

AI Skills for Business Competency Framework

Draft framework for
public consultation

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Developed by

**The
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Executive Summary

Artificial Intelligence (AI) holds enormous potential for businesses, enhancing productivity and competitiveness. However, adopting AI technology can be challenging. To support the adoption of AI, we need to ensure that non-technical employees and decision-makers understand the opportunities, limitations and ethics of using AI in a business setting, rather than these being the exclusive domain of technical practitioners. To address the skills barriers limiting AI adoption in businesses, this work presents guidance, including the high-level skills and competencies employees need to support AI adoption.

This is the first of a series of products delivering a National AI Strategy commitment to “publish research into what skills are needed to enable employees to use AI in a business setting and identify how national skills provision can meet those needs”. Following a period of public comment, we will work with a range of stakeholders across sectors to develop sector-specific case studies and resources and a full skills framework. These products will enable businesses to understand their AI upskilling needs and training providers to develop relevant training solutions.

For up-to-date information on how to provide feedback, please see the Innovate UK and Alan Turing Institute web pages.

Overview

The UK's National AI Strategy sets out a vision to strengthen the UK's position as an AI and science superpower over the coming decade. A key part of this involves ensuring we build a diverse and talented workforce with the right AI skills for the future.

As part of the National AI Strategy, the government committed to carrying out research into the skills needed to enable employees to use AI in a business setting, and identifying how national skills provision can meet those needs. To deliver this commitment, the Department for Science, Innovation and Technology's (DSIT) Office for AI has been working with the Innovate UK BridgeAI programme to develop research on the high-level competencies that businesses need their employees to engage with to enable AI adoption, including for traditionally non-technical roles. We aim for this research to facilitate an increase in the number and diversity of employees across the UK workforce with access to relevant, high-quality AI training, ultimately addressing the skills barriers limiting AI adoption.

Recognising the differing needs of employers, training providers and sector bodies, we will inform the development of multiple pieces of guidance, including high-level guidance on businesses' AI skills needs, domain translation reports which map these competencies to sectors supported by the BridgeAI programme, and a complete skills framework which details the Knowledge, Skills and Behaviours (KSBs) associated with business relevant AI competencies.

This high-level guidance will provide employers from organisations of all sizes and sectors with the understanding of the competencies required to deliver value from emerging technology, support them in identifying upskilling routes for their existing workforce, and develop a pipeline of higher-skilled talent.

This project will be informed by extensive stakeholder engagement with employers, professional bodies, industry groups, training providers and colleges, using feedback to iterate and improve the skills mapping. We intend for this document to provide a starting point for businesses and will continue to monitor the industry's changing skills needs to ensure its continued relevance.

Who is the Target Audience?

The Skills Framework, including personas and competency statements, will support:

- Employers and their employees to understand their AI upskilling needs
- Training providers by guiding the development of new offers to meet industry demand.

Employers and their Employees

This resource is aimed at employers at organisations of any size and type who need to better understand the AI skills and competencies that their employees need. The AI Skills for Business guidance provides a practical, high-level reference to identify the upskilling needs and progression routes within their organisation. It also helps them access the most effective skills and training for their workforce.

Training Providers

This resource aims to provide clarity to training providers, supporting them in developing training in the areas of greatest need by industry. These will be training providers who deliver workplace training and qualifications including, but not limited to, AI and digital, as we anticipate them using the skills framework to develop new AI training.

What do we mean by Artificial Intelligence?

This guidance recognises and embraces multiple definitions of Artificial Intelligence.

The National AI Strategy¹ defines Artificial Intelligence as:

“machines that perform tasks normally performed by human intelligence, especially when the machines learn from data how to do those tasks.” (Source: National AI Strategy, September 2021)

¹ Department for Science, Innovation and Technology (2021). National AI Strategy. <https://www.gov.uk/government/publications/national-ai-strategy/national-ai-strategy-html-version>

It also recognises that:

“Artificial Intelligence’ as a term can mean a lot of things, and the government recognises that no single definition is going to be suitable for every scenario. “(Source: National AI Strategy, September 2021)

The Defence AI Strategy² defines Artificial Intelligence as:

*“a family of general-purpose technologies, any of which may enable machines to perform tasks that would traditionally require human or biological intelligence, especially when the machines learn from data how to do those tasks; for example, recognising patterns, learning from experiences, making predictions and enabling actions to be taken.”
(Source: Defence AI Strategy, June 2022)*

The Organisation for Economic Co-operation and Development (OECD)³, in November 2023, published a revised definition of AI systems, which recognises the varying levels of autonomy of AI systems and their adaptiveness following deployment.

