AI
Ethics Principles

2025


AI

Table of Content

Introduction

Due to the fast growth of practices and technologies around Artificial Intelligence (AI), the use of AI has expanded to several industries such as health, education, entertainment, etc. AI helps make entities decision-making processes more efficient, accurate and faster by predicting future patterns. AI can be used to analyze data, including big data, by developing and operating systems with advanced models and algrithms that help improve the quality of processes. Due to the increasing interest in these technologies, many entities in both the public and private sectors, in addition to non-profit entities, have developed digital solutions based on AI to address existing challenges using creative and innovative methods, thus making the role of AI more essential to maintain the competitive capabilities of these entities.

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Support the Kingdom's efforts towards achieving its vision and national strategies related to adopting AI technology, encouraging research and innovation, and driving economic growth for prosperity and development.

Develop and establish AI ethics policies, guidelines, regulations, and frameworks.

Govern data and AI models to limit the negative implications of AI systems (economically, psychologically, socially, etc.) and potential threats (security, political, etc.).

Help entities adopt standards and ethics when building and developing AI-based solutions to ensure responsible use thereof.

Protect the privacy of data subjects and their rights with respect to the collection and processing of their data.

Definitions

For the purposes of this document, the following words and phrases, wherever mentioned herein, shall have meanings ascribed thereto, unless the context requires otherwise:

Adopting Entity

Any public entity, business, or individual that is required to comply with the present document.

Artificial Intelligence

Artificial intelligence or AI is a collection of technologies that can enable a machine or system to sense, comprehend, act, and learn.

AI System Assessor

Any natural or legal person that audits AI systems to achieve certain goals.

AI System Lifecycle

The cyclical process that AI projects are expected follow to be able to design, build, and produce a robust and safe system that delivers business value and insights through adhering to a standard and structured way of managing AI model delivery and implementation.

Authorized User

An individual that is permitted, appropriately cleared, and has a requirement to access an information system to perform or assist an established and preset role or responsibility on the system's functionalities and components.

AI Ethics

A set of values, principles, and techniques to guide moral conduct in developing and using AI technologies.

AI System

A set of predictive models and advanced algorithms that can be used to analyze data and predict the future or facilitate decision making for projected future events.

AI System Developer

Any natural or legal person that develops AI systems by building predictive models using data and algorithms to achieve certain goals.

AI System Owner

Any natural or legal person that applies or uses AI systems to achieve certain goals.

CDO

The Chief Data Officer (CDO) is responsible for the development and execution of the Data Management & Data Governance and oversee the implementation practices across the Public Entities.

Data

A collection of facts in a raw or unorganized form such as numbers, characters, images, video, voice recordings, or symbols.

Data Sample

The data used to build, train and test predictive models and AI algorithms to reach specific results.

End-User

Any natural or legal person that consumes or makes use of the goods or services produced by AI systems.

Personal Data

Every data – of whatever source or form – that would lead to the identification of the individual specifically, or make it possible to identify him directly or indirectly, including: name, personal identification number, addresses, contact numbers, license numbers, records, personal property, bank account and credit card numbers, fixed or removing pictures of the individual, and other data of personal nature.

SDAIA

Saudi Data and Artificial Intelligence Authority

Validity (Accuracy)

How accurately a method measures what it is intended to measure.

Data Governance

Data governance is the process of managing the availability, usability, integrity, and security of data in organizations and systems, based on data standards and policies that also control data usage.

Data Subject

An individual to whom the personal data belongs, his representative, or whoever has legal guardianship over him.

National Regulatory Authority

Any independent governmental or public entity assuming regulatory duties and responsibilities for a specific sector in the Kingdom of Saudi Arabia under a legal instrument.

Reliability

The property of intended consistency in behavior and results.

Sensitive Data

Personal data that indicates or includes a reference to a person's ethnic or tribal origin; religious, intellectual or political beliefs; membership of civil associations or institutions; criminal and security data; biometric identifying data; genetic data; credit data; health data; location data; and data that indicates that one or both of an individual's parents are unknown.

Scope

This AI Ethics Framework shall apply to all AI stakeholders designing, developing, deploying, implementing, using, or being affected by AI systems within KSA, including but not limited to public entities, private entities, non-profit entities, researchers, public services, institutions, civil society organizations, individuals, workers, and consumers.

AI Risks

The categories and levels of risks associated with the development and/or use of artificial intelligence are classified into the following:

- **Little or no risk:** There are no restrictions on AI systems that pose little or no risk such as spam filters, but it is recommended that these systems be ethically compliant.
- **Limited risk:** AI systems that pose limited risks, such as technical programs related to function, development, and performance, are subject to the application of the AI ethics principles mentioned in this document.
- **High risk:** AI systems that pose "high risks" to basic rights must undergo pre- and post-conformity assessments, and in addition to adhering to ethics, the relevant statutory requirements must be considered.
- **Unacceptable risk:** AI systems that pose an "unacceptable risk" to people's safety, livelihood, and rights such as those related to social profiling, exploitation of children, or distortion of behavior that are likely to occur are not allowed.

Risk management should be directly interlinked into AI initiatives, so that oversight is concurrent with internal development of AI technology. Risk management of AI systems affects a wide range of risk types including data, algorithm, compliance, operational, legal, reputational, and regulatory risks. Risk management subcomponents, such as model interpretability, bias detection, performance monitoring, are built in so that oversight is constant and consistent with AI development activities. In this approach, standards, testing, and controls are embedded into various stages of the AI System Lifecycle, from design to development and post-deployment.

AI System Lifecycle

The AI System Lifecycle is the cyclical process that AI projects follow. It defines each step that an organization is expected to follow to take advantage of AI to derive practical business value. It is a standard way of representing the tasks based on best practices in implementing and managing AI models which makes it a great candidate for embedding AI ethics.

