SIMPLE OBESITY PREDICTION TECHNIQUE IN CHILDERN BY MACHINE LEARNING

ANNOTATED BIBLIOGRPHY IN PARTIAL TO THE REQUIREMENTS OF THE DEGREE OF BACHELOR OF THE SCIENCE OF ENGINEERING

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APRIL 2023

ARTICLE 01

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2019/E/136

1) Safaei, M., Sundararajan, E. A., Driss, M., Boulila, W., & Shapi'i, A. (2021). A systematic literature review on obesity: Understanding the causes & consequences of obesity and reviewing various machine learning approaches used to predict obesity. Computers in Biology and Medicine, 136, 104754. https://doi.org/10.1016/j.compbiomed.2021.104754 .

2) Fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories exposed, and currently obesity is a major public health problem. 3) The aim of this study was to conduct a systematic literature review on obesity. The researchers searched for articles published between 2010 and 2020 that investigated the causes, consequences, and prediction of obesity and included 93 articles in their review. 4) The study included articles that investigated the causes, consequences, and prediction of obesity. They formed three research questions for this particular study. 5) It identified major causes and consequences of obesity, and it reviews the different machine learning approaches that have been used to predict obesity. This information can be used to develop new strategies for preventing and treating obesity. 6) This study has some limitations. The study only included articles published in English and the study had restricted search for articles to only six online databases. 7) This study concluded that obesity is a complex disorder with multiple causes and consequences. In their study, XGBoost achieved the highest score, and the proportion of physically inactive people was the most important feature in predicting adult obesity. 8) They reviewed the different machine-learning approaches that have been used to predict obesity. This information can be used to develop new strategies for preventing and treating obesity.

ARTICLE 02

SUBASINGHE S.A.B.D

2019/E/136

1) Shon, J., Park, J., & Lee, J. (2021). Using machine learning to predict adult obesity prevalence in US counties. Frontiers in Public Health, 9, 772377. doi:10.3389/fpubh.2021.772377.

2) Obesity was a major public health problem in the United States as obesity prevalence has increased by 11 percent over the past two decades and it associated with serious complications. 3) The authors of this article aimed to use machine learning to predict adult obesity prevalence in US countries. They used a dataset of U.S. Health 2020 data published in socialexplorer**.** 4) This paper referenced a study by Brakefield et al. In this study three-based classification methods were considered for model development. 5) This study is useful for understanding the factors that contributed to obesity prevalence. The findings of this study could be used to target interventions in areas with high rates of obesity. 6) This study had a number of limitations. First, the data was limited to the United States. Second, the data was based on self-reported surveys. This means that the data may be subject to bias. 7) The authors of this study found that machine learning can be used to predict adult obesity prevalence in US countries. This information could be used to target interventions in areas with high rates of obesity. 8) It explained the methods they used and the limitations of their study. I think the findings of this study could be useful for our research.

ARTICLE 03

SUBASINGHE S.A.B.D

2019/E/136

1) Alkhalaf, M., Yu, P., Shen, J., and Deng, C. (2022) 'A review of the application of machine learning in adult obesity studies', Applied Computing and Intelligence, 2, pp. 32-48. doi: 10.3934/aci.2022002.

2) This article discussed the potential of machine learning to improve our understanding of obesity and to develop more effective treatments. They also highlighted some of the challenges that need to be addressed before machine learning can be widely adopted in obesity**.** 3) The aims of this article are to review the current state of applications of machine learning in obesity studies, identify the key challenges that need to be addressed to fully realize the potential of machine learning in obesity research and discuss the potential applications of machine learning in obesity research. 4) They have selected only research papers between 2014 to 2019 and study subjected on adult people. Ten algorithms have been selected for this review (logistic and linear regression, decision trees, SVM, naïve Bayes, random forest, neural network, deep learning, XGBoost, and clustering) 5) This article provided a comprehensive overview of the current state and identifies the key challenges that need to be addressed. 6)The article focuses on the application of machine learning in adult obesity studies. This means that the findings may not be generalizable to other populations. 7) The authors concluded that the article suggests that machine learning can be used to identify new risk factors for obesity and develop more personalized treatments for obesity. They believe machine learning could revolutionized our understanding of obesity and develop more effective treatments. 8) They also identified the key challenges that must be addressed to realize the potential of machine learning in obesity research. I think this article will be useful for us in the application of machine learning in obesity research.