“a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment.” (OECD, 2023)

The Government Office for Science⁴ defined AI as:

“Artificial intelligence is more than the simple automation of existing processes: it involves, to greater or lesser degrees, setting an outcome and letting a computer program find its own way there. It is this creative capacity that gives artificial intelligence its power. But it also challenges some of our assumptions about the role of computers and our relationship to them.” (Source: Government Office for Science, 2016)

² Ministry of Defence (2022). Defence Artificial Intelligence Strategy. <https://www.gov.uk/government/publications/defence-artificial-intelligence-strategy/defence-artificial-intelligence-strategy>

³ Organisation for Economic Co-operation and Development (2019). OECD AI Principles Overview <https://oecd.ai/en/ai-principles>

⁴ Government Office for Science (2016). Artificial intelligence: opportunities and implications for the future of decision making. <https://www.gov.uk/government/publications/artificial-intelligence-an-overview-for-policy-makers>

How to use the Framework?

Personas are intended to describe individuals who may be members of the workforce and/or the target audience for training. We recognise that individuals may span one or more personas, as described in the later section “Mapping between Personas and Dimensions”. These personas can, for example, be adapted to support Training Needs Analysis (TNA) activity or to identify the target audience for a training offering.

The **Framework** is intended as a general framework, which can be contextualised to cater to a given sector’s needs and specific requirements. The framework describes five key dimensions of AI competence, and defines the corresponding knowledge and skill for each.

Synthesis of Frameworks and Definitions

This framework is underpinned by a systematic mapping of existing definitions of roles, occupations, and frameworks in relation to data and AI skills. These include:

- SFIA⁵
- Essential Digital Skills Framework⁶
- Data Skills for Work personas⁷
- The duties, Knowledge, Skills and Behaviours set out within (degree) apprenticeship occupational standards and T-Level standards, including:
 - ST0795 L3 Data Technician⁸
 - ST0118 L4 Data Analyst⁹
 - ST0585 L6 Data Scientist¹⁰
 - ST0884 L7 OR Specialist¹¹
 - ST0763 L7 AI Data Specialist¹²

⁵ <https://sfia-online.org/en/sfia-8/sfia-8>

⁶ <https://www.gov.uk/government/publications/essential-digital-skills-framework>

⁷ <https://dataskillsforwork.com/resource-database/framework-data-personas>

⁸ <https://www.instituteforapprenticeships.org/apprenticeship-standards/data-technician-v1-0>

⁹ <https://www.instituteforapprenticeships.org/apprenticeship-standards/data-analyst-v1-0>

¹⁰ <https://www.instituteforapprenticeships.org/apprenticeship-standards/data-scientist-integrated-degree-v1-0>

¹¹ <https://www.instituteforapprenticeships.org/apprenticeship-standards/operational-research-specialist-v1-0>

¹² <https://www.instituteforapprenticeships.org/apprenticeship-standards/artificial-intelligence-ai-data-specialist-v1-0>

- ST0482 L7 Digital and Technology Solutions (Data Analyst Specialism)¹³
- Data Maturity Assessment for Government: Framework¹⁴
- IfATE Digital Competencies Framework
- The Digital, Data and Technology Profession Capability Framework, maintained by the Central Digital and Data Office¹⁵
- Alliance for Data Science Professionals¹⁶ standards for certification and accreditation.

Call for Action

Throughout the life of the framework, we intend to update this mapping with emerging standards. If you are aware of other examples we should benchmark against, please email framework@turing.ac.uk.

Learner Personas

The framework defines four high-level learner personas: AI Citizens, AI Workers, AI Professionals and AI Leaders. This extends Data Skills for Work personas¹⁷ as proposed by The Data Lab.

Persona: AI Citizens

AI citizens are members of the public who may be customers to, or employees of, organisations making use of artificial intelligence.