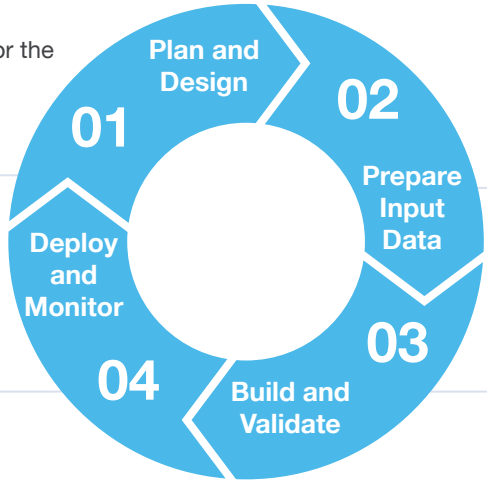
The AI System Lifecycle is split into four steps, all of which have equal importance, and the relevant activities are explained below:

Plan and Design

- Define the problem
- Support your problem with a data-driven approach
- Select a framing approach on technology and system which governs AI
- Conduct feasibility assessment for the selected approach
- Define KPIs

Prepare Input Data

- Gather data
- Discover and assess data
- Cleanse and validate data
- Transform data into AI model input features



Deploy and Monitor

- Deploy the model to the AI system
- Create versioning structure
- Monitor the production model performance periodically
- Assess if there is a need to change the design according to results of periodic reviews

Build and Validate

- Train and test the model
- Tune the hyperparameters of the model
- Validate model performance
- Risk Evaluation

AI Ethics Principles and Controls

Principle 1 – Fairness

The fairness principle requires taking necessary actions to eliminate bias, discrimination or stigmatization of individuals, communities, or groups in the design, data, development, deployment and use of AI systems. Bias may occur due to data, representation or algorithms and could lead to discrimination against the historically disadvantaged groups.

When designing, selecting, and developing AI systems, it is essential to ensure just, fair, non-biased, non-discriminatory and objective standards that are inclusive, diverse, and representative of all or targeted segments of society. The functionality of an AI system should not be limited to a specific group based on gender, race, religion, disability, age, or sexual orientation. In addition, the potential risks, overall benefits, and purpose of utilizing sensitive personal data should be well-motivated and defined or articulated by the AI System Owner.

To ensure consistent AI systems that are based on fairness and inclusiveness, AI systems should be trained on data that are cleansed from bias and is representative of affected minority groups. AI algorithms should be built and developed in a manner that makes their composition free from bias and correlation fallacy.

Plan and Design:

1- At the initial stages of setting out the purpose of the AI system, the design team shall collaborate to pipoint the objectives and how to reach them in an efficient and optimized manner. Planning the design of the AI system is an essential stage to translate the system's intended goals and outcomes. During this phase, it is important to implement a fairness-aware design that takes appropriate precautions across the AI system algorithm, processes, and mechanisms to prevent biases from having a discriminatory effect or lead to skewed and unwanted results or outcomes.

2- Fairness-aware design should start at the beginning of the AI System Lifecycle with a collaborative effort from technical and non-technical members to identify potential harm and benefits, affected individuals and vulnerable groups and evaluate how they are impacted by the results and whether the impact is justifiable given the general purpose of the AI system.

3- A fairness assessment of the AI system is crucial, and the metrics should be selected at this stage of the AI System Lifecycle. The metrics should be chosen based on the algorithm type (rule-based, classification, regression, etc.), the effect of the decision (punitive, selective, etc.), and the harm and benefit on correctly and incorrectly predicted samples.

4- Sensitive personal data attributes relating to persons or groups which are systematically or historically disadvantaged should be identified and defined at this stage. The allowed threshold which makes the assessment fair or unfair should be defined. The fairness assessment metrics to be applied to sensitive features should be measured during future steps.

Prepare Input Data:

1- Following the best practice of responsible data acquisition, handling, classification, and management must be a priority to ensure that results and outcomes align with the AI system's set goals and objectives. Effective data quality soundness and procurement begin by ensuring the integrity of the data source and data accuracy in representing all observations to avoid the systematic disadvantaging of under-represented or advantaging over-represented groups. The quantity and quality of the data sets should be sufficient and accurate to serve the purpose of the system. The sample size of the data collected or procured has a significant impact on theaccuracy and fairness of the outputs of a trained model.

2- Sensitive personal data attributes which are defined in the plan and design phase should not be included in the model data not to feed the existing bias on them. Also, the proxies of the sensitive features should be analyzed and not included in the input data. In some cases, this may not be possible due to the accuracy or objective of the AI system. In this case, the justification of the usage of the sensitive personal data attributes or their proxies should be provided.

Build and Validate:

1- At the build and validate stage of the AI System Lifecycle, it is essential to take into consideration implementation fairness as a common theme when building, testing, and implementing the AI system. Model building and feature selection will require engineers and designers to be aware that the choices made about grouping or separating and including or excluding features as well as more general judgments about the reliability and security of the total set of features may have significant consequences for vulnerable or protected groups.

2- During the selection of the champion model, the fairness metric assessment should be considered. The champion model fairness metrics should be within the defined threshold for the sensitive features. The optimization approach of fairness and performance metrics should be clearly set throughout this phase. The fairness assessment should be justified if the champion model does not pass the assessment.

3- Causality-based feature selection should be ensured. Selected features should be verified with business owners and non-technical teams.

4- Automated decision-support technologies present major risks of bias and unwanted application at the deployment phase, so it is critical to set out mechanisms to prevent harmful and discriminatory results at this phase.

Deploy and Monitor:

1- Well-defined mechanisms and protocols should be set in place when deploying the AI system to measure the fairness and performance of the outcomes and how it impacts individuals and communities. When analyzing the outcomes of the predictive model, it should be assessed if represented groups in the data sample receive benefits in equal or similar portions and if the AI system disproportionately harms specific members based on demographic differences to ensure outcome fairness.

2- The predefined fairness metrics should be monitored in production. If there is any deviation from the allowed threshold, it should be investigated whether there is a need to renew the model.

3- The overall harm and benefit of the system should be quantified and materialized on the sensitive groups.

Principle 2 – Privacy & Security

The privacy and security principle represents overarching values that require AI systems; throughout the AI System Lifecycle; to be built in a safe way that respects the privacy of the data collected as well as upholds the highest levels of data security processes and procedures to keep the data confidential preventing data and system breaches which could lead to reputational, psychological, financial, professional, or other types of harm. AI systems should be designed with mechanisms and controls that provide the possibility to govern and monitor their outcomes and progress throughout their lifecycle to ensure continuous monitoring within the privacy and security principles and protocols set in place.

Plan and Design:

1- The planning and design of the AI system and its associated algorithm must be configured and modelled in a manner such that there is respect for the protection of the privacy of individuals, personal data is not misused and exploited, and the decision criteria of the automated technology is not based on personally identifying characteristics or information.

2- The use of personal information should be limited only to that which is necessary for the proper functioning of the system. The design of AI systems resulting in the profiling of individuals or communities may only occur if approved by Chief Compliance and Ethics Officer, Compliance Officer or in compliance with a code of ethics and conduct developed by a national regulatory authority for the specific sector or industry.

3- The security and protection blueprint of the AI system, including the data to be processed and the algorithm to be used, should be aligned to best practices to be able to withstand cyberattacks and data breach attempts.

4- Privacy and security legal frameworks and standards should be followed and customized for the particular use case or organization.

5- An important aspect of privacy and security is data architecture; consequently, data classification and profiling should be planned to define the levels of protection and usage of personal data.

