 165 | 0.09 |
| Dengue\_NoGrave\_NoSignos | 64 | 80 | 12 | 334 | 0.17 |
| Dengue\_NoGrave\_SignosAlarma | 30 | 40 | 4 | 186 | 0.02 |
| No\_Dengue | 190 | 267 | 40 | 1000 | 0.63 |
| Acurracy | 0.44 | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Clinica | TN | FP | FN | TP | F1 |
| Dengue\_Grave | 28 | 53 | 31 | 141 | 0.11 |
| Dengue\_NoGrave\_NoSignos | 51 | 87 | 49 | 303 | 0.17 |
| Dengue\_NoGrave\_SignosAlarma | 22 | 50 | 28 | 160 | 0.11 |
| No\_Dengue | 149 | 326 | 157 | 865 | 0.58 |
| Acurracy | 0.4 | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Completo | TN | FP | FN | TP | F1 |
| Dengue\_Grave | 28 | 51 | 25 | 149 | 0.11 |
| Dengue\_NoGrave\_NoSignos | 51 | 87 | 45 | 307 | 0.18 |
| Dengue\_NoGrave\_SignosAlarma | 22 | 44 | 26 | 168 | 0.1 |
| No\_Dengue | 150 | 306 | 155 | 886 | 0.59 |
| Acurracy | 0.41 | | | | |