- Every AI citizen should be fully conversant with the foundational data skills set out in the Essential Digital Skills Framework¹⁸.
- They will be able to engage meaningfully and critically with the role of AI in life and livelihood.

¹³ <https://www.instituteforapprenticeships.org/apprenticeship-standards/digital-and-technology-solutions-specialist-integrated-degree-v1-0>

¹⁴ <https://www.gov.uk/government/collections/data-maturity-assessment-for-government>

¹⁵ <https://ddat-capability-framework.service.gov.uk/>

¹⁶ <https://afdsp.co.uk/>

¹⁷ <https://dataskillsforwork.com/resource-database/framework-data-personas>

¹⁸ <https://www.gov.uk/government/publications/essential-digital-skills-framework>

- They will be aware of the ways in which AI technology is used within their daily life.
- They will be aware of the opportunities as well as risks of AI and its underpinning technologies, and the need for security of personal data.
- They will be critical consumers of artificial intelligence, and possess an awareness of the capabilities of these technologies as well as a pragmatic outlook on their utility.

Persona: AI Workers

AI workers are employees whose primary role is outside of 'data' and 'AI', but may be in roles adjacent to – and impacted by – these technologies. They may be expected to make use of these technologies in undertaking their roles.

- AI workers will be aware of the role of emerging technologies in AI, and the potential impacts on their role and the broader workforce.
- They will be able to interface with and make use of AI-based tools in undertaking their duties.
- They will possess an awareness of the capabilities of, as well as the limitations of, the AI-based tools they use in the course of their duties.
- They will be aware of the opportunities as well as risks of AI and its underpinning technologies, and the need for security of personal data. They will possess specific awareness of the implications of AI risks within their sector and job role.
- They will be able to identify potential new areas within their role where AI-based approaches could improve efficiency, accuracy or productivity.

Persona: AI Professionals

AI professionals are employees whose core responsibilities concern data and AI.

- AI Professionals will possess competency in the design, creation, deployment and maintenance of AI-based systems.
- They will possess specialist knowledge in one or more subdiscipline(s) of Data Science and Artificial Intelligence, e.g. Computer Science, Statistics, Modelling, and Robotics.

- They possess a strong awareness of legal, ethical, regulatory and compliance considerations and know how to translate this into their roles.
- They are conversant in operating in settings of technical complexity and uncertainty.
- They will be aware of the risks of AI technology, and will know the steps required to mitigate these within their role. They will be able to support leadership to understand and mitigate these risks.
- They can interface effectively with AI Leaders to communicate the correctness of their technical solutions, as well as frame new AI-based opportunities appropriately to achieve buy-in from their organisation.

Persona: AI Leaders

AI leaders hold senior responsibility for the governance of the introduction of emerging technologies, including artificial intelligence. They will have significant decision-making responsibility within the organisation, and may include C-Suite or Board level roles.

- AI Leaders will be effective in understanding the role Artificial Intelligence can have in furthering their organisation's objectives.
- They will be competent in foreseeing new emerging technology and considering its impact across the business and more widely.
- They will be confident in technology roadmapping approaches to translate opportunity into reality, implemented through an AI strategy.
- They are able to operate in settings of organisational complexity and uncertainty.
- They will work effectively at the interface with technical and business teams, to undertake governance responsibility around the introduction of emerging technologies, and, in doing so, ensure legal and regulatory compliance.
- They will be aware of the risks of AI technology and able to take the required steps to mitigate these across their organisation.
- They will be aware of the potential impacts on their workforce, and will be aware of steps to mitigate negative consequences, e.g. through proactive reskilling and upskilling initiatives.

- They will be effective in supplier, contract, and stakeholder relationship management with respect to sourcing AI solutions and resources from external organisations.

Introduction to the Framework

The AI Skills for Business Framework builds upon established models of professional competence¹⁹ and reflective practitioner approaches²⁰. This competency framework identifies the knowledge, skills and personal qualities required to navigate practical challenges and exhibit competency within life and their profession. It outlines competence across four areas²¹:

“Knowledge/cognitive competence: the possession of appropriate work-related knowledge and the ability to put it into effective use, e.g. theoretical/technical knowledge, tacit knowledge, procedural knowledge, and contextual knowledge.