6- Security mechanisms for de-identification should be planned for the sensitive or personal data in the system. Furthermore, read/write/update actions should be authorized for the relevant groups.

Prepare Input Data:

1- The exercise of data procurement, management, and organization should uphold the legal frameworks and standards of data privacy. Data privacy and security protect information from a wide range of threats.

2- The confidentiality of data ensures that information is accessible only to those who are authorized to access the information and that there are specific controls that manage the delegation of authority.

3- Designers and engineers of the AI system must exhibit the appropriate levels of integrity to safeguard the accuracy and completeness of information and processing methods to ensure that the privacy and security legal framework and standards are followed. They should also ensure that the availability and storage of data are protected through suitable security database systems.

4- All processed data should be classified to ensure that it receives the appropriate level of protection in accordance with its sensitivity or security classification and that AI system developers and owners are aware of the classification or sensitivity of the information they are handling and the associated requirements to keep it secure. All data shall be classified in terms of business requirements, criticality, and sensitivity in order to prevent unauthorized disclosure or modification. Data classification should be conducted in a contextual manner that does not result in the inference of personal information. Furthermore, de-identification mechanisms should be employed based on data classification as well as requirements relating to data protection laws.

5- Data backups and archiving actions should be taken in this stage to align with business continuity, disaster recovery and risk mitigation policies.

Build and Validate:

1- Privacy and security by design should be implemented while building the AI system. The security mechanisms should include the protection of various architectural dimensions of an AI model from malicious attacks. The structure and modules of the AI system should be protected from unauthorized modification or damage to any of its components.

2- The AI system should be secure to ensure and maintain the integrity of the information it processes. This ensures that the system remains continuously functional and accessible to authorized users. It is crucial that the system safeguards confidential and private information, even under hostile or adversarial conditions. Furthermore, appropriate measures should be in place to ensure that AI systems with automated decision-making capabilities uphold the necessary data privacy and security standards.

3- The AI System should be tested to ensure that the combination of available data does not reveal the sensitive data or break the anonymity of the observation.

Deploy and Monitor:

1- After the deployment of the AI system, when its outcomes are realized, there must be continuous monitoring to ensure that the AI system is privacy-preserving, safe and secure. The privacy impact assessment and risk management assessment should be continuously revisited to ensure that societal and ethical considerations are regularly evaluated.

2- AI System Owners should be accountable for the design and implementation of AI systems in such a way as to ensure that personal information is protected throughout the life cycle of the AI system. The components of the AI system should be updated based on continuous monitoring and privacy impact assessment.

Principle 3 – Humanity

The humanity principle highlights that AI systems should be built using an ethical methodology to be just and ethically permissible, based on intrinsic and fundamental human rights and cultural values to generate a beneficial impact on individual stakeholders and communities, in both the long and short-term goals and objectives to be used for the good of humanity. Predictive models should not be designed to deceive, manipulate, or condition behavior that is not meant to empower, aid, or augment human skills but should adopt a more human-centric design approach that allows for human choice and determination.

Plan and Design:

1- It is essential to design and build a model that is based on the fundamental human rights and cultural values and principles that are applied within and on the AI system's decisions, processes, and functionalities.

2- The designers of the AI model should define how the AI system will align with fundamental human rights and KSA's cultural values while designing, building, and testing the technology; as well as how the AI system and its outcomes will strive to achieve and positively contribute to augment and complement human skills and capabilities.

Prepare Input Data:

1- To ensure that AI models embody a human-centric build and design that requires adhering to practices of responsible and ethical data management frameworks and processes to be followed according to best practices and data regulations within KSA.

2- Data must be properly acquired, classified, processed, and accessible to ensure respect for human rights, and KSA's cultural values and preferences.

Build and Validate:

1- When constructing AI systems, designers and engineers should prioritize building AI systems and algorithms that allow and facilitate decision-making with an outlook of aligning with human rights and KSA's cultural values. The automated decisions that result from AI systems should not act in a partial and standalone manner without considering broader human rights and cultural values in their final outcomes and results.

2- Designers and Engineers should enable AI systems with the appropriate parameters and algorithm training to attain outcomes that advance humanity.

Deploy and Monitor:

1- Periodic assessments of the deployed AI system should be conducted to ensure that its results are aligned with human rights and cultural values, accuracy key performance indicators (KPIs), and impact on individuals or communities to ensure the continuous improvement of the technology.

2- Designers of AI models should establish mechanisms of assessing AI systems against fundamental human rights and cultural values to mitigate any negative and harmful outcomes resulting from the use of the AI system. If any negative and harmful outcomes are found, the owner of the AI system should identify the areas that need to be addressed and apply corrective measures to recursively improve the functioning and outcomes of the AI system.

Principle 4 – Social & Environmental Benefits

The social and environmental benefit principle embraces the beneficial and positive impact of social and environmental priorities that should benefit individuals and the wider community that focus on sustainable goals and objectives. AI systems should neither cause nor accelerate harm or otherwise adversely affect human beings but rather contribute to empowering and complementing social and environmental progress while addressing associated social and environmental ills. This entails the protection of social good as well as environmental sustainability.

Plan and Design:

1- AI systems have a significant impact on communities and the ecosystems that they live in; hence AI System Owners should have a high sense of awareness that these technologies may have disruptive and transformative effects on society and the environment. The design of AI systems should be approached in an ethical and sensitive manner in line with the values of prevention of harm to both human beings and the environment.

2- When planning and designing AI systems, due consideration should be given to preventing and helping address social and environmental issues in a way that will ensure sustainable social and ecological responsibility.

Prepare Input Data:

1- The processes and policies that govern data management should be followed when preparing the categorization and structuring of data that will feed into the AI system.

2- The data pertaining to the social and environmental topics should be accessible to the public data infrastructure and must clearly articulate the social benefit of the data presented.

Build and Validate:

1- The models and algorithms must have, as their ultimate goal, a result linked to a socially recognized end, with the ability to demonstrate how the expected results relate to that social or environmental purpose through transformative and impactful benefits where applicable.

2- It is best practice to measure and maintain acceptable levels of resource usage and energy consumption during this phase setting the tone that AI systems not only strive to foster AI solutions that address global concerns relating to social and environmental issues but also practice sustainable and ecological responsibilities

Deploy and Monitor:

1- After the deployment of the AI system, the AI System Owner should ensure that continuous assessment of the human, social, cultural, economic and environmental impact of AI technologies are carried out with full cognizance of the implications of the AI system for sustainability as a set of constantly evolving goals across a range of dimensions against the priority objectives that were set at the Plan and Design phase.

2- The AI System Owner should also foster and encourage the power of AI solutions in addressing areas of global concern aligning with sustainable development goals.

