

Masters in artificial intelligence and machine learning

To equip students for a career in artificial intelligence and machine learning, this Master's degree combines theoretical knowledge with practical experience. Upon completion, graduates will possess an understanding of AI frameworks, their applications in various industries, and the technical foundations of modern life. The program is designed to cater to diverse backgrounds, allowing individuals to leverage their existing skills or retrain into a career in AI. To be eligible for our Master's program, non-UK degree holders must meet the English language proficiency requirement of IELTS band 6.0 with no component score below 5.5. Exemptions apply to those with a UK degree or from majority English-speaking countries. Some degrees taught solely in English will be considered on a case-by-case basis. To improve your English skills, you can enroll in our pre-sessional English program before starting the course. Our tuition fees are as follows: £10,900 (full-time) for UK students and £19,200 (full-time) for international students. We offer various funding options, including government loans, scholarships, new and returning student scholarships, and more. In this Master's program, you'll learn about machine learning approaches, including semantic analysis and clustering algorithms. You'll use industry-standard applications like Python to solve real-world problems in data analytics, artificial intelligence, and machine learning. By analyzing programming concepts and troubleshooting your own code, you'll develop the confidence to advise on AI and big data applications for live problems. Delivering AI that Enhances Human Capabilities Fostering Collaboration Over Replacement in Everyday Systems You'll Develop Practical Skills to Manipulate Technological Language Sharpen Data Communication Abilities with Visualisation Tools and Forecasting Techniques Course Content Reflects Current Research and Industry Practices Relevant to Future Careers or Further Studies, with Course Updates as Needed Access to a Powerful Supercomputer for Complex Simulations Student Clubs and Opportunities for Networking and Collaboration Master's Program Overview: * 12-Month Full-Time Study * 8-10 Hours of Teaching Per Week, with In-Person Sessions * 20-30 Hours of Independent Study Each Week * Focus on Research Project in the Last 3 Months Expert Staff Teaches the Course: * Computational Intelligence Expertise * Research Experience and Publications in Top Journals and Conferences Given text To tackle complex issues like those in Explainable Artificial Intelligence and Fuzzy Markup Language, researchers often join forces with IEEE Task Forces on Explainable Fuzzy Systems and Fuzzy Systems to better support students. Others analyze network data or language patterns on social media to detect potential threats or understand public sentiment. Scholars like AI, Machine Learning, Neural Networks, Data Analytics, and Global Optimization. Her work has garnered international recognition, with publications in top-tier journals and invitations to speak at conferences worldwide. Currently, she is spearheading a large collaborative project focused on developing Deep Learning models for fetal monitoring during labor. As a prospective student, you'll be immersed in an international community of over 5,000 students from more than 150 countries. This diverse environment will enable you to cultivate valuable skills in data analysis, programming, and problem-solving, preparing you for roles such as senior machine learning engineer or data scientist. As a student, you'll have access to various career resources for up to 5 years after graduation. These include expert careers advice, networking events, and workshops to enhance your employability skills. You'll also benefit from applied projects with companies like IBM and Boeing, as well as one-to-one appointments and CV/cover letter advice. Additionally, you'll have support starting your own business and personal tutoring to help you transition into postgraduate study. You'll receive academic and personal support throughout your Master's program, including regular meetings with your personal tutor and access to faculty learning support tutors for one-on-one and group sessions. These tutors can help you improve your academic skills, master mathematics concepts, develop programming knowledge, and more. Our labs are staffed by qualified laboratory support staff, who will guide you through scheduled lab sessions and provide one-to-one help during practical research projects. You'll also have access to Faculty Academic Skills Tutors for bookable 1-to-1 sessions, small group sessions, and online sessions tailored to your needs. Support is available for skills such as university study, time management, critical thinking, and avoiding plagiarism. If you have a disability or need extra support, the Additional Support and Disability or need extra support, the Additional Support and Disability or need extra support. skills and strategies, as well as accessing assistive technology and external resources. Library staff are available to provide one-to-one guidance and support via various channels, including in-person meetings, email, phone, and online chat. Additionally, the Maths Cafe provides a welcoming environment for advice and assistance with mathematical skills. The university's library is open 24 hours a day during term time, offering students access to resources and facilities outside of traditional opening hours. The Maths Cafe also hosts daily drop-in