# Resultados y Estadísticas: Parte 3.

**Nota**: Por cuestiones de orden, los números fueron redondeados a 4 décimas.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Id | Dataset | Kernel | C | Gamma | p1 | p2 | p3 | p4 | p5 | Promedio |
| 1 | LAB | rbf | 1 | scale | 0.2326 | 0.2326 | 0.2326 | 0.2326 | 0.2326 | 0.2326 |
| 2 | LAB | rbf | 1 | scale | 0.2396 | 0.2396 | 0.2396 | 0.2396 | 0.2396 | 0.2396 |
| 3 | LAB | rbf | 1 | scale | 0.5421 | 0.5421 | 0.5421 | 0.5421 | 0.5421 | 0.5421 |
| 4 | LAB | rbf | 1 | scale | 0.5421 | 0.5421 | 0.5421 | 0.5421 | 0.5421 | 0.5421 |
| 5 | LAB | rbf | 1 | scale | 0.5421 | 0.5421 | 0.5421 | 0.5421 | 0.5421 | 0.5421 |
| 6 | LAB | linear | 1.5 | auto | 0.2319 | 0.2319 | 0.2319 | 0.2319 | 0.2319 | 0.2319 |
| 7 | LAB | linear | 1.5 | auto | 0.2377 | 0.2377 | 0.2377 | 0.2377 | 0.2377 | 0.2377 |
| 8 | LAB | linear | 1.5 | auto | 0.5349 | 0.5349 | 0.5349 | 0.5349 | 0.5349 | 0.5349 |
| 9 | LAB | linear | 1.5 | auto | 0.5349 | 0.5349 | 0.5349 | 0.5349 | 0.5349 | 0.5349 |
| 10 | LAB | linear | 1.5 | auto | 0.5349 | 0.5349 | 0.5349 | 0.5349 | 0.5349 | 0.5349 |
| 11 | LAB | rbf | 2.5 | auto | 0.2343 | 0.2343 | 0.2343 | 0.2343 | 0.2343 | 0.2343 |
| 12 | LAB | rbf | 2.5 | auto | 0.2389 | 0.2389 | 0.2389 | 0.2389 | 0.2389 | 0.2389 |
| 13 | LAB | rbf | 2.5 | auto | 0.5396 | 0.5396 | 0.5396 | 0.5396 | 0.5396 | 0.5396 |
| 14 | LAB | rbf | 2.5 | auto | 0.5396 | 0.5396 | 0.5396 | 0.5396 | 0.5396 | 0.5396 |
| 15 | LAB | rbf | 2.5 | auto | 0.5396 | 0.5396 | 0.5396 | 0.5396 | 0.5396 | 0.5396 |
| 16 | LAB | rbf | 3.4 | scale | 0.2345 | 0.2345 | 0.2345 | 0.2345 | 0.2345 | 0.2345 |
| 17 | LAB | rbf | 3.4 | scale | 0.2388 | 0.2388 | 0.2388 | 0.2388 | 0.2388 | 0.2388 |
| 18 | LAB | rbf | 3.4 | scale | 0.5395 | 0.5395 | 0.5395 | 0.5395 | 0.5395 | 0.5395 |
| 19 | LAB | rbf | 3.4 | scale | 0.5395 | 0.5395 | 0.5395 | 0.5395 | 0.5395 | 0.5395 |
| 20 | LAB | rbf | 3.4 | scale | 0.5395 | 0.5395 | 0.5395 | 0.5395 | 0.5395 | 0.5395 |
| 21 | LAB | sigmoid | 6.9 | scale | 0.243 | 0.243 | 0.243 | 0.243 | 0.243 | 0.243 |
| 22 | LAB | sigmoid | 6.9 | scale | 0.2487 | 0.2487 | 0.2487 | 0.2487 | 0.2487 | 0.2487 |
| 23 | LAB | sigmoid | 6.9 | scale | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 |
| 24 | LAB | sigmoid | 6.9 | scale | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 |
| 25 | LAB | sigmoid | 6.9 | scale | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 |
| 26 | LAB | rbf | 10.1 | auto | 0.2338 | 0.2338 | 0.2338 | 0.2338 | 0.2338 | 0.2338 |
| 27 | LAB | rbf | 10.1 | auto | 0.238 | 0.238 | 0.238 | 0.238 | 0.238 | 0.238 |
| 28 | LAB | rbf | 10.1 | auto | 0.5419 | 0.5419 | 0.5419 | 0.5419 | 0.5419 | 0.5419 |
| 29 | LAB | rbf | 10.1 | auto | 0.5419 | 0.5419 | 0.5419 | 0.5419 | 0.5419 | 0.5419 |
| 30 | LAB | rbf | 10.1 | auto | 0.5419 | 0.5419 | 0.5419 | 0.5419 | 0.5419 | 0.5419 |
| 31 | LAB | rbf | 5.9 | scale | 0.2341 | 0.2341 | 0.2341 | 0.2341 | 0.2341 | 0.2341 |
| 32 | LAB | rbf | 5.9 | scale | 0.2391 | 0.2391 | 0.2391 | 0.2391 | 0.2391 | 0.2391 |
| 33 | LAB | rbf | 5.9 | scale | 0.5406 | 0.5406 | 0.5406 | 0.5406 | 0.5406 | 0.5406 |
| 34 | LAB | rbf | 5.9 | scale | 0.5406 | 0.5406 | 0.5406 | 0.5406 | 0.5406 | 0.5406 |
| 35 | LAB | rbf | 5.9 | scale | 0.5406 | 0.5406 | 0.5406 | 0.5406 | 0.5406 | 0.5406 |
| 36 | LAB | rbf | 5.7 | scale | 0.2341 | 0.2341 | 0.2341 | 0.2341 | 0.2341 | 0.2341 |
| 37 | LAB | rbf | 5.7 | scale | 0.239 | 0.239 | 0.239 | 0.239 | 0.239 | 0.239 |
| 38 | LAB | rbf | 5.7 | scale | 0.5409 | 0.5409 | 0.5409 | 0.5409 | 0.5409 | 0.5409 |
| 39 | LAB | rbf | 5.7 | scale | 0.5409 | 0.5409 | 0.5409 | 0.5409 | 0.5409 | 0.5409 |
| 40 | LAB | rbf | 5.7 | scale | 0.5409 | 0.5409 | 0.5409 | 0.5409 | 0.5409 | 0.5409 |
| 41 | LAB | sigmoid | 5.9 | scale | 0.2427 | 0.2427 | 0.2427 | 0.2427 | 0.2427 | 0.2427 |
| 42 | LAB | sigmoid | 5.9 | scale | 0.2488 | 0.2488 | 0.2488 | 0.2488 | 0.2488 | 0.2488 |
| 43 | LAB | sigmoid | 5.9 | scale | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 |
| 44 | LAB | sigmoid | 5.9 | scale | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 |
| 45 | LAB | sigmoid | 5.9 | scale | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 | 0.4345 |
| 46 | LAB | rbf | 5.2 | auto | 0.2341 | 0.2341 | 0.2341 | 0.2341 | 0.2341 | 0.2341 |
| 47 | LAB | rbf | 5.2 | auto | 0.2385 | 0.2385 | 0.2385 | 0.2385 | 0.2385 | 0.2385 |
| 48 | LAB | rbf | 5.2 | auto | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 |
| 49 | LAB | rbf | 5.2 | auto | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 |
| 50 | LAB | rbf | 5.2 | auto | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 |
| 51 | LAB | rbf | 4.6 | auto | 0.2346 | 0.2346 | 0.2346 | 0.2346 | 0.2346 | 0.2346 |
| 52 | LAB | rbf | 4.6 | auto | 0.2384 | 0.2384 | 0.2384 | 0.2384 | 0.2384 | 0.2384 |
| 53 | LAB | rbf | 4.6 | auto | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 |
| 54 | LAB | rbf | 4.6 | auto | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 |
| 55 | LAB | rbf | 4.6 | auto | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 |
| 56 | LAB | rbf | 6.7 | scale | 0.2335 | 0.2335 | 0.2335 | 0.2335 | 0.2335 | 0.2335 |