Principle 5 – Reliability & Safety

The reliability and safety principle ensures that the AI system adheres to the set specifications and that the AI system behaves exactly as its designers intended and anticipated. Reliability is a measure of consistency and provides confidence in how robust a system is. It is a measure of dependability with which it operationally conforms to its intended functionality and the outcomes it produces. On the other hand, safety is a measure of how the AI system does not pose a risk of harm or danger to society and individuals. As an illustration, AI systems such as autonomous vehicles can pose a risk to people's lives if living organisms are not properly recognized, certain scenarios are not trained for or if the system malfunctions. A reliable working system should be safe by not posing a danger to society and should have built-in mechanisms to prevent harm.

The risk mitigation framework is closely related to this principle. Potential risks and unintended harms should be minimized in this aspect.

The predictive model should be monitored and controlled in a periodic and continuous manner to check if its operations and functionality are aligned with the designed structure and frameworks in place. The AI system should be technically sound, robust, and developed to prevent malicious usage to exploit its data and outcomes to harm entities, individuals or communities. A continuous implementation/continuous development approach is essential to ensure reliability.

Plan and Design:

1- Designing and developing an AI system that can withstand the uncertainty, instability, and volatility that it might encounter is crucial.

2- Planning to set out a robust and reliable AI system that works with different sets of inputs and situations is essential to prevent unintended harm and mitigate risks of system failures when positioned against unknown and unforeseen events.

3- Establishing a set of standards and protocols for assessing the reliability of an AI system is necessary to secure the safety of the system's algorithm and data output. It is essential to keep a sustainable technical outlay and outcomes generated from the system to maintain the public's trust and confidence in the AI system.

4- The documentation standards are essential to track the evolution of the system, foresee possible risks and fix vulnerabilities.

5- All critical decision points in the system design should be subject to sign-off by relevant stakeholders to minimize risks and make stakeholders accountable for the decisions.

Prepare Input Data:

1- Adequate steps and actions should be taken to measure the data sample's quality, accuracy, suitability, and credibility when dealing with the data sets of an AI model. This is essential to ensure the accuracy of data interpretation by the AI system, the consistency of avoiding misleading measurements, as well as ensuring the relevance of the AI system's outcomes to the purpose of the model.

2- It is crucial for the build and validate step to test how the system behaves under outlier events, extreme parameters, etc. In this step, stress test data should be prepared for extreme scenarios.

Build and Validate:

1- To develop a sound and functional AI system that is both reliable and safe, the AI system's technical construct should be accompanied by a comprehensive methodology to test the qualit of the predictive data-based systems and models according to standard policies and protocols.

2- To ensure the technical robustness of an AI system rigorous testing, validation, and re-assessment as well as the integration of adequate mechanisms of oversight and controls into its development is required. System integration test sign-off should be done with relevant stakeholders to minimize risks and liability.

3- Automated AI systems involving scenarios where decisions are understood to have an impact that is irreversible or difficult to reverse or may involve life-and-death decisions should trigger human oversight and final determination. Furthermore, AI systems should not be used for social scoring or mass surveillance purposes.

Deploy and Monitor:

1- Monitoring the robustness of the AI system should be adopted and undertaken in a periodic and continuous manner to measure and assess any risks related to the technicalities of the AI system (an inward perspective) as well as the magnitude of the risk posed by the system and its capabilities (an outward perspective).

2- The model must also be monitored in a periodic and continuous manner to verify whether its operations and functions are compatible with the designed structure and frameworks. The AI system must also be safe to prevent destructive use to exploit its data and results to harm entities, individuals, or groups. It is necessary to continuously work on implementation and development to ensure system reliability.

Principle 6 – Transparency & Explainability

The transparency and explainability principle is crucial for building and maintaining trust in AI systems and technologies. AI systems must be built with a high level of clarity and explainability as well as features to track the stages of automated decision-making, particularly those that may lead to detrimental effects on data subjects. It follows that data, algorithms, capabilities, processes, and purpose of the AI system need to be transparent and communicated as well as explainable to those who are directly and indirectly affected. The degree to which the system is traceable, auditable, transparent, and explainable is dependent on the context and purpose of the AI system and the severity of the outcomes that may result from the technology. AI systems and their designers should be able to justify how the rationale behind their design, practices, processes, algorithms, and decisions or behaviors are ethically permissible, nondiscriminatory, and nonharmful to the public.

Plan and Design:

1- When designing a transparent and trusted AI system, it is vital to ensure that stakeholders affected by AI systems are fully aware and informed of how outcomes are processed. They should further be given access to and an explanation of the rationale for decisions made by the AI technology in an understandable and contextual manner. Decisions should be traceable. AI system owners must define the level of transparency for different stakeholders on the technology based on data privacy, sensitivity, and authorization of the stakeholders.

2- The AI system should be designed to include an information section in the platform to give an overview of the AI model decisions as part of the overall transparency application of the technology. Information sharing as a sub-principle should be adhered to with end-users and stakeholders of the AI system upon request or open to the public, depending on the nature of the AI system and target market. The model should establish a process mechanism to log and address issues and complaints that arise to be able to resolve them in a transparent and explainable manner.

Prepare Input Data:

1- The data sets and the processes that yield the AI system's decision should be documented to the best possible standard to allow for traceability and an increase in transparency.

2- The data sets should be assessed in the context of their accuracy, suitability, validity, and source. This has a direct effect on the training and implementation of these systems since the criteria for the data's organization, and structuring must be transparent and explainable in their acquisition and collection adhering to data privacy regulations and intellectual property standards and controls.

Build and Validate:

1- Transparency in AI is thought about from two perspectives, the first is the process behind it (the design and implementation practices that lead to an algorithmically supported outcome) and the second is in terms of its product (the content and justification of that outcome). Algorithms should be developed in a transparent way to ensure that input transparency is evident and explainable to the end-users of the AI system to be able to provide evidence and information on the data used to process the decisions that have been processed.

2- Transparent and explainable algorithms ensure that stakeholders affected by AI systems, both individuals and communities, are fully informed when an outcome is processed by the AI system by providing the opportunity to request explanatory information from the AI system owner. This enables the identification of the AI decision and its respective analysis which facilitates its auditability as well as its explainability.

3- If the AI system is built by a third party, AI system owners should make sure that an AI Ethics due diligence is carried out and all the documentation are accessible and traceable before procurement or sign-off.

Deploy and Monitor:

1- Upon deployment of the AI system, performance metrics relating the AI system's output, accuracy and alignment to priorities and objectives, as well as its measured impact on individuals and communities should be documented, available and accessible to stakeholders of the AI technology.