sessions, workshops, and online resources to support students in developing their mathematics skills. The university's MSc program in Artificial Intelligence and Machine Learning focuses on theoretical foundations, scientific principles, and core methodologies, providing students will complete compulsory modules and have the option to choose specialized optional modules. Teaching is delivered primarily through lectures, with assessment provided through coursework and examination. The program aims to equip students with advanced knowledge of AI and ML principles, as well as deep research skills through a comprehensive research project. To gain admission to the course, applicants must meet specific requirements, including general entry requirements and those tailored to their chosen field. Engage in various activities such as tutorials, seminars, and project work to develop a range of skills like critical thinking and collaboration. For numerate disciplines or programs with mathematical content, additional requirements apply, such as passing mathematics-related modules with a good 2:1 level score. International students must demonstrate English proficiency through IELTS or equivalent qualifications. We require a minimum IELTS score of 6.5, equivalent to TOEFL 88 or Pearson Test of English 67. Alternatively, international students can take our Presessional English course. The university offers small classes with no more than 18 students and provides tuition fee coverage, including membership to the Guild of Students. We offer postgraduate taught courses fees to international students, who must pay a tuition fee deposit before receiving an electronic Confirmation of Acceptance for Studies (CAS). To help with the cost of studies, we provide over £33 million in student support and scholarships. Our Master's programmes are available to all UK students, who can use our loan towards fees, maintenance or other costs at their discretion. This loan is also available to full-time, part-time and distance learning Masters programmes, as long as the student does not already have a Masters qualification (or equivalent). Additionally, we offer Birmingham Masters Scholarships worth £3,000 to over 300 students each year. To apply for our postgraduate programme, you will need to submit your application and supporting documents online. Our course will equip you with the right skills and knowledge to tackle real-world problems using AI techniques. You can choose careers in Machine Learning Engineer, AI Developer, Research Scientist or Technology Consultant, among others. Our Careers Network provides advice, guidance and opportunities at every step of your studies, including events, career coaching and networking opportunities. Furthermore, we offer a range of support services for international students, subject-specific careers consultants and a dedicated careers website. Graduates can look forward to various opportunities at Birmingham, as their university experience extends beyond academics. The campus offers a diverse range of activities and support services, ensuring a seamless transition into life post-graduation. AI has finally reached its potential after decades of hype, with its applications now visible in daily life through facial recognition, language translation, and virtual assistants like Siri and Alexa. Businesses are increasingly leveraging AI to enhance productivity and innovation, while its impact on the workforce will be significant, with some jobs becoming obsolete and new ones emerging as humans work alongside advanced machines. This briefing summarizes research by McKinsey Global Institute on AI technologies and their uses, limitations, and effects. Compiled for the Tallinn Digital Summit in 2018, it highlights key issues policymakers and business leaders must address to mitigate the disruptions arising from AI adoption. The rise of hyperscale clusters accessible through cloud computing is making it easier for users to tap into vast amounts of data that AI algorithms can utilize for training. Breakthroughs in system-level innovations have contributed significantly to advancements in AI, as seen in autonomous vehicles leveraging various technologies like sensors, navigation systems, and robotics to achieve seamless integration. However, despite the progress, numerous complex problems persist, necessitating further scientific discoveries. Most existing AI applications are based on "narrow AI," which involves developing machine-learning techniques for specific tasks such as natural language processing. The more challenging aspect is "artificial general intelligence," where AI systems can tackle a wide range of issues like humans do, but this remains decades away from becoming a reality. Recent advancements in deep learning have contributed to the current excitement around AI. This technique is based on artificial neural networks that mimic the way neurons interact in the brain. Deep learning involves complex neural networks with multiple layers and simulated connections, allowing for more efficient processing of large amounts of data. Various machine learning, unsupervised learning, and reinforcement learning, each suited to different use cases. Supervised learning is commonly used when labeled data are available and involves training AI systems to recognize patterns or outputs based on given inputs. Unsupervised learning techniques operate without labeled training AI systems to recognize patterns or outputs based on given inputs. training systems through virtual rewards or penalties, essentially a trial-and-error