spots involved a thorough analysis of potential pollution sources.
Results: The analysis reveals that these hotspots are primarily caused by streams and collectors, highlighting the importance of accurately pinpointing pollution sources for effective remediation. Furthermore, the study demonstrates the capability of 3D modeling to provide detailed insights into the river's hydrology, facilitating the identification of optimal sites for algae colonization for bioremediation purposes.
Conclusion: This strategy provides an effective approach to water purification and preservation of aquatic life. This research not only provides a foundation for an extensive database that enhances the understanding of river pollution but also increases awareness of the vulnerability of aquatic life, crucial for the development of a sustainable water resource management strategy. Healthy aquatic ecosystems are vital for supporting biodiversity and ecosystem services, which in turn can have indirect impacts on human health. The implications of this research extend to the field of water resource management, encouraging the exchange of knowledge and information among experts dedicated to improving the sustainability of aquatic ecosystems.

PO-45

The Development of Medical Imaging in China and Its Impact on the Clinical Practice

Kui Cai[1], Guobin Li[2], Junan Zheng[2], Lei Chen[2], Qing Mao[2], Ruixin Jiang[2], Shuheng Zhang[2], Taomin Zhang[2], Wenjing Ma[2], Xiaoyue Gu[2], ***Ying Qian***[3]

[1]Beijing Hospital, China

[2]Shanghai United Imaging Healthcare Co., Ltd., China

[3]Jiangsu Province Hospital, China

Thanks to growing innovations and discoveries, medical imaging devices have been widely used not only as a diagnostic tool for diseases, but also used to treat, manage, and predict illnesses in clinical practice. During this process, radiologists are facing many challenges, for instance, "how to achieve high-resolution imaging", "how to get scanning done faster ", and "how to make the system more user-friendly". To address these issues, imaging practitioners from China have got certain positive results through a series of new products design, development, manufacturing with advanced technology.In the field of magnetic resonance, the world's first whole-body ultra-high-field 5T MRI, uMR Jupiter, has brought microscopic-level high-resolution imaging of the whole body, achieving the clinical ability to "see the unseen" and leading the forefront exploration in precision medicine. By integrating AI into the scanner, the MRI achieves ultra-fast imaging, ultra-high resolution, and a fully intelligent workflow, helping to enhance diagnostic capabilities and productivity.
In the field of molecular imaging, the world's first total-body PET/CT scanner, uEXPLORER, which is known as the "Hubble Telescope" for the human body, has led the international wave of total-body PET technology and expanded the application boundaries of nuclear medical imaging. By integrating AI into PET/CT, the capabilities of low noise and high contrast can be empowered to other clinical systems, further promoting the technological evolution and exploring clinical panoramas of the nuclear medicine industry.
With AI-empowered technologies, CT scanner offers precise imaging and ease of use throughout the entire clinical spectrum, including functions such as smart patient positioning, AI empowered iterative reconstruction, and AI empowered motion correction. These functions greatly expand the boundaries of clinical practice and makes the impossible possible such as One-beat Cardiac Solution and ultra-low-dose solutions.
In addition to enhancing the capabilities of all full-modality medical imaging and treatment equipment, AI also has great application value and exploration prospects in clinical quality control and scientific research such as clinical data man agement, versatile annotation tools, and advanced research tools.
In summary, the progress in clinical practice and the advancement of medical imaging impact and improve each other, and we believe that they will help patients to healthier lives and contribute for human health enterprise through numerous technological innovations and new findings from clinical studies.