2- Information on any system failures, data breaches, system breakdowns, etc. should be logged and stakeholders should be informed about these instances keeping the performance and execution of the AI system transparent. Periodic UI and UX testing should be conducted to avoid the risk of confusion, confirmation of biases, or cognitive fatigue of the AI system.

Principle 7 – Accountability & Responsibility

The accountability and responsibility principle holds designers, vendors, procurers, developers, owners and assessors of AI systems and the technology itself ethically responsible and liable for the decisions and actions that may result in potential risk and negative effects on individuals and communities. Human oversight, governance, and proper management should be demonstrated across the entire AI System Lifecycle to ensure that proper mechanisms are in place to avoid harm and misuse of this technology. AI systems should never lead to people being deceived or unjustifiably impaired in their freedom of choice. The designers, developers, and people who implement the AI system should be identifiable and assume responsibility and accountability for any potential damage the technology has on individuals or communities, even if the adverse impact is unintended. The liable parties should take necessary preventive actions as well as set risk assessment and mitigation strategy to minimize the harm due to the AI system. The accountability and responsibility principle is closely related to the fairness principle. The parties responsible for the AI system should ensure that the fairness of the system is maintained and sustained through control mechanisms. All parties involved in the AI System Lifecycle should consider and action these values in their decisions and execution.

Plan and Design:

1- This step is crucial to design or procure an AI System in an accountable and responsible manner. The ethical responsibility and liability for the outcomes of the AI system should be attributable to stakeholders who are responsible for certain actions in the AI System Lifecycle. It is essential to set a robust governance structure that defines the authorization and responsibility areas of the internal and external stakeholders without leaving any areas of uncertainty to achieve this principle. The design approach of the AI system should respect human rights, and fundamental freedoms as well as the national laws and cultural values of the kingdom.

2- Organizations can put in place additional instruments such as impact assessments, risk mitigation frameworks, audit and due diligence mechanisms, redress, and disaster recovery plans.

3- It is essential to build and design a human-controlled AI system where decisions on the processes and functionality of the technology are monitored and executed, and are susceptible to intervention from authorized users. Human governance and oversight establish the necessary control and levels of autonomy through set mechanisms.

Prepare Input Data:

1- An important aspect of the Accountability and Responsibility principle during Prepare Input Data step in the AI System Lifecycle is data quality as it affects the outcome of the AI model and decisions accordingly. It is, therefore, important to do necessary data quality checks, clean data and ensure the integrity of the data in order to get accurate results and capture intended behavior in supervised and unsupervised models.

2- Data sets should be approved and signed-off before commencing with developing the AI model. Furthermore, the data should be cleansed from societal biases. In parallel with the fairness principle, the sensitive features should not be included in the model data. In the event that sensitive features need to be included, the rationale or trade-off behind the decision for such inclusion should be clearly explained. The data preparation process and data quality checks should be documented and validated by responsible parties.

3- The documentation of the process is necessary for auditing and risk mitigation. Data must be properly acquired, classified, processed, and accessible to ease human intervention and control at later stages when needed.

Build and Validate:

1- Model development of the AI system and algorithm should consist of the selection of features, hyperparameter tuning and performance metric selection. To achieve this, the technical stakeholders who build and validate models should be responsible for these decisions.

2- Assigning the appropriate ownership and communicating responsibilities will set the tone for accountability that would aid in steering the development of the AI system on good reasons, solid interference, and will allow the intervention of human critical judgement and expertise.

3- The decisions should be supported with quantitative (performance measures on train/test datasets, consistency of the performance on different sensitive groups, performance comparison for each set of hyperparameters, etc.) and qualitative indicators (decisions to mitigate and correct unintended risks from inaccurate predictions).

4- The appropriate stakeholders and owners of the AI technology should review and sign off the model after successful testing and validation of user acceptance testing rounds have been conducted and completed before the AI models can be productionized.

Deploy and Monitor:

1- The responsibility and associated liability in the Deploy and Monitor step should be set clearly. The outcomes and decisions set in the build and validate step should be monitored continuously and should result in periodic performance reports.

2- Predefined triggers/alerts should be defined for this step on the data and performance metrics. Setting these triggers is a rigorous process and each trigger should be assigned to the appropriate stakeholder. These triggers/alerts can be defined as part of the risk mitigation or disaster recovery procedure and may need human oversight.

Roles and Responsibilities

The AI Ethics Framework defines the following roles and responsibilities both at the national and entity level.

National Level

SDAIA

SDAIA works to review and update the principles of artificial intelligence ethics and monitor compliance with them. SDAIA also prepares national guides, standards, and directives that ensure the effective management and dissemination of artificial intelligence ethics at the Kingdom level and achieve the desired goal. In order to implement its objectives, the Authority may carry out the following tasks:

- **AI Ethics Development:** Develop, issue, and update this AI Ethics principles and framework. This document should be revisited regularly to address possible changes affecting AI Ethics, associated regulations, communities, and the environment.
- **AI Ethics Adoption Plan Development:** Develop supporting material and provide continuous guidance to Adopting Entities to facilitate the adoption of this Framework.
- **AI Ethics Advisory:** Support Adopting Entities in complying with this Framework and answer any queries related to the AI Ethics and compliance with this document.

- **AI Ethics Compliance Measurement:** Measure compliance of Adopting Entities on a regular basis based on the defined compliance mechanism directly or through sector regulators (Refer to the 'Compliance' section for more details) and audit AI Ethics activities when required.

- **AI Ethics Compliance Monitoring:** Conduct investigations and audits and monitor compliance with this Framework with the support of the National Regulatory Authorities.

Adopting Entities

All Adopting Entities shall have the primary responsibility for ensuring that their AI Ethics documents are published in compliance with these AI Ethics Principles. As such, Entities shall designate individuals who will be responsible for carrying out the AI Ethics activities as outlined below.

1- Head of the Entity / Chief Data Officer (CDO): Responsible for the AI Ethics practice within an Entity. Responsibilities include:

- Approve and oversee the implementation of the AI Ethics Plan within the Entity.

- Designate different roles with regard to AI Ethics.

- Approve the AI Ethics annual report.

- Take or delegate the necessary actions for the resolution of the issues that are raised by the CCO/CO.

- Act as the first point of contact between the Entity and the Authority. The Head of the Entity or CDO shall resolve any pending issues around AI Ethics for their respective Entity and escalate them to SDAIA whenever necessary.

