Sex estimation based on the clavicle measurements in Romanian population using TensorFlow

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Abstract (300 word limit)

In forensic anthropology, sex estimation is the grounds for an accurate identification of unknown human skeletal remains. This part is essential in establishing the individual biological profile. The objective of the study is to enhance the development of forensic anthropology in Romania by creating a formula for assessing sex based on metric analysis of clavicle. A total of 46 cases from Institute of Legal Medicine Iasi, Romania were included in the study. The maximum length of the clavicle, the maximum breadth of sternal end and the maximum breadth of acromial articular surface of the individual which age we knower were taken before autopsy. The method relies on a machine learning ensemble algorithm, TensorFlow, to classify the age of the metric analysis, which was used in this pilot study. The algorithm behind it is based on known algorithms in the field and creating a new one requires advanced research and mathematics. The result provided by the computer is a number between 0 and 1. Under 0.5 she's considered a woman and over a man. For better accuracy you can enter other help values as age or more numeric values that can group the dataset. That way, improving future predictions. The preliminary results obtained are good. The computer finds the correct number of men and women. Yet, the sample is still limited, and more research (more cases) should be done to verify these preliminary results. In the end, the program should be tested on skeletal collections.

Recent Publications (minimum 5)

1. Navega D, Coelho C, Vicente R, Ferreira MT, Wasterlain S, Cuhna E (2015) AncesTrees: ancestry estimation with randomized decision trees. International Journal of Legal Medicine 129:1145-1153.
2. Akhlaghi M, Moradi B, Hajibeygi M (2012) Sex determination using anthropometric of the clavicle in the Iranian Population. Journal of Forensic and Legal Medicine 19:381-385.
3. Papaioannou VA, Kranioti EF, Joveneaux P, Nathena D, Michalodimitrakis M (2012) Sexual dimorphism of the scapula and the clavicle in a contemporary Greek population: application in forensic identification. Forensic Science International 217:231e1-231e7.
4. Kralik M, Urbanova P, Wagenknechtova M (2014) Sex assessment using clavicle measurements: Inter- and intra-population comparisons. Forensic Science International 234:181e1-181e15.
5. Curate F, Umbelino C, Perinha A, Nogueira C, Silva AM, Cuhna E (2017) Sex determination from the femur in Portuguese population with classical and machine-learning classifiers. Journal of Forensic and Legal Medicine 52:75-81.



Photograph

Biography (150-word limit)

Madalina Diac M.D., graduated University of Medicine and Pharmacy "Gr. T. Popa" in 2014 and Criminalistics Master of the Faculty of Juridical Sciences, University "Al. I. Cuza" Iasi in 2017. In present, Ph. D student in Forensic Medicine at the University of Medicine and Pharmacy "Gr. T. Popa" Iasi, Romania, from 2016. Currently MD, specialty Forensic Medicine, at the Institute of Legal Medicine Iași and also as assistant professor at the University of Medicine and Pharmacy "Gr. T. Popa" Iași, Romania. Author and co-author of various papers in journals and conferences Email: madalina_dc89@yahoo.com



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Iuliana Hunea M.D., graduated University of Medicine and Pharmacy "Gr. T. Popa" in 2014. From 2015 to present, Ph.D student in Pathophysiology at the University of Medicine and Pharmacy "Gr. T. Popa" Iasi, Romania and student at Faculty of Law, University "Al. I. Cuza" Iasi from 2015. Currently MD, specialty Forensic Medicine, at the Institute of Legal Medicine Iași. Author and co-author of various papers in journals and conferences.


Diana Bulgaru-Iliescu, Foresnsic MD and Director of the Institute of Legal Medicine in Iași. She holds a PhD in Medical Sciences, and has a Master in Bioethics. She is a member of the Superior Committee of Legal Medicine, founding member of the Romanian Society of Bioethics and member of the Legal medicine Society. Author/co-author of over 50 articles published in scientific journals with high impact, chapters and books in the field of forensics. Associated Professor since 2005 of the Faculty of Law at Al. I. Cuza University in Iasi and beginning with 2015, Professor of the Faculty of Medicine, at University Gr. T Popa, Iasi. bulgarudiana@yahoo.com

Notes/Comments: