meridian IT
UNITED KINGDOM

Oxford Cancer Biomarkers

CASE STUDY - OCB

OXFORD CANCER BIOMARKERS Combining leading-edge diagnostics with AI technology to improve outcomes for cancer patients, with Meridian IT

Industry: Cancer diagnostics

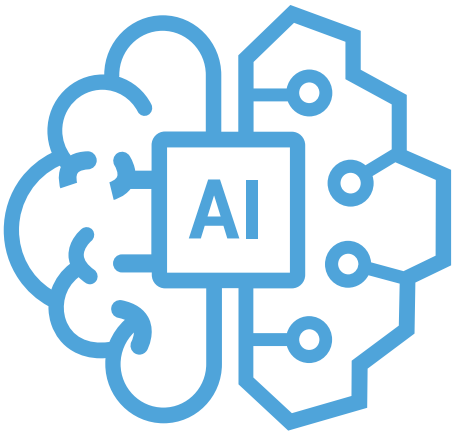
Focus: Server, OCB accelerated analysis

Challenges:

- Identifying which colorectal cancer patients with Stage II tumours require chemotherapy to improve survival rates
- Sparing people with lower risk Stage II tumours from unnecessary chemotherapy and the consequent risks associated with toxicity
- Improving speed and accuracy of the service delivery to enable scale up and tech transfer with potential to validate in other cancers

Overview

Predicting which patients with stage II colorectal cancer will suffer a recurrence after surgery is difficult. However, many are routinely prescribed chemotherapy, even though it may be unnecessary and cause severe side effects. In some patients these can be fatal. Oxford Cancer Biomarkers worked with Meridian IT to apply IBM® PowerAI Vision to identify novel diagnostic biomarkers in tumor microenvironments, with the potential to enhance early diagnosis and treatment decisions.



Business Challenge

Cancer is the second leading cause of death worldwide. Tobacco use, alcohol consumption, unhealthy diet and lack of physical activity are key cancer risk factors, so undertaking lifestyle changes can prevent or mitigate the onset of the disease. Generally, the sooner cancer is diagnosed, the better the outcomes. As a result, identifying genetic predisposition to cancer or early signs of the disease is a priority in oncology research.

Oxford Cancer Biomarkers (OCB) was established in 2012 to discover and develop biomarkers (a quantifiable biological parameter that provides insight into a patient's clinical state) to advance personalised medicine within oncology, focusing on colorectal cancer and its treatments.

David Browning, CEO of Oxford Cancer Biomarkers, explains: "At OCB, we want to move away from a one-size-fits-all approach to cancer care by giving clinicians as much information about a patient's condition as possible. We aim to develop screening tests that discover these insights more quickly and cost-effectively and less invasively than existing methods."

Enhancing treatment decisions

OCB turned its attention to chemotherapy toxicity. A common treatment process for cancer patients is surgery to remove the tumor, followed by cycles of chemotherapy to ensure all cancerous cells are destroyed. 30 percent of colorectal cancer patients are identified with stage II tumors. Of these, only about 33 percent actually need chemotherapy. Research shows that around a third of these patients have a low risk of recurrence and do not need chemotherapy. Just over half will require standard monotherapy and the rest are high risk requiring combination chemotherapy. However, clinicians were unable to accurately identify individual needs

Treatment protocols vary by country, but some treat all patients in a belt-and-braces approach that increases risk of toxicity whilst others select without robust scientific backup. OCB wanted to provide the ability to target precision medicine for the individual.

"Many patients are routinely prescribed 5FU therapy because, until now, it's been too complicated to predict which patients are likely to suffer a recurrence after surgery," says Browning. "We began examining resected tissue samples, combining biomarkers to identify the risk of relapse.

However, between 20 and 30 percent of cancer patients experience severe side effects when treated with the most frequently used chemotherapy drug: 5FU (or capecitabine).

Furthermore, approximately 1 percent of patients are at high risk of life-threatening toxicities from the drug.