2- Chief Compliance Officer (CCO) / Compliance Officer (CO): The strategic lead of the AI Ethics practice, the CO is positioned under the CDO and reports directly to the CDO. The responsibilities of the CCO/CO shall include:

- Oversee the development of the AI Ethics Plan and present it to the head of the Entity. The CCO/CO shall also review the performance of AI Ethics to identify improvement opportunities and feed into the AI Ethics Plan.
- Review the AI Ethics identification and prioritization activities, monitor AI Ethics KPIs for in-house and third-party systems, and ensure maintenance activities are being performed.
- Ensure compliance of the Entity's AI Ethics activities with national regulations, including but not limited to Data Classification, Data Privacy, and Freedom of Information. Make sure that third-party systems comply with these Principles through contractual guarantees.

3- Responsible AI Officer (RAIO): The operational lead of Responsible AI within the entity and works collaboratively with other officers from the Data Management team. Responsibilities include:

- Develop the AI Ethics Plan, including the AI Ethics prioritization methodology, and set targets and KPIs to be agreed on with the CCO/CO or head of Entity/CDO.
- Collaborate with other officers in managing, governing, and protecting data.
- Defining, updating, maintaining, and reviewing AI ethics priorities and procedures.
- Educate and raise awareness across the Entity's employees on AI Ethics and support national awareness campaigns in coordination with the CCO/CO.

4- AI System Assessor: Responsible for auditing AI systems to achieve certain goals and has the following responsibilities:

- Review communications channels and interactions with stakeholders to provide disclosure and effective feedback channels.
- Conduct periodical reviews on the AI Ethics process and documentation.
- Continuously review AI Ethics KPI's.
- Publish audit reports on the AI Ethics Assessment of the organization which covers the AI development and deployment process as well as the third-party AI product procurement process.

Optional Registration

Optional Registration aims to motivate target entities to consider AI ethics when building and developing AI-based solutions to ensure a responsible use.

Compliance

- The Authority may follow up and measure the level of commitment and compliance of registered entities and support them in evaluating compliance with the application of their AI ethics and submitting optional reports.

- The level of compliance is measured according to the following:
  - Displaying the progress of the product or entity in complying with the checklist mentioned in the attachments of this document.
  - Results of internal or external evaluation of AI ethics.
  - Objectives of the product or entity and indicators for measuring the performance of AI ethics.
  - The level of compliance to AI ethics and the fulfillment of its requirements and the badges obtained by the product or entity.

The authority can assist the entities in reviewing annual reports and make recommendations regarding general compliance with AI ethics.

Motivational Badges

To motivate the implementing agencies to register and work with the principles of AI ethics, the Authority may provide motivational badges that will reflect the level of compliance and progress on AI ethics adoption. The Authority will issue a guide explaining the mechanism and controls for awarding them.

Annexure

Annexure A: AI Ethics Tools

- **AI Fairness Position Statement:** A fairness position statement allows the owner of the AI technology to clearly state the fairness criteria that have been employed by the AI system and explain the rationale and logic behind it in a direct and non-technical language. To implement a fair AI system in a sustainable way, choosing the right fairness objectives is key to setting the tone of the AI model in terms of its ethical standards and regulatory requirements. This is done by sharing the reasons and underlying fairness values expressed throughout the model as well as the decision-making process of the AI model to communicate and reach the wider audience. This document would be made accessible and available to the public and affected individuals and communities.

- **Ethical Impact Assessment:** AI has accelerated innovation in how business is conducted and executed by practitioners, and therefore it is imperative to evolve AI system ethical impact assessments to identify areas that need adjustment and recalibrating to design the AI model into an ethically accepted technology to maximize its positive impact on complimenting human capabilities and skillsets. The objective of impact assessments is to evaluate and analyze the level of ethical impact of the AI technology on individuals or communities in both direct and indirect manners which enables the owner of the AI system to address identified issues and strengthen areas where improvements and adjustments are required. It is also essential to be able to assess the ethical risks that the AI system is projecting, analyze the discriminatory harm impact and accurate representation of the system on the ethical impact through a diversified and multi-stakeholder analysis, as well as act as a facilitator to address whether a model should move to production or deployment. One of the purposes of the ethical impact assessment is to help build public confidence around the AI system and demonstrate consideration and due diligence to wider the public audience.

- **Privacy and Security Standards:** Privacy and security standards are in place to help companies improve their information security strategy by providing guidelines and best practices based on the company's industry and the type of data they maintain. In the following table, some examples are given for privacy and security standards:

Standard Name	Link
ISO standards for artificial intelligence, such as the ISO 23894 risk standard and the standards issued by the Saudi Standards and Metrology Organization	https://www.iso.org/standard/77304.html
Standards of the Institute of Electrical and Electronics Engineers	https://www.standards.ieee.org
NIST AI Risk Management Framework (National Institute of Standards and Technology)	https://www.nist.gov/cyberframework/framework
NIST AI Risk Management Framework (National Institute of Standards and Technology)	https://www.nist.gov/itl/ai-risk-management-framework
CIS Controls (Center for Internet Security Controls)	https://www.cisecurity.org/controls/
PCI-DSS (Payment Card Industry Data Security Standard)	https://www.pcisecuritystandards.org/pci_security/
COBIT (Control Objectives for Information and Related Technologies)	http://www.isaca.org/resources/cobit

- **Architecture for Trustworthy AI:** The requirements that are stated in the AI Ethics Principles and Controls section should be reflected in the design of the AI system architecture. The AI system architecture should set the rules and restrictions across the AI System Lifecycle. The principles and controls are generic and addressing them to the particular use cases or AI systems should be done with the sense-plan-act theoretical approach. Adapting the architecture to AI Ethics entails the integration of the three steps of this approach:
  - **Sense:** The system should be developed such that it recognizes all environmental elements necessary to ensure adherence to the requirements
  - **Plan:** The system should only consider plans that adhere to the requirements
  - **Act:** The system's actions should be restricted to behaviors that realize the requirements.

The technical objectives of accuracy, reliability, safety, and robustness must be prioritized to ensure that the AI System functions safely. AI System Developers should build a system that will operate accurately and reliably, in accordance with the intended design, even when confronted with unexpected changes, anomalies, and disturbances.

- **Algorithm Assessment:** The objective of the algorithm assessment is to ensure that individuals or communities are informed about the use of algorithms and the weights and counterweights that exist to manage their use. The AI maturity of enterprises and government entities are different, and this assessment will show the improvement areas for the respective entities or government entities to improve descriptions on how algorithms inform or impact decision making, particularly in those cases where there is a degree of automatic decision making or where the algorithms support decisions that have a significant impact on individuals or groups. This assessment will balance the human oversight for efficient AI systems.