| 57 | LAB | rbf | 6.7 | scale | 0.2384 | 0.2384 | 0.2384 | 0.2384 | 0.2384 | 0.2384 |
| 58 | LAB | rbf | 6.7 | scale | 0.5416 | 0.5416 | 0.5416 | 0.5416 | 0.5416 | 0.5416 |
| 59 | LAB | rbf | 6.7 | scale | 0.5416 | 0.5416 | 0.5416 | 0.5416 | 0.5416 | 0.5416 |
| 60 | LAB | rbf | 6.7 | scale | 0.5416 | 0.5416 | 0.5416 | 0.5416 | 0.5416 | 0.5416 |
| 61 | LAB | rbf | 9.5 | scale | 0.2338 | 0.2338 | 0.2338 | 0.2338 | 0.2338 | 0.2338 |
| 62 | LAB | rbf | 9.5 | scale | 0.2379 | 0.2379 | 0.2379 | 0.2379 | 0.2379 | 0.2379 |
| 63 | LAB | rbf | 9.5 | scale | 0.5418 | 0.5418 | 0.5418 | 0.5418 | 0.5418 | 0.5418 |
| 64 | LAB | rbf | 9.5 | scale | 0.5418 | 0.5418 | 0.5418 | 0.5418 | 0.5418 | 0.5418 |
| 65 | LAB | rbf | 9.5 | scale | 0.5418 | 0.5418 | 0.5418 | 0.5418 | 0.5418 | 0.5418 |
| 66 | LAB | rbf | 2.2 | auto | 0.2346 | 0.2346 | 0.2346 | 0.2346 | 0.2346 | 0.2346 |
| 67 | LAB | rbf | 2.2 | auto | 0.2392 | 0.2392 | 0.2392 | 0.2392 | 0.2392 | 0.2392 |
| 68 | LAB | rbf | 2.2 | auto | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 |
| 69 | LAB | rbf | 2.2 | auto | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 |
| 70 | LAB | rbf | 2.2 | auto | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 | 0.5391 |
| 71 | LAB | rbf | 6.9 | scale | 0.2329 | 0.2329 | 0.2329 | 0.2329 | 0.2329 | 0.2329 |
| 72 | LAB | rbf | 6.9 | scale | 0.2387 | 0.2387 | 0.2387 | 0.2387 | 0.2387 | 0.2387 |
| 73 | LAB | rbf | 6.9 | scale | 0.5411 | 0.5411 | 0.5411 | 0.5411 | 0.5411 | 0.5411 |
| 74 | LAB | rbf | 6.9 | scale | 0.5411 | 0.5411 | 0.5411 | 0.5411 | 0.5411 | 0.5411 |
| 75 | LAB | rbf | 6.9 | scale | 0.5411 | 0.5411 | 0.5411 | 0.5411 | 0.5411 | 0.5411 |
| 1 | Clinica | rbf | 1 | scale | 0.2477 | 0.2477 | 0.2477 | 0.2477 | 0.2477 | 0.2477 |
| 2 | Clinica | rbf | 1 | scale | 0.2473 | 0.2473 | 0.2473 | 0.2473 | 0.2473 | 0.2473 |
| 3 | Clinica | rbf | 1 | scale | 0.9341 | 0.9341 | 0.9341 | 0.9341 | 0.9341 | 0.9341 |
| 4 | Clinica | rbf | 1 | scale | 0.9341 | 0.9341 | 0.9341 | 0.9341 | 0.9341 | 0.9341 |
| 5 | Clinica | rbf | 1 | scale | 0.9341 | 0.9341 | 0.9341 | 0.9341 | 0.9341 | 0.9341 |
| 6 | Clinica | linear | 1.5 | auto | 0.2488 | 0.2488 | 0.2488 | 0.2488 | 0.2488 | 0.2488 |
| 7 | Clinica | linear | 1.5 | auto | 0.2506 | 0.2506 | 0.2506 | 0.2506 | 0.2506 | 0.2506 |
| 8 | Clinica | linear | 1.5 | auto | 0.922 | 0.922 | 0.922 | 0.922 | 0.922 | 0.922 |
| 9 | Clinica | linear | 1.5 | auto | 0.922 | 0.922 | 0.922 | 0.922 | 0.922 | 0.922 |
| 10 | Clinica | linear | 1.5 | auto | 0.922 | 0.922 | 0.922 | 0.922 | 0.922 | 0.922 |
| 11 | Clinica | rbf | 2.5 | auto | 0.2471 | 0.2471 | 0.2471 | 0.2471 | 0.2471 | 0.2471 |
| 12 | Clinica | rbf | 2.5 | auto | 0.2456 | 0.2456 | 0.2456 | 0.2456 | 0.2456 | 0.2456 |
| 13 | Clinica | rbf | 2.5 | auto | 0.9329 | 0.9329 | 0.9329 | 0.9329 | 0.9329 | 0.9329 |
| 14 | Clinica | rbf | 2.5 | auto | 0.9329 | 0.9329 | 0.9329 | 0.9329 | 0.9329 | 0.9329 |
| 15 | Clinica | rbf | 2.5 | auto | 0.9329 | 0.9329 | 0.9329 | 0.9329 | 0.9329 | 0.9329 |
| 16 | Clinica | rbf | 3.4 | scale | 0.2468 | 0.2468 | 0.2468 | 0.2468 | 0.2468 | 0.2468 |
| 17 | Clinica | rbf | 3.4 | scale | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 |
| 18 | Clinica | rbf | 3.4 | scale | 0.9319 | 0.9319 | 0.9319 | 0.9319 | 0.9319 | 0.9319 |
| 19 | Clinica | rbf | 3.4 | scale | 0.9319 | 0.9319 | 0.9319 | 0.9319 | 0.9319 | 0.9319 |
| 20 | Clinica | rbf | 3.4 | scale | 0.9319 | 0.9319 | 0.9319 | 0.9319 | 0.9319 | 0.9319 |
| 21 | Clinica | sigmoid | 6.9 | scale | 0.2462 | 0.2462 | 0.2462 | 0.2462 | 0.2462 | 0.2462 |
| 22 | Clinica | sigmoid | 6.9 | scale | 0.256 | 0.256 | 0.256 | 0.256 | 0.256 | 0.256 |
| 23 | Clinica | sigmoid | 6.9 | scale | 0.8448 | 0.8448 | 0.8448 | 0.8448 | 0.8448 | 0.8448 |
| 24 | Clinica | sigmoid | 6.9 | scale | 0.8448 | 0.8448 | 0.8448 | 0.8448 | 0.8448 | 0.8448 |
| 25 | Clinica | sigmoid | 6.9 | scale | 0.8448 | 0.8448 | 0.8448 | 0.8448 | 0.8448 | 0.8448 |
| 26 | Clinica | rbf | 10.1 | auto | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 |
| 27 | Clinica | rbf | 10.1 | auto | 0.2463 | 0.2463 | 0.2463 | 0.2463 | 0.2463 | 0.2463 |
| 28 | Clinica | rbf | 10.1 | auto | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 |
| 29 | Clinica | rbf | 10.1 | auto | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 |
| 30 | Clinica | rbf | 10.1 | auto | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 |
| 31 | Clinica | rbf | 5.9 | scale | 0.2471 | 0.2471 | 0.2471 | 0.2471 | 0.2471 | 0.2471 |
| 32 | Clinica | rbf | 5.9 | scale | 0.2472 | 0.2472 | 0.2472 | 0.2472 | 0.2472 | 0.2472 |
| 33 | Clinica | rbf | 5.9 | scale | 0.9304 | 0.9304 | 0.9304 | 0.9304 | 0.9304 | 0.9304 |
| 34 | Clinica | rbf | 5.9 | scale | 0.9304 | 0.9304 | 0.9304 | 0.9304 | 0.9304 | 0.9304 |
| 35 | Clinica | rbf | 5.9 | scale | 0.9304 | 0.9304 | 0.9304 | 0.9304 | 0.9304 | 0.9304 |
| 36 | Clinica | rbf | 5.7 | scale | 0.2474 | 0.2474 | 0.2474 | 0.2474 | 0.2474 | 0.2474 |
| 37 | Clinica | rbf | 5.7 | scale | 0.2472 | 0.2472 | 0.2472 | 0.2472 | 0.2472 | 0.2472 |
| 38 | Clinica | rbf | 5.7 | scale | 0.9303 | 0.9303 | 0.9303 | 0.9303 | 0.9303 | 0.9303 |
