Advanced data analytics & artificial intelligence

Commonly used acronym: *AI*

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Organisation

Name of the organisation BioLizard
Department Bio | Verse
Country Belgium
Geographical Area Flemish Region

SCOPE OF THE METHOD

The Method relates to	Animal health, Environment, Human health: Food & agriculture
The Method is situated in	Basic Research, Regulatory use - Routine production, Translational - Applied Research
Type of method	In silico

DESCRIPTION

Method keywords

artificial intelligence
Machine learning
machine learning algorithms
deep learning
Data analysis
advanced analytics

Scientific area keywords

insilico medicine
in silico models
in silico
predictive modeling
data integration
data mining

Method description

Through leveraging our combined computational and biological knowledge, we have proven expertise supporting clients in:
(1) Evaluating and validating the potential for predictive modeling within your projects,
(2) Developing and applying machine learning techniques and other AI-based algorithms for a range of biological questions, from identifying, quantifying, and annotating

metabolite peaks to optimizing image analysis pipelines,
(3) Developing and applying unique proprietary clinical diagnostic algorithms to support *de novo* discovery and validation of biomarker or drug candidates,
(4) Implementing predictive algorithms to assess patient prognosis, survival, and treatment responses,
(5) Mining in-house or public data to train and validate machine learning models that can predict binding affinities, generate promising DNA, RNA, or amino acid sequences that recapitulate desired properties, and more … And more!

Method status

History of use
Internally validated
Validated by an external party (e.g. OECD, EURL ECVAM,…)

PROS, CONS & FUTURE POTENTIAL

Advantages

Using advanced and predictive data analytics and AI to analyze your biological data can uncover novel and potentially vital information that might otherwise be missed, supporting you in gaining a more complete understanding of complex biological processes. Your existing results can also be further enhanced by applying AI to improve your data analytics pipelines, make your analyses more data-driven, and uncover additional insights.

Challenges

Although AI still has many limitations and challenges, small adaptations in your approach can have a big impact on the usefulness of AI. Adjusting the way that data is stored and collected, improving overarching data management strategies, and adapting algorithms to suit the input data can have a dramatic effect on the applicability of AI. That’s why getting input from experienced AI experts, with deep understanding of biological data, like the team at BioLizard, can give a big boost to the effectiveness of adopting AI when you’re starting out. Another common pitfall that we see is overestimation of how easily and accurately AI can spit out flashy results. As with all analysis methods, it’s important to consider where your data comes from. If your experiment was conducted in a confined environment or in a way that is not applicable to the question that you want to answer, applying AI won’t be able to change the original parameters of your data collection or make your data universally applicable. However, in our experience, not having the perfect data is a challenge that can often be overcome by using the vast amounts of public data resources that are now available. It’s just a matter of finding the right input data to match your scientific question! One last common pitfall and misconception about applying AI and ML is that it will be too expensive! However, experimenting with AI doesn’t have to be costly. Just like in the wet lab, you can start with small proof of concept studies to see how and where AI will add value to your organisation. BioLizard often assists clients with this by examining their unique situations and pinpointing key areas that could be streamlined using ML. If everything is already state-of-the-art and further application of AI isn’t useful, BioLizard provides that honest feedback. However, if there are some opportunities for improvement, we can make an effort versus benefit analysis to see where the low-hanging fruits are, and help clients decide in which areas AI can add the most value. Finally, it’s important to understand what information is key and/or limiting, and to integrate that into algorithms. Thanks to the complexity of biological data, it’s almost never possible to capture a perfect picture of your whole population of interest.

That means that we’re almost always sub-sampling from smaller, and potentially biased sub-populations. In turn, this means that it’s important to understand the limitations of what your data can tell you. Because BioLizard has combined expertise in both biology and ML, this makes us an ideal partner for leveraging both types of knowledge to create truly accurate and applicable algorithms.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

Links

BioLizard Services - Advanced data analytics & AI
Case study: Using bioinformatics and machine learning to find new anti-microbia…
AI in biotech: Fashioning the future of R&D and IP
Three best practices for applying machine learning in the life sciences
AI in the life sciences: (Un)limited potential?
Strategic AI for single cell sequencing & omics advances
Three reasons why you should use machine learning for protein engineering and d…
From enigma to insight: How explainable AI can help us unravel biological compl…
BioLizard - Bio|Verse platform

Other remarks

We use a range of in-house pipelines to make sure that you’re left with high-quality results. Our process includes adjusting these pipelines to best fit your data and maximize your output, while ensuring data security and privacy standards are met. Throughout the process, we maintain open communication and align regularly with our clients to ensure the successful completion of even your most complex projects, and to ensure that you know exactly how we have handled your data. Finally, our user-friendly Bio|Verse platform empowers you to interact with your data in a self-directed way without requiring any coding expertise.

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