Functional competence: the ability to perform a range of work-based tasks effectively to produce specific outcomes, e.g. occupation specific skills like report writing, IT literacy, budgeting, project management, etc.

Personal or behavioural competence: the ability to adopt appropriate behaviours in work-related situations, e.g. self-confidence, control of emotions, listening, objectivity, collegiality, sensitivity to peers, conformity to professional norms, etc.

Values/ethical competence: the possession of appropriate professional values and the ability to make sound judgements, e.g. adherence to laws, social/moral sensitivity, confidentiality, etc.”

The framework seeks to cultivate and empower “T-shaped” professionals who are flexible, agile and possess the “depth of knowledge in a particular expertise as well as have the ability to work and communicate across disciplines”²².

¹⁹ Cheetham, G., & Chivers, G. (1996). Towards a holistic model of professional competence. *Journal of European industrial training*, 20(5), 20-30.

²⁰ Schon, D. A., & DeSanctis, V. (1986). The reflective practitioner: How professionals think in action.

²¹ Uhlenbrook, S., & De Jong, E. (2012). T-shaped competency profile for water professionals of the future. *Hydrology and Earth System Sciences*, 16(10), 3475-3483.

²² Carlson, S. (2017). A new liberal art: How systems thinking prepares students for a complex world. *The Chronicle of Higher Education*, 64(5).

The framework is formed of five dimensions. Dimensions A through D provide skills against key phases of the AI project lifecycle. Meanwhile, the professional values introduced in Dimension E are expected to underpin activity across all areas.

- **Dimension A:** Data privacy and stewardship
- **Dimension B:** Specification, acquisition, engineering, architecture storage and curation
- **Dimension C:** Problem definition and communication
- **Dimension D:** Problem solving, analysis, statistical modelling, visualisation
- **Dimension E:** Evaluation and reflection.

Mapping between Personas and Dimensions

This framework recognises the varied nature of roles which have the opportunity to incorporate AI, and intends to be flexible to accommodate these. Individual roles vary not only in terms of technical and organisational complexity. They vary in terms of the level of responsibility and accountability, the level of authority to make decisions, and the extent of the impact across the organisation.

The OECD articulate AI actors' responsibilities²³ in values-based principles for AI as follows:

"AI actors should be accountable for the proper functioning of AI systems and for the respect of the above principles, based on their roles, the context, and consistent with the state of art." (OECD, 2023)

Personas are intended to be flexible to accommodate these variations.

Consequently, an individual role will experience differing areas of specialisation, and differing emphasis on key competencies. We adopt the four skill levels as defined by DDaT Capability Framework, as follows:

- Awareness: an individual can a) describe the fundamentals of the skill, and b) demonstrate basic knowledge of some of the skill's tools and techniques.
- Working: an individual can a) apply the skill with some support, and b) adopt the most appropriate tools and techniques.

²³ <https://oecd.ai/en/dashboards/ai-principles/P9>

- Practitioner: an individual can a) apply the skill without support, b) determine and use the most appropriate tools and techniques, and c) share knowledge and experience of the skill.
- Expert: an individual can a) lead and guide a team or organisation in the skill's best practice, b) teach the skill's advanced tools and techniques.

An indicative mapping across the Worker, Professional and Leader Personas and the Dimensions of the framework is available in Table 1.

- For AI Citizens we expect a strong awareness across privacy and stewardship of data, and an awareness of the risks and opportunities presented by AI and its underpinning technologies.
- For AI Workers, we expect as a minimum an Awareness across all dimensions, and Working competence for Dimensions A and E.
- For AI Professionals, we expect a Working or greater level of understanding/knowledge across Dimensions B and D, which may sit across different job roles (e.g. Data Analyst and Data Engineer), but a strong Practitioner level or above in core dimensions A and E.
- AI Leaders are expected to be Expert in Dimensions A, C, and E, which are essential to support them in undertaking their governance responsibilities around the introduction of new technologies. They are expected to possess at least a working level across Dimensions B and D to support effective collaboration with colleagues working in those specialisms.

Table 1: Indicative mapping between Personas and the Dimensions and Learning Objectives of the Framework.