| 39 | Clinica | rbf | 5.7 | scale | 0.9303 | 0.9303 | 0.9303 | 0.9303 | 0.9303 | 0.9303 |
| 40 | Clinica | rbf | 5.7 | scale | 0.9303 | 0.9303 | 0.9303 | 0.9303 | 0.9303 | 0.9303 |
| 41 | Clinica | sigmoid | 5.9 | scale | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 |
| 42 | Clinica | sigmoid | 5.9 | scale | 0.2545 | 0.2545 | 0.2545 | 0.2545 | 0.2545 | 0.2545 |
| 43 | Clinica | sigmoid | 5.9 | scale | 0.8414 | 0.8414 | 0.8414 | 0.8414 | 0.8414 | 0.8414 |
| 44 | Clinica | sigmoid | 5.9 | scale | 0.8414 | 0.8414 | 0.8414 | 0.8414 | 0.8414 | 0.8414 |
| 45 | Clinica | sigmoid | 5.9 | scale | 0.8414 | 0.8414 | 0.8414 | 0.8414 | 0.8414 | 0.8414 |
| 46 | Clinica | rbf | 5.2 | auto | 0.2474 | 0.2474 | 0.2474 | 0.2474 | 0.2474 | 0.2474 |
| 47 | Clinica | rbf | 5.2 | auto | 0.2467 | 0.2467 | 0.2467 | 0.2467 | 0.2467 | 0.2467 |
| 48 | Clinica | rbf | 5.2 | auto | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 |
| 49 | Clinica | rbf | 5.2 | auto | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 |
| 50 | Clinica | rbf | 5.2 | auto | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 |
| 51 | Clinica | rbf | 4.6 | auto | 0.2475 | 0.2475 | 0.2475 | 0.2475 | 0.2475 | 0.2475 |
| 52 | Clinica | rbf | 4.6 | auto | 0.2468 | 0.2468 | 0.2468 | 0.2468 | 0.2468 | 0.2468 |
| 53 | Clinica | rbf | 4.6 | auto | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 |
| 54 | Clinica | rbf | 4.6 | auto | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 |
| 55 | Clinica | rbf | 4.6 | auto | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 | 0.9306 |
| 56 | Clinica | rbf | 6.7 | scale | 0.247 | 0.247 | 0.247 | 0.247 | 0.247 | 0.247 |
| 57 | Clinica | rbf | 6.7 | scale | 0.2469 | 0.2469 | 0.2469 | 0.2469 | 0.2469 | 0.2469 |
| 58 | Clinica | rbf | 6.7 | scale | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 |
| 59 | Clinica | rbf | 6.7 | scale | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 |
| 60 | Clinica | rbf | 6.7 | scale | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 | 0.929 |
| 61 | Clinica | rbf | 9.5 | scale | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 |
| 62 | Clinica | rbf | 9.5 | scale | 0.2464 | 0.2464 | 0.2464 | 0.2464 | 0.2464 | 0.2464 |
| 63 | Clinica | rbf | 9.5 | scale | 0.9293 | 0.9293 | 0.9293 | 0.9293 | 0.9293 | 0.9293 |
| 64 | Clinica | rbf | 9.5 | scale | 0.9293 | 0.9293 | 0.9293 | 0.9293 | 0.9293 | 0.9293 |
| 65 | Clinica | rbf | 9.5 | scale | 0.9293 | 0.9293 | 0.9293 | 0.9293 | 0.9293 | 0.9293 |
| 66 | Clinica | rbf | 2.2 | auto | 0.2465 | 0.2465 | 0.2465 | 0.2465 | 0.2465 | 0.2465 |
| 67 | Clinica | rbf | 2.2 | auto | 0.2465 | 0.2465 | 0.2465 | 0.2465 | 0.2465 | 0.2465 |
| 68 | Clinica | rbf | 2.2 | auto | 0.9333 | 0.9333 | 0.9333 | 0.9333 | 0.9333 | 0.9333 |
| 69 | Clinica | rbf | 2.2 | auto | 0.9333 | 0.9333 | 0.9333 | 0.9333 | 0.9333 | 0.9333 |
| 70 | Clinica | rbf | 2.2 | auto | 0.9333 | 0.9333 | 0.9333 | 0.9333 | 0.9333 | 0.9333 |
| 71 | Clinica | rbf | 6.9 | scale | 0.2472 | 0.2472 | 0.2472 | 0.2472 | 0.2472 | 0.2472 |
| 72 | Clinica | rbf | 6.9 | scale | 0.2467 | 0.2467 | 0.2467 | 0.2467 | 0.2467 | 0.2467 |
| 73 | Clinica | rbf | 6.9 | scale | 0.9287 | 0.9287 | 0.9287 | 0.9287 | 0.9287 | 0.9287 |
| 74 | Clinica | rbf | 6.9 | scale | 0.9287 | 0.9287 | 0.9287 | 0.9287 | 0.9287 | 0.9287 |
| 75 | Clinica | rbf | 6.9 | scale | 0.9287 | 0.9287 | 0.9287 | 0.9287 | 0.9287 | 0.9287 |
| 1 | Completo | rbf | 1 | scale | 0.2453 | 0.2453 | 0.2453 | 0.2453 | 0.2453 | 0.2453 |
| 2 | Completo | rbf | 1 | scale | 0.2489 | 0.2489 | 0.2489 | 0.2489 | 0.2489 | 0.2489 |
| 3 | Completo | rbf | 1 | scale | 0.9652 | 0.9652 | 0.9652 | 0.9652 | 0.9652 | 0.9652 |
| 4 | Completo | rbf | 1 | scale | 0.9652 | 0.9652 | 0.9652 | 0.9652 | 0.9652 | 0.9652 |
| 5 | Completo | rbf | 1 | scale | 0.9652 | 0.9652 | 0.9652 | 0.9652 | 0.9652 | 0.9652 |
| 6 | Completo | linear | 1.5 | auto | 0.2461 | 0.2461 | 0.2461 | 0.2461 | 0.2461 | 0.2461 |
| 7 | Completo | linear | 1.5 | auto | 0.2492 | 0.2492 | 0.2492 | 0.2492 | 0.2492 | 0.2492 |
| 8 | Completo | linear | 1.5 | auto | 0.9563 | 0.9563 | 0.9563 | 0.9563 | 0.9563 | 0.9563 |
| 9 | Completo | linear | 1.5 | auto | 0.9563 | 0.9563 | 0.9563 | 0.9563 | 0.9563 | 0.9563 |
| 10 | Completo | linear | 1.5 | auto | 0.9563 | 0.9563 | 0.9563 | 0.9563 | 0.9563 | 0.9563 |
| 11 | Completo | rbf | 2.5 | auto | 0.2462 | 0.2462 | 0.2462 | 0.2462 | 0.2462 | 0.2462 |
| 12 | Completo | rbf | 2.5 | auto | 0.2482 | 0.2482 | 0.2482 | 0.2482 | 0.2482 | 0.2482 |
| 13 | Completo | rbf | 2.5 | auto | 0.9659 | 0.9659 | 0.9659 | 0.9659 | 0.9659 | 0.9659 |
| 14 | Completo | rbf | 2.5 | auto | 0.9659 | 0.9659 | 0.9659 | 0.9659 | 0.9659 | 0.9659 |
| 15 | Completo | rbf | 2.5 | auto | 0.9659 | 0.9659 | 0.9659 | 0.9659 | 0.9659 | 0.9659 |
| 16 | Completo | rbf | 3.4 | scale | 0.2466 | 0.2466 | 0.2466 | 0.2466 | 0.2466 | 0.2466 |
| 17 | Completo | rbf | 3.4 | scale | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 |
| 18 | Completo | rbf | 3.4 | scale | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 |
| 19 | Completo | rbf | 3.4 | scale | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 |