ARTICLE 04

SUBASINGHE S.A.B.D

2019/E/136

1) Cheng, Erika R., Rai Steinhardt, and Zina Ben Miled. 2022. "Predicting Childhood Obesity Using Machine Learning: Practical Considerations" BioMedInformatics 2, no. 1: 184-203. https://doi.org/10.3390/biomedinformatics2010012

2) The article discussed the potential of machine learning to improve the prediction of childhood obesity. 3) The aims of this article were reviewing the use of machine learning to predict childhood obesity and present a case study in predicting childhood obesity. The secondary aim was to understand whether BMI prediction varies considerably between boys and girls, which would require separate BMI prediction models for each. 4) Existing models of childhood obesity mostly depend on clinical practices, but here they suggest the need to account for the complexity and interconnectedness of contributing factors across the life course, ranging from the social, built, and economic environments to behavior, physiology, and epigenetics. 5) This article is useful when finding information on machine learning to predict childhood obesity. 6) The article focuses on the use of machine learning to predict childhood obesity in Iran. This means that the findings may not be generalizable to other populations. 7) The authors concluded that machine learning has the potential to be a valuable tool for the prediction of childhood obesity and argued that more research is needed to improve the accuracy of these models, but that machine learning is a promising area of research. 8)They also presented a case study that demonstrates the potential of machine learning in this area. I think this article will be useful for us to understand the current state of the field.

ARTICLE 05

SUBASINGHE S.A.B.D

2019/E/136

1) Choquet, H., & Meyre, D. (2011). Molecular basis of obesity: Current status and future prospects. Current Genomics, 12(3), 154-168. doi:10.2174/138920211796221203. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3137001/pdf/CG-12-154.pdf

2) Obesity was a complex disorder caused by a combination of genetic and environmental factors. Epigenetic factors can also influence the risk of obesity. Epigenetic factors are changes in gene expression not caused by changes in the DNA sequence. Epigenetic factors can be influenced by environmental factors such as diet, stress, and exposure to toxins. 3) The aim of this article is to discuss the molecular basis of obesity, including the role of genetics, epigenetics, and environmental factors. The article also discusses the potential for new treatments for obesity. 4) The article discusses the molecular basis of obesity in a comprehensive and up-to-date manner. The article covers a wide range of topics, including genetics, epigenetics, environmental factors, and new treatments for obesity. 5)The article provides a comprehensive overview of the molecular basis of obesity and the potential for new treatments. Therefore, this article would be useful for us to get a better understanding of the molecular basis of obesity. 6) One limitation of this article is that it is somewhat technical. 7) The article concludes by discussing the prospects for the treatment of obesity. The authors suggest that developing new treatments targeting the genetic and molecular mechanisms of obesity will be essential for preventing and treating this chronic disease.8) The authors did a great job of summarizing the current state of knowledge about the molecular basis of obesity. I believe that this article is a valuable resource for us for our future investigations into our research.

ARTICLE 06

SUBASKAR S.
2019/E/137

(1)Lee, Y. C., Christensen, J. J., Parnell, L. D., Smith, C. E., Shao, J., McKeown, N. M., ... & Lai, C. Q. (2022). Using machine learning to predict obesity based on genome-wide and epigenome-wide gene–gene and gene–diet interactions. Frontiers in Genetics, 12, 783845.

(2) This paper examines the main obesity-related factor and evaluates various machine learning algorithms for optimal prediction accuracy. (3) The objective of this study was to create a predictive model that accurately assesses an individual's risk of obesity by examining and understanding the intricate relationships and interactions, with a specific emphasis on dietary factors. (4) Researchers utilized the GMDR method to conduct a combined genome-wide and epigenome-wide scan for BMI and obesity-related factor reduction and evaluated the prediction models' quality and accuracy using ROC-AUC. (5) This article provides valuable insights for feature selection and the identification of appropriate machine learning algorithms. (6) This study focuses exclusively on adult obesity-related data and does not include information specific to children. (7) The authors suggest the need for further advancements in developing prediction models and implementing precision nutrition strategies as a means to prevent and treat obesity. (8) This article holds great significance for our research as it discusses crucial DNA methylation sites that are relevant to our study.

ARTICLE 07

SUBASKAR S.
2019/E/137

(1) Patel, P., Selvaraju, V., Babu, J. R., Wang, X., & Geetha, T. (2022). Racial Disparities in Methylation of NRF1, FTO, and LEPR Gene in Childhood Obesity. Genes, 13(11), 2030.

(2) This article investigates the variations in DNA methylation patterns of NRF1, FTO, and LEPR genes among obese children belonging to different racial backgrounds. (3) The researchers identify the key variables that contribute to the successful reduction of obesity-related health inequalities among different groups. (4) The researchers evaluated the DNA methylation levels of the genes in children by utilizing real-time quantitative PCR-based multiplex MethyLight technology on saliva samples. (5) The research article utilized methylation data of specific genes to investigate the molecular mechanisms underlying childhood obesity. (6) The study's focus on the methylation status of only three genes may limit the comprehensive understanding of the molecular mechanisms underlying childhood obesity. (7) The findings of this study highlight a racial disparity in the correlation between gene methylation and childhood obesity. (8) The methodology used in this study can be valuable in our research for identifying additional molecular markers and developing machine learning models.