Area	AI Worker	AI Professional	AI Leader
<p>Dimension A: Privacy and Stewardship</p> <ul style="list-style-type: none"> Ensuring the protection of personal and sensitive data Managing sensitive data Data stewardship and standards 	Working	Practitioner or Expert	Expert
<p>Dimension B: Specification, acquisition, engineering, architecture, storage and curation</p> <ul style="list-style-type: none"> Data Collection and Management Data Engineering Deployment 	Awareness or Working	Working, Practitioner or Expert	Working, Practitioner or Expert
<p>Dimension C: Problem definition and communication</p> <ul style="list-style-type: none"> Problem definition Relationship Management 	Awareness or Working	Practitioner-Expert	Expert
<p>Dimension D: Problem solving, analysis, modelling, visualisation</p> <ul style="list-style-type: none"> Identifying and applying technical solutions and project management approaches Data preparation and feature modelling 	Awareness or Working	Working, Practitioner or Expert	Working, Practitioner or Expert

<ul style="list-style-type: none"> • Data Analysis and Model building • Artificial Intelligence 			
<p>Dimension E: Evaluation and Reflection</p> <ul style="list-style-type: none"> • Project Evaluation • Governance • Knowledge of data provenance processes • Sustainability and Best Practices • Reflective Practice and Ongoing Development 	<p>Working</p>	<p>Practitioner-Expert</p>	<p>Expert</p>

Dimension A: Privacy and Stewardship

This area concerns the security and protection of data, including the design, creation, storage, distribution and associated risks.

This dimension is concerned with:

- The Data life cycle (provenance, identification, management, analysis, exploitation, curation)
- Data stewardship and standards
- Knowledge and understanding of information security
- Protection and management of personal and sensitive data
- Knowledge of the legal and regulatory environment.

Competence within this dimension will be underpinned by engagement in domain- and/or sector-specific knowledge, and the ability to frame a technical response within these contexts and constraints. Awareness and activity around practical data controls will articulate fully with legal, regulatory and ethical considerations. The complexities of handling situations arising from the (mis)use of sensitive data will be emphasised.

Ensuring the protection of personal and sensitive data

- Assess risks and enact data protection policies and procedures.
- Ensure safe and secure management of sensitive data, models and infrastructures.
- Apply appropriate data controls, such as encryption, (pseudo)anonymisation, and synthetic data.
- Manage potential risks around environment and infrastructure.

Managing sensitive data

- Act with integrity, giving due regard to legal, regulatory and security requirements.

- Be aware of the necessary steps to ensure the safe, secure and robust management of sensitive data, models and infrastructures and an awareness of how these link to professional responsibilities.
- Be aware of the actions that should be taken to respond to potential data loss in line with organisational, legal and regulatory procedures.

Data stewardship and standards

- Have knowledge of the FAIR Guiding Principles for scientific data management and stewardship into practices, where appropriate and practicable.
- Identify opportunities for efficient and creative reuse of data.
- Understand the relationship between technical standards and regulation/governance and their benefits for interoperability and knowledge sharing.

Dimension B: Specification, acquisition, engineering, architecture, storage and curation

This area concerns the collection, secure storage, manipulation, and curation of data, as well as the application of data management and analytical techniques.

Competence within this dimension will be underpinned by engagement in domain- and/or sector-specific knowledge, and the ability to frame a technical response within these contexts and constraints. Awareness and activity around practical data controls will articulate fully with legal, regulatory and ethical considerations. The complexities of handling situations arising from the (mis)use of sensitive data will be reflected in the proposal of practical solutions.

Data Collection and Management

- Judiciously analyse the availability of appropriate data and resources to meet project requirements.
- Source and access data appropriate for a problem.
- Judiciously evaluate and synthesise data.
- Have/demonstrate knowledge of data provenance processes.
- Identify data characteristics (volume, velocity and variety).
- Identify infrastructure requirements for data storage and analysis.
- Show familiarity or experience with tabular and non-tabular data (e.g. unstructured and streaming data).

Data Engineering

- Source and access data appropriate for the problem.
- Construct data sets, potentially drawing from multiple disparate sources using data linkage.
- Perform data profiling and characterisation to understand the surface properties of the data.
- Handle missing data, through principled inclusion/exclusion criteria and imputation methods.
- Take a systematic approach to data curation and the application of data quality controls.
- Identify the most appropriate solutions (e.g. cloud or on-premise deployment) in response to business and project needs.