| 20 | Completo | rbf | 3.4 | scale | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 |
| 21 | Completo | sigmoid | 6.9 | scale | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 |
| 22 | Completo | sigmoid | 6.9 | scale | 0.2473 | 0.2473 | 0.2473 | 0.2473 | 0.2473 | 0.2473 |
| 23 | Completo | sigmoid | 6.9 | scale | 0.8889 | 0.8889 | 0.8889 | 0.8889 | 0.8889 | 0.8889 |
| 24 | Completo | sigmoid | 6.9 | scale | 0.8889 | 0.8889 | 0.8889 | 0.8889 | 0.8889 | 0.8889 |
| 25 | Completo | sigmoid | 6.9 | scale | 0.8889 | 0.8889 | 0.8889 | 0.8889 | 0.8889 | 0.8889 |
| 26 | Completo | rbf | 10.1 | auto | 0.2444 | 0.2444 | 0.2444 | 0.2444 | 0.2444 | 0.2444 |
| 27 | Completo | rbf | 10.1 | auto | 0.2465 | 0.2465 | 0.2465 | 0.2465 | 0.2465 | 0.2465 |
| 28 | Completo | rbf | 10.1 | auto | 0.965 | 0.965 | 0.965 | 0.965 | 0.965 | 0.965 |
| 29 | Completo | rbf | 10.1 | auto | 0.965 | 0.965 | 0.965 | 0.965 | 0.965 | 0.965 |
| 30 | Completo | rbf | 10.1 | auto | 0.965 | 0.965 | 0.965 | 0.965 | 0.965 | 0.965 |
| 31 | Completo | rbf | 5.9 | scale | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 |
| 32 | Completo | rbf | 5.9 | scale | 0.2477 | 0.2477 | 0.2477 | 0.2477 | 0.2477 | 0.2477 |
| 33 | Completo | rbf | 5.9 | scale | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 |
| 34 | Completo | rbf | 5.9 | scale | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 |
| 35 | Completo | rbf | 5.9 | scale | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 | 0.9653 |
| 36 | Completo | rbf | 5.7 | scale | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 |
| 37 | Completo | rbf | 5.7 | scale | 0.2476 | 0.2476 | 0.2476 | 0.2476 | 0.2476 | 0.2476 |
| 38 | Completo | rbf | 5.7 | scale | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 39 | Completo | rbf | 5.7 | scale | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 40 | Completo | rbf | 5.7 | scale | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 41 | Completo | sigmoid | 5.9 | scale | 0.2504 | 0.2504 | 0.2504 | 0.2504 | 0.2504 | 0.2504 |
| 42 | Completo | sigmoid | 5.9 | scale | 0.2447 | 0.2447 | 0.2447 | 0.2447 | 0.2447 | 0.2447 |
| 43 | Completo | sigmoid | 5.9 | scale | 0.8752 | 0.8752 | 0.8752 | 0.8752 | 0.8752 | 0.8752 |
| 44 | Completo | sigmoid | 5.9 | scale | 0.8752 | 0.8752 | 0.8752 | 0.8752 | 0.8752 | 0.8752 |
| 45 | Completo | sigmoid | 5.9 | scale | 0.8752 | 0.8752 | 0.8752 | 0.8752 | 0.8752 | 0.8752 |
| 46 | Completo | rbf | 5.2 | auto | 0.2456 | 0.2456 | 0.2456 | 0.2456 | 0.2456 | 0.2456 |
| 47 | Completo | rbf | 5.2 | auto | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 |
| 48 | Completo | rbf | 5.2 | auto | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 49 | Completo | rbf | 5.2 | auto | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 50 | Completo | rbf | 5.2 | auto | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 51 | Completo | rbf | 4.6 | auto | 0.2456 | 0.2456 | 0.2456 | 0.2456 | 0.2456 | 0.2456 |
| 52 | Completo | rbf | 4.6 | auto | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 |
| 53 | Completo | rbf | 4.6 | auto | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 54 | Completo | rbf | 4.6 | auto | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 55 | Completo | rbf | 4.6 | auto | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 | 0.9654 |
| 56 | Completo | rbf | 6.7 | scale | 0.245 | 0.245 | 0.245 | 0.245 | 0.245 | 0.245 |
| 57 | Completo | rbf | 6.7 | scale | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 |
| 58 | Completo | rbf | 6.7 | scale | 0.9638 | 0.9638 | 0.9638 | 0.9638 | 0.9638 | 0.9638 |
| 59 | Completo | rbf | 6.7 | scale | 0.9638 | 0.9638 | 0.9638 | 0.9638 | 0.9638 | 0.9638 |
| 60 | Completo | rbf | 6.7 | scale | 0.9638 | 0.9638 | 0.9638 | 0.9638 | 0.9638 | 0.9638 |
| 61 | Completo | rbf | 9.5 | scale | 0.2442 | 0.2442 | 0.2442 | 0.2442 | 0.2442 | 0.2442 |
| 62 | Completo | rbf | 9.5 | scale | 0.2466 | 0.2466 | 0.2466 | 0.2466 | 0.2466 | 0.2466 |
| 63 | Completo | rbf | 9.5 | scale | 0.9645 | 0.9645 | 0.9645 | 0.9645 | 0.9645 | 0.9645 |
| 64 | Completo | rbf | 9.5 | scale | 0.9645 | 0.9645 | 0.9645 | 0.9645 | 0.9645 | 0.9645 |
| 65 | Completo | rbf | 9.5 | scale | 0.9645 | 0.9645 | 0.9645 | 0.9645 | 0.9645 | 0.9645 |
| 66 | Completo | rbf | 2.2 | auto | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 | 0.2459 |
| 67 | Completo | rbf | 2.2 | auto | 0.2488 | 0.2488 | 0.2488 | 0.2488 | 0.2488 | 0.2488 |
| 68 | Completo | rbf | 2.2 | auto | 0.9656 | 0.9656 | 0.9656 | 0.9656 | 0.9656 | 0.9656 |
| 69 | Completo | rbf | 2.2 | auto | 0.9656 | 0.9656 | 0.9656 | 0.9656 | 0.9656 | 0.9656 |
| 70 | Completo | rbf | 2.2 | auto | 0.9656 | 0.9656 | 0.9656 | 0.9656 | 0.9656 | 0.9656 |
| 71 | Completo | rbf | 6.9 | scale | 0.2452 | 0.2452 | 0.2452 | 0.2452 | 0.2452 | 0.2452 |
| 72 | Completo | rbf | 6.9 | scale | 0.2477 | 0.2477 | 0.2477 | 0.2477 | 0.2477 | 0.2477 |
| 73 | Completo | rbf | 6.9 | scale | 0.9641 | 0.9641 | 0.9641 | 0.9641 | 0.9641 | 0.9641 |
| 74 | Completo | rbf | 6.9 | scale | 0.9641 | 0.9641 | 0.9641 | 0.9641 | 0.9641 | 0.9641 |
| 75 | Completo | rbf | 6.9 | scale | 0.9641 | 0.9641 | 0.9641 | 0.9641 | 0.9641 | 0.9641 |