Fairness Assessment: It is a set of diagnostic methods that helps you compare how fair models and label markers perform for specific groups. It checks whether the model's result is regularly overestimated or underestimated for one or more groups compared to others. Additionally, it evaluates how well the diversity of data is represented for each group. In the following table, fairness assessment tool examples are included

Tool Name	Link
Google Model Card Toolkit	https://github.com/tensorflow/model-card-toolkit
AI Fairness 360	https://github.com/Trusted-AI/AIF360
Microsoft Fairlearn	https://fairlearn.org/
Google What-If Tool	https://pair-code.github.io/what-if-tool/
Aequitas Bias And Fairness Audit Toolkit	http://aequitas.dssg.io/
Veritas Fairness Assessment Tool	https://github.com/mas-veritas2/veritastool
Tensorflow Fairness Indicators	https://www.tensorflow.org/tfx/guide/fairness_indicators
Ai Explainability 360	https://github.com/Trusted-AI/AIX360

- **AI Methods Explanation Report:** As explained under Transparency and Explainability section, it should be explained why the system behaves the way it does and how it takes decisions. Although some training methods have superior performance, they work as black-box, and it is a challenge to interpret the results. Small deviations in the data could lead to dramatic deviations and changes in the outcome. The report should explain the behavior of the system as well as ensure the deployment of reliable technology. The report should help to better understand the AI system's underlying mechanism as well as the interpretation of the outcomes.

  AI System stakeholders should consider the trade-off between performance, materialization, and explanation methods. In some cases, explanation methods increase complexity or require sacrificing performance. A cost-benefit analysis should be conducted and the level of explainability should be justified based on this analysis.

- **Algorithm Auditing:** Unexpected algorithmic behaviors can be detected with algorithm audits. In general, algorithm audits are done on an ad-hoc basis, and it is important to standardize algorithm auditing process with supporting AI algorithms. The process should be systematic and continuous. Regulating and auditing AI systems for ethical compliance is more complicated than regulating and auditing human decision-making or processes. AI systems should be designed with due consideration of AI Ethics principles and controls. Auditing mechanisms should follow the same principles and controls in alignment with these principles.

- **Safety Self-Assessment:** Safety considerations of accuracy, reliability, security, and robustness should be considered at every step of the AI System Lifecycle. AI system safety self-assessments should be continuously logged and documented in a way that allows review and re-assessment. The performance of AI system safety self-assessments should be conducted by relevant stakeholders at each stage of the workflow. They should evaluate how the design and implementation practices line up with the safety objectives of accuracy, reliability, security, and robustness.

- **Data Protection Methods:** These methods help to protect data by applying data transformation methods, especially for the data that is classified as sensitive. The following data protection methods are given as examples and they should be after data classification.

- **Data De-Identification:** is the process of eliminating Personally Identifiable Data (PII) from any document or other media, including an individual's Protected Health Information (PHI).

- **Data Anonymization:** is a kind of data sanitization process that intends to protect the privacy of individuals. It is the process of removing PII from data sets to maintain the anonymity of individuals whom the data describes. It is often the preferred method for making structured medical datasets secure for sharing.

- **Data Masking:** is a technique that removes or hides information, replacing it with realistic replacement data or fake information. The objective is to create a version that can't be decoded or reverse engineered. There are a number of ways to change the data, including encryption, character shuffling, and word or character replacement.

- **Data Pseudonymization:** is a way of masking data that ensures it is not possible to attribute personal data to a specific person, without using additional information subject to security measures. It is an integral part of the EU General Data Protection Regulation (GDPR), which has several recitals specifying how and when data should be pseudonymized.

- **Data Encryption:** is a method of data masking, used to protect it from cybercriminals, others with malicious intent, or accidental exposure. The data might be the contents of a database, an email note, an instant message, or a file retained on a computer.

- **Data Tokenization:** is a process of substituting personal data with a random token. Often, a link is maintained between the original information and the token (such as for payment processing on sites). Tokens can be completely random numbers or generated by one-way functions (such as salted hashes).

- **Data Loss Prevention (DLP)**: Data Loss Prevention (DLP) is used to detect and prevent data breaches. This involves monitoring network activity, identifying and blocking suspicious behavior, and implementing encryption and access controls.

- **Data Governance**: Data Governance encompasses all aspects of data management throughout its entire life cycle, including security, usability, availability, and privacy. This involves defining data handling policies and processes and assigning data management authority and responsibilities.

- **Data Minimization**: Data minimization refers to the practice of collecting just the personal information required to satisfy a specified objective. This helps to mitigate the risks connected with data breaches and the abuse of personal information

Annexure B: AI Ethics Tools Mapping to AI System Lifecycle

Tool	Plan & Design	Prepare Input Data	Build & Validate	Deploy & Monitor
Fairness Position Statement	●			
Ethical Impact Assessment	●			●
Privacy and Security Standards	●	●	●	●
Architecture for Trustworthy AI	●			
Algorithm Assessment			●	●
Fairness Assessment			●	
AI Methods Explanation Report			●	●
Algorithm Auditing			●	●
Safety Self-Assessment	●	●	●	●
Data Protection Methods	●	●	●	●

Annexure C: AI Ethics Checklist

AI System Lifecycle Phase 1: Plan & Design

Phase	Question	Binding for Third-party	Principles
PD.1	Did you design the appropriate level of human oversight for the AI system and use case?	Yes	Accountability & Responsibility
PD.2	Does your AI system design prevent overconfdence in or overreliance on the AI system with necessary human intervention mechanisms?	Yes	Accountability & Responsibility
PD.3	Did you de ne human oversight processes with the appropriate KPIs and assign responsibility to the relevant parties?	No	Accountability & Responsibility
PD.4	Did you design an operation and governance strategy to abort or intervene in the system when the system doesn't work in an intended way?	No	Accountability & Responsibility
PD.5	Did you consider the liability and Data Subject protection requirements and take them into account?	Yes	Accountability & Responsibility
PD.6	Did you define thresholds of the KPIs and did you put governance procedures or autonomous actions in place to trigger alternative/fallback plans?	No	Accountability & Responsibility
PD.7	Did you provide training and education to help develop accountability practices?	No	Accountability & Responsibility
PD.8	Did you ensure that the AI Ethics Governance structure is compliant with the proposed governance mechanism in the National AI Ethics Policy?	No	Accountability & Responsibility
PD.9	Did you ensure that the AI Ethics Governance structure includes internal or external audit mechanisms?	No	Accountability & Responsibility
PD.10	Did you establish a strategy or a set of procedures to avoid creating or reinforcing unfair bias in the AI system, covering both input data as well as for the algorithm design?	Yes	Fairness