ARTICLE 08

SUBASKAR S.
2019/E/137

(1) Cheng, E. R., Steinhardt, R., & Ben Miled, Z. (2022). Predicting Childhood Obesity Using Machine Learning: Practical Considerations. BioMedInformatics, 2(1), 184-203.

(2) This study aims to investigate the practical considerations and challenges associated with utilizing machine learning techniques for predicting childhood obesity using diverse omics data sets. (3) The objective of this study was to examine the potential of utilizing metabolomic data for the identification of childhood obesity and the development of a precise predictive model. (4) The researchers developed predictive models using the long short-term memory (LSTM) architecture, which is a type of recurrent neural network. These models were trained using electronic health record (EHR) data spanning 2 to 8 clinical encounters to estimate the BMI of children. (5) The findings of this study can provide valuable insights for the development of machine learning models that utilize molecular data to identify children at risk of obesity. (6) The study's reliance on data from a single primary care clinic may restrict the generalizability of the results. (7) Machine learning models have demonstrated effectiveness in predicting childhood obesity using electronic health record (EHR) data. However, practical considerations such as data quality, feature selection, and model interpretability need to be thoroughly addressed and taken into account. (8) The authors provide insights into the importance of feature selection, model selection, and data preprocessing, which can inform the development of more accurate and reliable machine-learning models for predicting childhood obesity.

ARTICLE 09

SUBASKAR S.
2019/E/137

(1)Mondal, P. K., Foysal, K. H., Norman, B. A., & Gittner, L. S. (2023). Predicting Childhood Obesity Based on Single and Multiple Well-Child Visit Data Using Machine Learning Classifiers. Sensors, 23(2), 759.

(2) The study's results demonstrated that machine learning classifiers can achieve high accuracy in predicting childhood obesity, underscoring the potential of machine learning in early detection and prevention efforts for childhood obesity. (3) The objective of this study was to compare the performance of machine learning classifiers in predicting childhood obesity using data from single well-child visits versus multiple well-child visits. (4) This study encompasses the evaluation of various classification models, feature selection techniques, and performance metrics, to offer insights into the feasibility and accuracy of employing well-child visit data for predicting obesity. (5) This study's demonstration of machine learning techniques' potential to predict obesity risk in children using clinical data can be valuable for complementing the use of molecular data in research. (6) The utilization of retrospective data from electronic health records in the study may not capture all the relevant factors associated with childhood obesity. (7) The proposed models have the potential to serve as decision support tools for healthcare professionals, aiding in the early prediction of childhood obesity to mitigate obesity-related complications and ultimately enhance healthcare outcomes. (8) This research offers a promising avenue for utilizing machine learning in the prediction of childhood obesity, emphasizing the potential of leveraging electronic health records to enhance early identification and intervention for children at risk of obesity.

ARTICLE 10

SUBASKAR S.

2019/E/137

(1) Torres-Martos, Á., Bustos-Aibar, M., Ramírez-Mena, A., Cámara-Sánchez, S., Anguita-Ruiz, A., Alcalá, R., ... & Alcalá-Fdez, J. (2023). Omics Data Preprocessing for Machine Learning: A Case Study in Childhood Obesity. Genes, 14(2), 248.

(2) The authors introduced the "Omics Data Preprocessing for Machine Learning" guideline, which addresses the primary challenges associated with multi-omics human data, providing a framework to tackle these challenges effectively. (3) The authors demonstrated approaches to overcome the key challenges encountered in constructing machine learning predictive models using multi-omics human data. (4) The study outlines the distinctive characteristics of each omics data layer, identifies the most appropriate preprocessing approaches for each data source, and provides a compilation of best practices and tips for utilizing machine learning in the prediction of disease development. (5) This study provides evidence that omics data preprocessing can improve the accuracy of machine learning models for predicting childhood obesity. (6) The dataset was relatively small. (7) The findings of this study suggest that omics data preprocessing can improve the accuracy of machine learning models for predicting childhood obesity. (8) This article is very useful for our research because it is well-written and informative, and the authors did a good job of explaining the methods and results also.

In summery each annotated bibliography has written according to this order:

1.citation

2.introduction

3.aims & research

4.scope

5.usefulness

6.limitations

7.conclusions

8.reflection