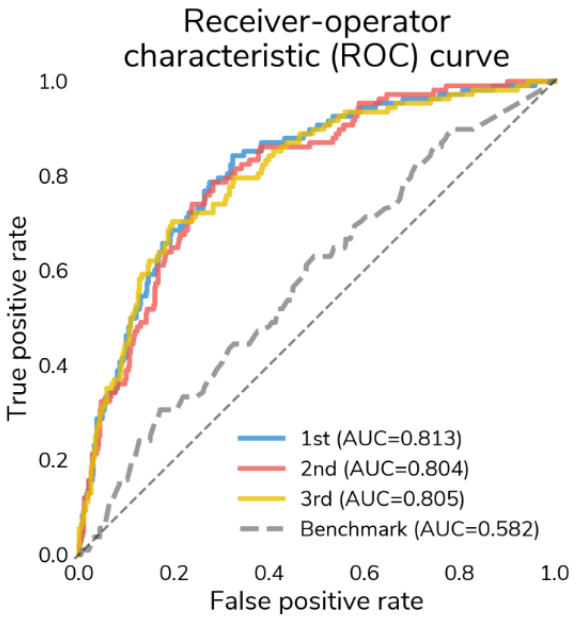
VisioMel Data Challenge:
Feedback from the winners and initial results

The Data Challenge VisioMel, focusing on melanoma and supported by the French Society of Pathology, the French Society of Dermatology, the Cutaneous Cancer Group and the National Professional Council of Pathologists, was one of the Data Challenge projects selected in the call for expression of interest launched in spring 2021 by the Health Data Hub. After several months of organisation and seven weeks of intense competition, the VisioMel Data Challenge came to a close in May 2023. Find out more about the winners of this competition and their approach to the problem.

Encouraging results from the VisioMel Data Challenge and prospects for secondary studies

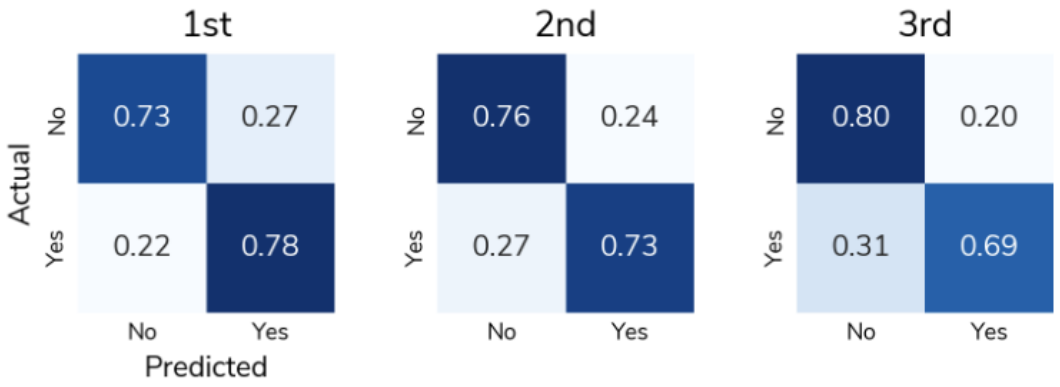
The aim of the VisioMel Data Challenge was to predict the five-years recurrence of melanoma based on digital images of melanoma histological slides and clinical variables. Competitors had to predict a probability of recurrence (between 0 and 1) for each patient. The competition ran from 23 March to 11 May 2023 and attracted a total of 541 entrants who submitted 637 algorithms.

An initial analysis of the predictions of the best-performing algorithms was carried out using the area under the ROC curve (ROC-AUC) metric. This metric measures how effectively the models separate relapse cases from other cases. The results of these three models are very close, with an AUC value greater than 0.80.



Similarly, for these three models, a confusion matrix was calculated (detailing the proportions of true/false positives and true/false negatives).

Confusion matrix of proportions (%) of true/false positives and negatives:



On average, the winners' algorithms correctly detected 73% of relapse cases and 75% of "no relapse" cases.

These initial analyses have also shown that correct predictions of relapse events are higher for patients with epidermal ulceration and thick Breslow.

Further analysis are currently underway to determine whether the algorithms perform well in specific diagnostic categories.

Meet the winners at the competition!

1. Raphael Kiminya

A freelance data scientist from Kenya, Raphael Kiminya took part in the 2020 Data Challenge on cancerous and precancerous lesions of the cervix. His approach involves pre-training a convolutional neural network (CNN) with specific targets, then refining it to predict relapse. In particular, he has used multi-instance learning (MIL) to classify images of whole slides.

2. Lucas Robinet and Ziad Kheil

Lucas Robinet is a first-year doctoral student working on the use of multimodal deep learning for the personalised treatment of glioblastoma. Ziad Kheil is also a first-year doctoral student developing deep learning on medical images. To address the problem, they have used a convolutional neural network model called ResNet.

3. Marvin Lerousseau and Grégoire Gessain

Marvin Lerousseau, a researcher at Mines Paris and the Institut Curie, and Grégoire Gessain, an internal pathologist, came third with promising results and an interesting approach.

The Data Challenges are part of an open source and open data approach. By refusing to share their algorithms, the competitors did not receive the prize, so a fourth winner was chosen.

4. Tristan Lazard

Tristan Lazard is completing his doctorate in computational pathology at Mines Paristech and the Institut Curie. He used a two-stage approach: a self-supervised learning phase, using a spatially unaware neural network, followed by a learning phase specific to the challenge task, using a conventional machine learning model.

Find out more about the winners and their approach to solving the problem!
Video of Grégoire Gressain and Marvin Lerousseau
Video of Lucas Robinet and Zias Kheil

The Health Data Hub would like to congratulate all the participants and the winners. In partnership with the French Ministerial Delegation for Digital Health and BpiFrance, it would also like to thank the VisioMel consortium for its involvement in the Data Challenges in Healthcare initiative and for its contribution to the emergence of innovative open source solutions.