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David Browning,

CEO of Oxford Cancer Biomarkers

OCB's ColoProg can help clinicians identify individual patient risk, leading to a more personal chemotherapy approach.

Transformation

Working with IBM Business Partner Meridian IT, OCB continued development of image analysis algorithms to enhance its existing ColoProg platform, based on IBM PowerAI Vision. Running on IBM Power Systems AC922 accelerated servers hosted by Meridian IT, these enhancements utilise deep learning models to augment OCB's proprietary DNA ploidy (a measure of the DNA content within tumor cells) and stroma content (non-malignant cells that can provide an extracellular matrix on which tumor cells can grow) assays, to classify resected tissue samples. The company combines these biomarkers to stratify patients into low, intermediate and high-risk groups of colorectal cancer recurrence, enabling better clinical decision-making.

"As soon as we met the IBM and Meridian IT teams, we felt that our knowledge complemented theirs: OCB could provide the clinical background, while IBM and Meridian IT knew how to adapt leading-edge technology to our use case," comments Browning. "Both IBM and Meridian IT are at the forefront of artificial intelligence innovation, so we knew that they were the right partners to come on this journey with us."

Designed for image classification, IBM PowerAI Vision includes an intuitive toolset and the most popular deep learning frameworks. Using these features, Meridian IT was able to build models for OCB fast. The team took advantage of massive throughput capability offered by the accelerated IBM Power Systems servers equipped with NVIDIA with NVLink GPUs to expedite training of the models, bringing enhanced ColoProg to life sooner than expected.

"IBM PowerAI Vision and IBM accelerated Power Systems servers are a match made in heaven for AI challenges," says Browning. "We've been pushing the technology hard to make breakthroughs in a new area, and it hasn't let us down. Meridian IT have collaborated closely with us in an iterative process, challenging and refining our ideas to ensure the best results."

Using IBM AI-powered image analysis, OCB has transformed its ability to build patient risk profiles. Browning recalls: "As soon as we saw IBM PowerAI in action, we knew that it was going to have a seismic effect on our ability to process tissue samples.

Results

Previously it took us months to years to build and test new models, now we can do it in hours."

OCB provides insights that support more informed clinical decisions following cancer surgery, improving patient outcomes. By minimising overtreatment with chemotherapy, it also reduces the cost of care.

"Time is of the essence in cancer treatment," says Browning. "With IBM technology, we can get information about a patient's risk of recurrence and their likely reaction to chemotherapy to clinical decision-makers more quickly, which can have life-saving impact. We also help healthcare providers use their resources more efficiently."

Working with Meridian IT and IBM, OCB is reducing time-to-market for the enhanced ColoProg platform, helping it start to deliver value to patients and generate revenues sooner. The company is already exploring how the solution can be extended to breast and prostate cancers.

Browning concludes: **"Teaming up with IBM and Meridian IT to tackle issues in colorectal cancer diagnosis and treatment is just the beginning of an exciting collaboration. With IBM's global healthcare experience and Meridian IT's deep knowledge of AI solutions, we're in good hands to bring leading-edge precision diagnostic tests to markets worldwide."**

About Meridian IT Limited

Meridian IT has been a leader in the UK's enterprise technology sector since 1979 because we've always put people first. To help our clients to succeed, we need to be confident that our own team has what it takes. That's why we've focused on building up the strongest commercial and technical services teams in the business.

Our UK business is designed to be agile and responsive, constructed around five key teams who specialise in Infrastructure, Cloud Services, Security, Software and AI. By bringing all these competencies together into a cohesive delivery model, we can provide true end-to-end solutions to meet almost any requirement.

As part of the Meridian Group International, a privately owned business with operations in Europe, North America and Asia-Pacific, we have the financial stability and backing to act as a trusted partner for long-term, large-scale projects. By harnessing resources from our international network, we can deliver projects across multiple markets, combining global reach with local expertise.

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