Una de las Configuraciones con los mejores resultados es:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Kernel | C | Gamma | F-1 Lab | F-1 Clinic | F-1 Completo |
| rbf | 1 | scale | Aprox 54% | Aprox 93% | Aprox 96% |

***Resultados.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LAB | TN | FP | FN | TP | F1 |
| Dengue\_Grave | 30 | 49 | 0 | 174 | 0.11 |
| Dengue\_NoGrave\_NoSignos | 60 | 88 | 0 | 342 | 0.18 |
| Dengue\_NoGrave\_SignosAlarma | 26 | 42 | 0 | 192 | 0 |
| No\_Dengue | 173 | 294 | 0 | 1030 | 0.64 |
| Acurracy | 0.46 | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Clinica | TN | FP | FN | TP | F1 |
| Dengue\_Grave | 28 | 53 | 29 | 143 | 0.11 |
| Dengue\_NoGrave\_NoSignos | 51 | 84 | 47 | 308 | 0.17 |
| Dengue\_NoGrave\_SignosAlarma | 22 | 43 | 29 | 166 | 0.11 |
| No\_Dengue | 150 | 312 | 158 | 877 | 0.59 |
| Acurracy | 0.41 | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Completo | TN | FP | FN | TP | F1 |
| Dengue\_Grave | 28 | 49 | 29 | 147 | 0.11 |
| Dengue\_NoGrave\_NoSignos | 51 | 82 | 48 | 309 | 0.17 |
| Dengue\_NoGrave\_SignosAlarma | 22 | 41 | 29 | 168 | 0.11 |
| No\_Dengue | 150 | 304 | 158 | 885 | 0.59 |
| Acurracy | 0.41 | | | | |