process. Ongoing research continues to evolve these techniques, although limitations persist, and new methods show promise in addressing them. For instance, large amounts of human effort can be required for labeling training data necessary for supervised learning, but emerging solutions such as in-stream supervision may help alleviate this issue, comprehensive datasets necessary for training AI models, similar to obtaining clinical-trial data to predict healthcare treatment outcomes more accurately. The complexity of deep learning techniques also creates an "explainability" problem - illustrating which factors led to a decision or prediction and how - particularly crucial in applications like criminal justice or financial lending where trust matters. Emerging approaches, such as local interpretable model-agnostic explanations (LIME), aim to increase transparency in AI models. Another challenge lies in developing generalized learning is a promising solution to this problem. Businesses can significantly benefit from AI adoption, with its potential impact extending across various sectors and functions. In areas such as predictive maintenance, logistics optimization, customer service management, and sales, AI has shown the ability to improve business performance and generate value through improved analytics techniques. Our analysis of over 400 use cases in 19 industries and nine business functions indicates that AI surpasses traditional analytics methods in 69% of potential applications. Only 16% of AI use cases were deemed "greenfield," where other analytics methods would not be effective. By 2030, deep learning techniques, and several deep learning techniques could generate up to 40% of the total potential value. However, adoption is uneven across companies and sectors, highlighting the need for more strategic AI integration. Many organizations have started using AI, but the pace and extent of adoption vary greatly. Nearly half of companies surveyed by McKinsey in 2018 reported having embedded at least one AI capability into their processes. Another 30% are testing AI. However, only about 21% have integrated AI across multiple business areas. Only a small percentage of large firms use AI across all departments. Studies show that early adopters focus on growing markets and increasing market share, while less experienced companies prioritize cost-cutting. Companies with more technology investments tend to benefit more from AI. The gap between early adopters and others is growing in various sectors, particularly in high-tech and financial services. There are several obstacles to adoption, including developing a clear strategy, finding the right talent, overcoming internal silos, and securing leadership support. To overcome these challenges companies need to create an enterprise-wide view of AI opportunities, develop robust data capture and governance processes, and invest in modern digital capabilities. The adoption of Artificial Intelligence (AI) in the US and major European economies has led to a significant increase in productivity growth, reaching 2.4% by 2010-14 compared to just 1% a decade earlier. AI's potential to boost economic impact lies in its ability to augment human capabilities, freeing up workers to focus on more valuable tasks, and create new products and services. The deployment of AI also brings positive externalities such as increased cross-border commerce and data flows, which can contribute to further economic growth. However, there are also negative externalities like competition shifts and labor market transition costs that could lower the positive impacts. Overall, our research suggests that AI adoption could raise global GDP by up to \$13 trillion by 2030, with annual growth rate of 1.2%. The readiness of countries to adopt AI varies greatly, with factors such as investment, research activity, digital absorption, connectedness, and labor market structure playing a crucial role in determining the potential for AI-driven economic growth. The ability to drive innovation and foster productive environments is crucial for countries looking to harness the power of AI. Kingdoms and smaller economies like Belgium and Singapore have shown success in this area. However, some countries face challenges in building their digital infrastructure and innovation capacity. India stands out with its high number of STEM graduates, but other countries struggle with underdeveloped digital skills and inadequate investment capacity. This can lead to falling behind peers. The impact of AI on work will be significant, with half of current activities being technically automatable. Jobs gained, and jobs changed are three simultaneous effects that will depend on factors such as labor market dynamics, cost of deployment, and regulatory factors. In advanced economies like France, Japan, and the US, automation may affect more jobs due to higher wage levels. In contrast, countries with lower wage levels and extend of adoption will vary across sectors and countries, driven by labor market dynamics and social norms. The global workforce is likely to undergo significant changes due to automated, but the growth in demand for work may more than offset this loss, ranging from 21% to 33% of the global workforce (555-890 million). Emerging economies with young populations will face challenges in providing jobs, while developed economies may experience a balance between lost and created jobs due to aging populations. Jobs will change rather than disappear as machines increasingly complement human labor. Skills for workers