

Bayezian Neuroscience & AI Centre of Excellence Launch Event

Bayezian, the UK-based AI company and incubator, is launching its Neuroscience & AI Centre of Excellence at an event at London's award winning Neuron Pod.

Hosted by Dr. Isabel Maranhão, Head of Neuroscience & AI at Bayezian, on the 19th June, the event will bring together academic researchers and industry leaders to share their latest work in applying AI to understand the brain.

Alongside the Head of Neuroscience & AI, speakers include Dr. Adam Barrett of the University of Sussex, who will share his take on integrated information theory, its panpsychist view of consciousness, and its implications in AI. Prof. Joseph Devlin of UCL, will outline his work in Neuroscience and AI. The presentations will be followed by a discussion panel among the three speakers and networking drinks.

Decoding Brain Activity with AI

AI's ability to analyse complex data and recognise patterns makes it a powerful tool for decoding neural activity, leading to advancements in neuroscience, medicine, and brain-computer interface technology. Thanks to ML techniques on brain activity, AI has already had a profound impact on the diagnosis and treatment of neurological disorders, including other disorders not mentioned in this piece such as Parkinson, strokes, and other traumatic injuries.

Decoding brain activity holds great promise for advancing our understanding of the brain, developing innovative technologies and improving human health and wellbeing. By deciphering the neural code, researchers can unlock the mysteries of the mind and harness the brain's potential for a wide range of applications. Personally, I am incredibly excited to witness how these advancements in brain decoding will positively impact the lives of millions of people and the myriad of clinical applications it may bring about.

<https://www.electronicsspecifier.com/products/artificial-intelligence/unlocking-the-mind-why-and-how-ai-can-help-decode-brain-activity>

Resources

Mice Maze

Bayezian has collaborated with Neuroscience Labs at University of Sussex for the development of an innovative experimental design for mice behaviour research.

The Maravall Lab has created a dynamic maze, which allows free exploration for mice, and contains decision points with stimuli that can change in order to gain an understanding of sequential sensory processing and decision-making. However, practically implementing the experimental design contained many hurdles. The research, led by Dr. Isabel Maranhão, PhD, found Bayezian solving a computer vision challenge.

Bayezian created an algorithm that can track the mice and record its path choices in a computationally efficient way; deep neural networks and trained models on mouse detection were too slow for real time triggering of events, being more useful instead for post-hoc analysis.

<https://docs.google.com/document/d/1VEChwXX94DvP08KC6cxtVTQU8bwugQgKwIXxoHYMEaY/edit>

Breast Cancer Genomics

Breast cancer, a complex and heterogeneous disease, is seeing a global rise in cases, with 2.3 million new instances reported annually. Bayezian is leveraging AI and machine learning to predict breast cancer survival durations using genomic data, aiming to tailor treatments to individual patients. Utilising the METABRIC database, which includes genetic mutations, gene expression levels, tumour type, stage, and treatment data from 1,980 patients, Bayezian has developed a regression machine learning model. This tool assists clinical practitioners in maximising prognosis based on a patient's unique medical history and genetic profile. Despite the potential, challenges such as biases, assumptions about genomic data, and issues in data preparation must be navigated to ensure clinical viability.

Bayezian addresses these challenges through various methods, including principal component analysis to reduce dataset complexity and XGBoost to manage multicollinearity in genomic data. These techniques help to maintain data integrity and improve model accuracy. The current model achieves a root mean squared error (RMSE) of 55 months, highlighting the progress while recognizing the need for further refinement. Bayezian is committed to advancing its AI-driven tool to provide reliable, personalised insights for breast cancer treatment, ultimately improving patient outcomes and extending survival rates.

<https://docs.google.com/document/d/1-lwWFJO6Te5CHK02T-Dfs6uhLxSc09EaUwIMJqWxM9w/edit>

Improving Male Fertility Diagnosis

Recent research indicates that infertility impacts one in seven couples in the UK, with around seven percent of men experiencing infertility. Male fertility has declined by over 50 percent in the past 40 years, influenced by factors such as sperm DNA fragmentation and low sperm motility.

After being approached by an individual facing fertility diagnosis challenges, Bayezian embarked on a project 18 months ago to enhance fertility diagnosis accuracy. The team developed a deep learning algorithm using the Modified Human Sperm Morphology Analysis (MHSMA) dataset, consisting of human sperm images labelled for various abnormalities. This algorithm, employing convolutional neural networks for image and pattern recognition, achieves a 96 percent accuracy rate in identifying sperm fertility, outperforming existing methods.

<https://www.ibtimes.co.uk/ai-startup-makes-significant-breakthrough-speeding-diagnosis-male-fertility-1717059>

Cord Awards

UK-based AI company Bayezian has been ranked as one of the 'Most Responsive' and best 'Gender Diversity Sourcing' firms in the Summer cord Hiring Leaders Awards.