# Resultados y Estadísticas: Parte 4.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Dataset | Tipo | P1 | P2 | P3 | P4 | P5 | Promedio |
| Clinica | Bernoulli | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 |
| Gausiano | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.67 |
| Categorical | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.87 |
| Bernoulli | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 | 0.91 |
| Gausiano | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.67 |
| Categorical | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.86 |
| Bernoulli | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.91 |
| Gausiano | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.66 |
| Categorical | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.86 |
| Bernoulli | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.91 |
| Gausiano | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.66 |
| Categorical | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.86 |
| Bernoulli | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.91 |
| Gausiano | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.66 |
| Categorical | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.86 |
| Completo | Bernoulli | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.91 |
| Gausiano | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.7 |
| Categorical | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.88 |
| Bernoulli | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.93 |
| Gausiano | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.69 |
| Categorical | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.88 |
| Bernoulli | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.93 |
| Gausiano | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.69 |
| Categorical | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.88 |
| Bernoulli | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.93 |
| Gausiano | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.69 |
| Categorical | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.88 |
| Bernoulli | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.93 |
| Gausiano | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.69 |
| Categorical | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.88 |
| LAB | Bernoulli | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.93 |
| Gausiano | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.48 |
| Categorical | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.41 |
| Bernoulli | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.4 |
| Gausiano | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.48 |
| Categorical | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.41 |
| Bernoulli | 0.49 | 0.49 | 0.49 | 0.49 | 0.49 | 0.4 |
| Gausiano | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.49 |
| Categorical | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.42 |
| Bernoulli | 0.49 | 0.49 | 0.49 | 0.49 | 0.49 | 0.4 |
| Gausiano | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.49 |
| Categorical | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.42 |
| Bernoulli | 0.49 | 0.49 | 0.49 | 0.49 | 0.49 | 0.4 |
| Gausiano | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.49 |
| Categorical | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.42 |