assisted by machines, along with work design, must adapt to keep pace with rapidly evolving technology. Four workforce transitions are expected: 1. Millions of workers will require different skills to thrive in the future workplace, including social and emotional skills like communication and empathy, basic digital skills, and higher cognitive skills such as critical thinking and creativity. These changes present opportunities for growth but also demand that individuals and organizations will significantly impact the workforce, with physical and manual skills becoming less dominant while remaining a crucial category in many countries by 2030. As machines take over routine tasks, workers are being retrained to focus on high-value activities such as troubleshooting and customer service. checkout machines replacing cashiers in stores. The pace of skill shifts will lead to excess demand for some skills and supply for others. Middle-wage jobs, particularly those that involve highly automatable activities, are at risk of decline. In contrast, high-skill professions such as medicine and technology will see significant growth. Tackling these transitions poses challenges, especially in economies with existing skill shortages and inadequate educational systems. Income inequality and wage polarization are already concerns, and AI's impact is multifaceted. While it offers economic benefits, it also creates societal pitfalls, including unintended consequences and misuse. AI has the potential to tackle pressing societal challenges by automating routine or unsafe activities, allowing humans to work more safely and productively. For instance, autonomous vehicles could save thousands of lives per year, while reducing the need for humans in hazardous environments. AI capabilities like image classification, object detection, and natural language processing can be applied to various domains to address issues such as early-stage cancer diagnosis, visual impairment navigation, and disease outbreak tracking. ### Implementing AI-enabled interventions for social good requires overcoming various obstacles. scarcity faced by any organization implementing AI, as well as more fundamental issues such as access to infrastructure, financial resources, and technology that are particularly prevalent in remote or economically disadvantaged regions. To ensure the responsible use of AI, it's essential to address concerns about unintended consequences, misuse, algorithmic bias, and data privacy. Additionally, there's a need to examine how AI deployment might exacerbate economic disparities between individuals, firms, sectors, and countries. Other pressing issues involve the potential for AI misuse in surveillance, military applications, social media, and politics, which can have far-reaching social implications, such as in criminal justice systems. Furthermore, malicious actors could exploit AI vulnerabilities, including those related to cybersecurity. Ongoing research efforts are aimed at identifying best practices to mitigate these concerns within academic, nonprofit, and private sectors. Some worries revolve around the potential for algorithms and training data to introduce new biases or perpetuate existing social and procedural biases. For example, facial recognition models trained on a demographic dataset that mirrors AI developer demographics may not accurately represent the broader population. Data privacy and personal information usage are also crucial considerations for realizing AI's full potential. The European Union has taken the lead in addressing these concerns with the General Data Protection, grants users the right to be forgotten and object, and strengthens oversight of organizations handling data, including significant fines for noncompliance. Cybersecurity threats, such as "deep fakes" that could manipulate election results or facilitate large-scale fraud, also pose a concern. To achieve positive outcomes, there are three key priorities: Firstly, businesses and policymakers should adopt AI to capitalize on its potential benefits to the economy and society while acknowledging the challenges it poses. This includes addressing workforce impacts and other social concerns. Secondly, deploying AI in various sectors will require accelerating technical advancements and resolving existing challenges related to data availability, computing power, talent scarcity, access, infrastructure, and financial resources. Lastly, there is a need for ongoing research into mitigating AI's risks and ensuring responsible deployment that balances individual rights with societal benefits. To ensure equal access to AI's benefits, we must invest in research and innovation, expand data sets, and develop AI-relevant human capital and infrastructure. This includes increasing literacy among business leaders and policymakers, as well as supporting existing digitization efforts. The future of work challenge demands robust economic growth, business dynamism, and focused measures addressing skills, creativity, and lifelong learning; stepping up investments in human capital; improving labor market dynamism; rethinking incomes; and establishing transition support and safety nets. Moreover, we must address the responsible AI challenge by strengthening consumer, data, and privacy protections, establishing a shared framework for beneficial use, sharing best practices, and striking the right balance between business and national competitive race. These measures will enable all users to benefit from AI while minimizing its potential negative impacts on society.