Deployment

- Plan the deployment of data products with their end-users.
- Develop monitoring and maintenance processes.
- Develop and oversee experiments to track the performance of different model configurations.
- Oversee model management to support regulatory compliance, reproducibility and reusability.

- Adopt Infrastructure as Code (IaC) approaches to manage the provisioning, configuration and management of infrastructure.
- Deliver secure, stable and scalable data products to meet the needs of the organisation, e.g. Application Programming Interface (API), derivative dataset, dashboard or report.
- Embrace modern software development best practices.
- Automated deployment and model serving technologies, including deployment orchestration, containerisation, monitoring and testing.
- Design and deliver data products that meet appropriate accessibility standards for their users.

Dimension C: Problem definition and communication

This area concerns the ability to identify and clearly define a problem with others and communicate solutions to both technically qualified and lay audiences.

Individuals should be able to demonstrate an understanding of the wider context within which organisations work. They should understand the contribution data science and artificial intelligence can make to their objectives, and the impact of dimensions of data maturity on an organisation's ability to progress. They should be able to demonstrate communication skills, including written, oral and visual. They will possess the ability to communicate technical knowledge, including both substantive results, the procedures used to create them, and the uncertainty or limitations inherent in them, and to do so in a manner appropriate to the nature of the audience.

Problem definition

- Identify and elicit project requirements.
- Determine success criteria and frame these in a wider context.
- Clearly articulate the problem statement.
- Identify and critically evaluate assumptions.
- Recognise and quantify biases and identify solutions to manage and mitigate these.

- Demonstrate sector/domain knowledge and knowledge of how data science and artificial intelligence can deliver value to these sectors/domains.

Relationship Management

- Communicate in an effective manner for diverse audiences, including technical colleagues, subject matter experts and leadership.
- Effectively manage the expectations of diverse stakeholders with conflicting priorities to mediate equitable solutions.
- Use relevant communication techniques (written, oral or visual) that are appropriate for the audience.
- Build appropriate and effective business relationships.
- Show experience in human factors considerations with respect to data-driven solutions.

Dimension D: Problem solving, analysis, modelling, visualisation

This area concerns the knowledge of and ability to apply a range of mathematical, statistical and computing tools and methods to define and analyse a problem and present solutions.

Individuals should be able to demonstrate experience in undertaking data analysis, including (but not limited to) exploratory data analysis, visualisation and predictive work. They will be aware of the opportunities as well as limitations of various data and AI methods, and will be mindful of constraints.

Identifying and applying technical solutions and project management approaches

- Identify viable solutions based on requirements and data available.
- Identify and provide guidance to technical and non-technical stakeholders on the most appropriate solution.

- Apply technical and project management methodologies appropriate for the organisation and project.

Data preparation and feature modelling

- Identify appropriate solutions, including statistical and machine learning approaches and demonstrate an understanding of the assumptions, strengths and weaknesses of the selected approaches.
- Identify and evaluate appropriate evaluation metrics, including computational performance and accuracy.
- Manipulate data with due regard for differences in characteristics.
- Creation and evaluation of new data features.

Data Analysis and Model building

- Apply appropriate solutions, including statistical and machine learning approaches. Demonstrate competence in a modern programming language.
- Use appropriate analysis platforms and tools.
- Identify and quantify different kinds of uncertainty in the outputs of data collection, experiments and analyses.
- Adopt a systematic approach to exploratory data analysis to embrace and manage ambiguity and uncertainty.
- Critically analyse data and analytical results.
- Adopt appropriate methods to visualise data and communicate complex findings.
- Be able to identify data and model uncertainties, and assess model outputs accordingly.

Artificial Intelligence

- Distinguish between general and narrow AI.
- Identify problems which are amenable to being solved using Artificial Intelligence approaches.
- Evaluate appropriate approaches to augment human skills with artificial intelligence (e.g. “human in the loop” and “Human-AI Teaming”).