The Summer cord Hiring Leaders Awards celebrate companies that set exceptional standards in hiring. Announced quarterly, businesses of various sizes are celebrated for their success at 'Gender Diversity Sourcing', 'Most Responsive' and 'Fastest to Respond' and the most successful are ranked in a Top 20 list.

<https://cord.co/hiring-insights/hiring-leaders-awards/articles/hiring-leaders-awards-faq>

Bayezian's 'Plus ones' and personal satisfaction: how a fresh approach is keeping staff content

The pandemic has prompted companies to rethink employee autonomy and purpose. A 2021 McKinsey study revealed that while nearly half of employees reconsidered their work, 70% still felt their job defined their sense of purpose. To enhance personal fulfillment and drive innovation, companies can adopt the 'plus one' concept, allowing employees to pursue personal projects alongside their regular duties. This approach not only nurtures individual passions but also fosters groundbreaking discoveries and innovations that benefit the company.

The 'plus one' concept has proven effective at Bayezian, where employees work on client projects while exploring personal AI research interests. This freedom has led to significant achievements, such as advancements in Formula One outcome prediction and a breakthrough fertility algorithm. By encouraging employees to bring their passions into the workplace, companies can stimulate idea generation, skill development, and employee satisfaction. In a time when digital skills are crucial and talent is scarce, the 'plus one' concept offers a way to retain engaged, skilled employees while driving business success and societal impact.

<https://docs.google.com/document/d/1xPSIPi1iBdcBp587BBwcBeBIS-xzndqCnCXy16xHLLo/edit>

Avoiding The Swinging Pendulum In The Great AI Debate

Glyn Heath, co-founder and director of Bayezian, suggests that AI's trajectory swings between utopian and dystopian outcomes. He emphasises that while extremes like achieving eternal life or causing humanity's extinction are unlikely in the near future, opinions on AI's potential are becoming increasingly polarised.

Heath believes that a balanced approach is needed to address both the opportunities and risks AI presents. He notes the possibility of developing artificial general intelligence (AGI) that could solve major global issues but also warns against the dangers of runaway AGI. Urgency is required to tackle these issues, particularly as current AI technologies, like GPT-4, demonstrate vulnerabilities that could be exploited. Heath highlights the need for ongoing, incremental advancements and stresses that efforts to improve AI must consider both preventing negative outcomes and fostering positive innovations. Balancing these aspects will be critical to guiding AI development responsibly and effectively.

<https://www.forbes.com/sites/adrianbridgwater/2024/03/05/avoiding-the-swinging-pendulum-in-the-great-ai-debate/?sh=a38d710185d4>

Three Questions for Data Privacy Week

With the rapid rise in generative AI and large language models (LLMs), Data Privacy Week 2024 is set to be more crucial than ever, highlights Ben Wells, head of statistical data science at Bayezian. The New York Times' lawsuit against Microsoft and OpenAI for allegedly using copyrighted material to train ChatGPT underscores significant concerns about AI training data. OpenAI admits that training their models would be impossible without copyrighted content, raising questions about fair compensation for content creators. Despite OpenAI's substantial revenue, creators have yet to see any financial benefits, leading to a growing call for LLM models to pay for the data they use. However, determining the right compensation remains challenging due to the complex nature of data usage in AI training.

Privacy concerns extend beyond training data to how AI models collect and use personal information during interactions. AI tools learn and improve based on user input, making it critical for data to be anonymized, securely stored, and deleted after use. Transparency around data usage is necessary, as is giving users control over their data. The ethical management of AI's growth is essential, requiring companies to implement robust safeguards against misuse. While the EU AI Act is a promising step towards regulating AI, global cooperation is needed to ensure consistent and effective governance, preventing companies from evading regulations by relocating.

<https://www.theengineer.co.uk/content/opinion/comment-three-questions-for-data-privacy-week>

Generative AI and the Copyright Conundrum

In late 2023, The New York Times sued OpenAI and Microsoft for copyright infringement, highlighting the ongoing conflict between generative AI and copyright laws. As large language models (LLMs) rely on data from published works for training, this lawsuit marks a pivotal moment in addressing these issues. The EU AI Act aims to regulate AI use by demanding transparency and prohibiting certain applications, but enforcement may take years. The delicate balance between protecting intellectual property and fostering AI innovation remains unresolved, with developers, publishers, and lawmakers struggling to find common ground.

OpenAI's response to the lawsuit, expressing surprise and disappointment, underscores the tension in this debate. Despite their efforts to reduce content "regurgitation," creators remain dissatisfied. OpenAI's plea for special treatment in licensing fees, arguing AI development is impossible without copyrighted materials, has been met with criticism. The proposed solution is for AI developers to pay for using copyrighted content, akin to music licensing in public spaces. As legal battles unfold, foundational AI developers will likely be compelled to compensate creators, raising costs and challenging the current state of AI attribution. The future may require new regulatory bodies to ensure fair and effective management of AI's integration into society.

<https://www.comparethecloud.net/articles/generative-ai-and-the-copyright-conundrum/>