PO-47

An explainable XGBoost model to predict pediatric sleep apnea resolution after treatment from new phenotypic information

Gonzalo C. Gutiérrez-Tobal[1], Javier Gomez-Pilar[1], Daniela Ferreira-Santos[2], Pedro Pereira-Rodrigues[2], Daniel Álvarez[1], Félix del Campo[1], David Gozal[3], Roberto Hornero[1]

[1]Universidad de Valladolid and Centro de Investiga-

ción Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (CIBER-BBN),, Biomedical Engineering Group, Spain
[2]CINTESIS@RISE, MEDCIDS, Faculty of Medicine of the University of Porto, Porto, Portugal
[3]Joan C. Edwards School of Medicine, Marshall University, United States

Pediatric obstructive sleep apnea (OSA) causes recurrent breathing pauses during the night of the affected children, termed apneas and hypopneas. These apneic events lead to an inadequate gas exchange and, eventually, fragmented and restless sleep. Up to 5.7% of children are suggested to be affected by OSA, hampering their normal development, and leading to neurocognitive affectation, decreased quality of life, and increased risk for cardiovascular diseases. However, children show a heterogeneous range of symptoms and responses to treatment, being OSA phenotypes, not yet completely understood, one plausible reason for these differences. A recent study automatically defined 3 new pediatric OSA phenotypes with different odds of recovering after treatment based on 26 anthropometric and clinical features. In this study, the objective is to use the new phenotypic information to predict before treatment (surgical removing of tonsils and adenoids) whether a child will recover from OSA after treatment. Accordingly, we used data from 199 children (5-10 years old) to train and validate a Gentle Adaptive Boosting ensemble model (XGBoost implementation). We also used the relative importance of the variables to conduct an explainable artificial intelligence (XAI) analysis. A leave-one-out cross-validation method was used for hyperparameter optimization (15 decision trees), and a bootstrap 0.632 method was used for performance evaluation. Our results showed 79.4% Sensitivity (69.9-88.0?% confidence interval), 65.0% Specificity (51.7-77.3 95% CI), 77.8% Positive Predictive Value (70.3-86.0?% CI), and 66.5% Negative Predictive Value (58.0-76.2?% CI) in predicting OSA resolution after treatment. Moreover, oral anatomy (Mallampati score), obesity (body mass index), age, and gasp and chokes presence during the night were highlighted by XAI as the most relevant features for the model predictions, showing a minimum of 10% (gasp and chokes) and a maximum of 18% (Mallampati score) of relative importance. Accordingly, we conclude that the information from the new phenotypes can be used to help predict whether a child will respond to surgical removing of adenoids and tonsils in the context of pediatric OSA. Furthermore, both anatomical and clinical characteristics are relevant to conduct these predictions.

Grants. This research has been developed under the grants PID2020-115468RB-I00 and PDC2021-120775-I00 funded by 'Ministerio de Ciencia e Innovación/Agencia Estatal de Investigación/10.13039/501100011033/' and ERDF, A way of making Europe; and by 'CIBER en Bioingeniería, Biomateriales y Nanomedicina (CIBER-BBN)' through 'Instituto de Salud Carlos III' co-funded with ERDF funds.

PO-49

Analysis of age-related variations in photoplethysmography: a Machine Learning approach

Sara Lombardi, Federica Tavernise, Piergiorgio Francia, Leonardo Bocchi
University of Florence, Italy

Vascular aging is an important indicator in cardiovascular risk assessment. In this study, we used a machine learning approach to estimate the cardiovascular age of subjects using the photoplethysmographic signal (PPG). From PPG, acquired in 115 healthy subjects aged 18 to 66 years, we extracted a set of morphological features and Heart Rate Variability parameters. These parameters were used in a cross-validation approach to predict the cardiovascular age of the subjects using the GradientBoostingRegressor algorithm. Quantitative performance evaluation showed promising results, yielding a mean absolute error of (6.81 ± 0.86) and a coefficient of determination equal to (0.44 ± 0.22). Using the SHAP method, we determined the impact of features on model performance by identifying heart rate change, low signal frequencies, and systolic phase velocity as the most significant parameters. These findings improve our understanding about the influence of age on the PPG signal, offering potential insights for future clinical applications in cardiovascular risk prevention.

PO-51

Influence of fatigue in swimmers suffering from swimmer shoulder pain

Alessandra Raffini, Alex Buoite Stella, Miriam Martini, Laura Mazzari, Agostino Accardo
University of Trieste, Italy