- Make use of artificial intelligence tools effectively, e.g. through prompt engineering for Large Language Models.
- Understand the differences between supervised and unsupervised AI approaches, and the data needed to train them.
- Be able to identify appropriate AI architectures for different tasks and available datasets (for example, Dense Neural Networks, Convolutional Neural Networks, Recurrent Neural Networks, Graph Neural Networks, and Transformers).
- Be aware of 'off-the-shelf' AI and ML tools, and how these can be adapted and exploited for specific purposes within their sector, and identify situations where bespoke solutions are required.
- Recognise the scope, potential and limits of different AI approaches in relation to the practical problem at hand and the data available to tackle it.
- Be aware of the ways models can be adapted for specific purposes within their sector, e.g. through the use of domain-specific Large Language Models.
- The ability to foresight and evaluate possible future applications of AI and consider the positive and negative effects.

Dimension E: Evaluation and Reflection

This area concerns reflecting on performance and outcomes, identifying development needs and applying important principles associated with ethics and sustainability.

It is important that all professionals working within the field of data science and artificial intelligence have a clear understanding of the ethics that underpin the collection, management, use, and communication of the data and the results with which they work. It is equally important that a data professional takes responsibility for the assurance of the models they build. Assurance covers both the efficacy of the application and the ethical nature of its design and implementation.

Project Evaluation

- Continually monitor project performance and outcomes.
- Identify and feed forward lessons learned.
- Participate in and lead collaborative project evaluations, e.g. retrospectives.

Governance

- Be able to apply a systematic risk management approach to each phase of the AI system lifecycle on a consistent basis to address risks related to AI systems, including privacy, digital security, safety and bias.
- Be able to identify and enforce processes to ensure AI systems are robust, secure and safe throughout their entire lifecycle so that, in conditions of normal use, foreseeable use or misuse, or other adverse conditions, they function appropriately and do not pose an unreasonable safety risk.
- Be able to effectively document risk management decisions made at each stage of the AI lifecycle, and, in doing so, contribute to transparency and accountability.

Transparency and Explainability

- Support discourse with stakeholder groups to foster an appropriate understanding of AI systems.
- Clearly communicate to make stakeholders aware of their interactions with AI systems, including in the workplace.
- Design technical and organisational approaches to enable those affected by AI systems to understand the outcome, and support their empowerment challenge its outcome.

Knowledge of data provenance processes

- Identify and manage the risks of erroneous and biased data.
- Know what it means to act with integrity with respect to legal and regulatory requirements.
- Understand strategies an individual can apply to help advocate for and uphold principles of ethical and safe use of data and AI technologies.

- Know how data use procedures are used to ensure sensitive data is only used for its agreed purpose.
- Knowledge of data retention strategies and their link to regulatory and legal requirements.

Sustainability and Best Practices

- Evidence of incorporating the principles of open science and/or reproducible research within the organisation, and perhaps beyond.
- Competence in programmatic approaches to undertaking data science work.
- Knowledge and experience of applying the scientific method in data science work.
- Ensure high technical standards, in line with software development best practices; for example, software testing, version control, continuous Integration and continuous delivery.
- Knowledge of the potential for automation to promote reproducible analyses.

Reflective Practice and Ongoing Development

- Learn from experience through self-assessment of one's own responses to practice situations.
- Identify learning opportunities to maintain knowledge and skills in the relevant area of data science.
- Demonstrate cultural intelligence around perceptions of data and AI technology.
- Take ownership of ongoing professional development.
- Contribute to knowledge-sharing across their organisation and/or the wider community.
- Contribute to the management and empowerment of the broader team.
- Engage with the latest developments across industry and academia and incorporate these into solutions.

Call for Action

This document is the result of extensive stakeholder engagement and is the first step towards developing a full framework, which aims to support employers, employees, and training providers to identify upskilling routes and understand the competencies required to deliver value from AI.

Following a period of public consultation, we will work with a range of stakeholders across sectors to develop sector-specific case studies and resources and a full skills framework. These will enable businesses to understand their AI upskilling needs and training providers to develop relevant training solutions.

Your insights matter! Join the call for feedback to shape AI skills development. Share your thoughts on the initial version of the guidance and be a part of driving innovation in your industry. Respond to the consultation by visiting this [link](#).

Please email us at framework@turing.ac.uk if you have any other questions, we would like to hear from you. Or, if you need a version of this document in a more accessible format, please tell us what format you need. It will help us if you say what assistive technology you use.

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