En este caso, el F1 promedio más alto se obtenían mediante el NB Bernoulli y el NBCategorical.

# Análisis Resumido

1. . ¿Qué clasificador le dio los mejores resultados en validación?

Después de realizar un análisis individual y comparara los resultados de los diferentes clasificadores implementados en este proyecto se llega a la conclusión de que el Random forest dio los mejores resultados en la validación de los datos utilizados.

1. ¿Qué clasificador le dio los mejores resultados en los datos de prueba?

Para los datos de prueba que se proporcionaron y se utilizaron en los diferentes clasificadores, se considera que el mejor resultado lo tuvo el XXX ya que en comparación a los otros clasificadores sus métricas mostraban una mayor (¿precisión? (x vs x).

1. ¿Qué clasificador prefiere y por qué razones?

Luego de implementar y poner en comparativa los diferentes clasificadores, el grupo llega a la conclusión de que se prefiere el Random forest esto es por motivos de rendimiento, facilidad de uso y flexibilidad en cuanto a los rangos y naturaleza de los datos que el mismo soporta.

# Dificultades encontradas.

* Uso correcto de librerías: Se estaban utilizando algunas librerías de forma incorrecta, por ejemplo: en la función fit(X,Y), se enviaban los datos (Y,X).
* Generación de graficas: Al incio del miniproyeco las graficas se generaban incorrectamente.
* Curva de aprendizaje de nuevas herramientas y librerías de Python.

# Conclusiones.

* Si se aplica el pre-procesamiento correcto a los datos, para su uso en modelo de clasificación, se puede sacar mucho provecho y proporcionar soluciones a problemas reales e importantes.
* A pesar de que ciertos datos tengan una menor incidencia, eso no significa que estos tengan menor importancia dentro del análisis y entrenamiento de los modelos, por ejemplo, la clase “dengue grave” la cual tenia poca incidencia y sin embargo dentro del problema tiene una gran importancia.

# Referencias

Criterio. (6 de Octubre de 2020). Honduras supera los 20 mil casos de dengue en 2020 sin que salud haga algo. Obtenido de https://criterio.hn/honduras-supera-los-20-mil-casos-de-dengue-en-2020-sin-que-salud-haga-algo/#:~:text=En%20este%20momento%20el%20pa%C3%ADs,y%201%2C570%20de%20dengue%20grave.

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