Phase	Question	Binding for Third-party	Principles
PD.11	Did you identify sensitive personal data attributes relating to persons or groups that are systematically or historically disadvantaged? If so, the permissible limit that makes the assessment fair or unfair must be determined.	No	Fairness
PD.12	Did you de ne fairness assessment KPIs?	No	Fairness
PD.13	Did you consider a mechanism to include the participation of different stakeholders in the AI system's development and use?	No	Fairness
PD.14	Did you conduct an impact analysis on how the AI system affects fundamental human rights and cultural values? Did you list any potential negative effects on fundamental human rights and cultural values and the solutions or recovery mechanisms?	Yes	Humanity
PD.15	Did you put measures in place to ensure that the AI system does not lead to people being deceived or unjustifiably impaired in their freedom of choice?	Yes	Humanity
PD.16	Did you align your AI system with relevant standards or policies (for example, ISO, IEEE, Data Privacy Law) or widely adopted protocols for daily data management and governance?	Yes	Privacy & Security
PD.17	Did you follow established protocols, processes, and procedures to manage and ensure proper data governance? Did you ensure that National Data Management and Personal Data Protection Standards are followed?	Yes	Privacy & Security
PD.18	Did you ensure that data access control meets security, privacy, and compliance requirements? Did you design a log mechanism for audit and debug purposes?	Yes	Privacy & Security
PD.19	Did you design a risk management strategy for your AI system? Did you include risk tiers, KPIs, risk assessment, and mitigation procedures?	No	Reliability & Safety

Phase	Question	Binding for Third-party	Principles
PD.20	Did you assess whether there is a likelihood that the AI system may cause damage or harm to users or third parties? Did you assess the potential damage, impacted audience, and severity?	Yes	Reliability & Safety
PD.21	Did you assess whether there is a likelihood that the AI system may unintentionally give wrong results or inaccurate predictions, fail or feed societal biases?	Yes	Reliability & Safety
PD.22	Did you consider the potential impact or safety risk to the environment, living creatures, or society in addition to the Data Subjects?	Yes	Social & Environmental Benefits
PD.23	Did you assess whether the system's business model is aligned with the organization's vision and mission as well as the code of conduct?	Yes	Transparency & Explainability
PD.24	Did you design an interpretable AI system where the data, algorithms, outcomes, and decisions are transparent and explainable to the related parties?	Yes	Transparency & Explainability
PD.25	Did you design User Experience with human psychology in mind to avoid the risk of confusion, confirmation bias, or cognitive fatigue?	Yes	Transparency & Explainability
PD.26	Was there any trade off assumption?	Yes	Fairness
PD.27	Have you established a measurement or assessment mechanism for privacy impact?	Yes	Privacy & Security
PD.28	Has the data management approach been reviewed based on human-centric values and according to data regulations within the KSA?	Yes	Humanity

AI System Lifecycle Phase 2: Prepare Input Data

Phase	Question	Binding for Third-party	Principles
PID.1	Is there an established mechanism that fags issues related to data privacy or protection in the process of data collection and processing?	Yes	Privacy & Security
PID.2	Has the data been reviewed in terms of scope and categorization?	No	Privacy & Security
PID.3	Has the data been reviewed to check if personal data is evident within the dataset? Is there an established mechanism that allows the AI model to train without or with minimal use of personal or sensitive data?	No	Privacy & Security
PID.4	Is there an established mechanism that controls the usage of personal data (such as valid consent and the possibility to revoke, when applicable)?	Yes	Privacy & Security
PID.5	Are there processes to ensure that AI systems are secure and keep information safe, confidential, and private, as well as the integrity of the processed information even under hostile or adversarial conditions?	Yes	Privacy & Security
PID.6	Has the quality and source of the acquired data been assessed through set processes?	No	Privacy & Security
PID.7	Has there been an assessment on whether an analysis can be performed post training and testing the data?	No	Transparency & Explainability
PID.8	Has diversity and inclusion of the dataset at hand been considered or reviewed?	No	Fairness
PID.9	Is there an established mechanism that measures whether the integrity, quality, and accuracy of data collection and its sources have been evaluated and data is up to date?	No	Accountability & Responsibility
PID.10	Has an analysis process been developed for the proxies of the sensitive features?	Yes	Fairness
PID.11	Has the team evaluated the classification, processing, and access to data to ensure that it has been properly acquired?	Yes	Humanity

Phase	Question	Binding for Third-party	Principles
PID.12	Have the data and AI models been validated to include respect for human rights, values, and cultural preferences in the Kingdom of Saudi Arabia?	Yes	Humanity
PID.13	Did you classify the data using SDAIA recommendations? If you use other standards, please mention them.	Yes	Social & Environmental Benefits
PID.14	Are there appropriate procedures to measure the quality, accuracy, relevance, and credibility of a data sample when dealing with data sets for an AI model?	Yes	Reliability & Safety

AI System Lifecycle Phase 3: Build & Validate

Phase	Question	Binding for Third-party	Principles
BV.1	Has the behavior of the system been tested against unexpected situations and environments? Is there a defined fallback plan if the AI model encounters adversarial attacks or other unexpected situations? Have the fallback plans been tested and confirmed?	Yes	Reliability & Safety
BV.2	Are there defined processes that outline procedures to describe actions to be taken when an AI system fails in different contexts? Have the processes been tested?	Yes	Reliability & Safety
BV.3	Are there defined processes that outline procedures to describe when an AI system fails in different contexts? Have the processes been tested?	Yes	Reliability & Safety
BV.4	Is there an established mechanism of communication to assure the end-users of the system's reliability?	Yes	Reliability & Safety
BV.5	Are there clear and understandable definitions explaining why the outcomes of the AI system took a certain decision?	No	Transparency & Explainability
BV.6	Has the model been built in a simple and interpretable manner?	No	Transparency & Explainability

Phase	Question	Binding for Third-party	Principles
BV.5	Are there clear and understandable definitions explaining why the outcomes of the AI system took a certain decision?	No	Transparency & Explainability
BV.6	Has the model been built in a simple and interpretable manner?	No	Transparency & Explainability
BV.7	Has an examination of the AI model's interpretability been successfully completed a er the model's training?	No	Transparency & Explainability
BV.8	Has there been a research exercise done relating to the use of available technical tools to be able to improve the understanding of the data, model, and its performance?	No	Fairness
BV.9	Are there established processes and quantitative analysis to test and monitor for potential biases and the overall fairness of the system during the development of the system? Are there mechanisms in place to protect any individuals or groups who might be disproportionately affected by negative implications?	No	Fairness
BV.10	Are there any established mechanisms that assess whether the AI system encourages humans to develop attachment and empathy towards the system? Are there mechanisms that ensure that the AI systems' social interaction is simulated and that it has no capacity for "feelings"?	No	Social & Environmental Benefits
BV.11	Have the stakeholders approved the successful tests and validated rounds of user acceptance testing prior to the production of AI models?	Yes	Accountability & Responsibility
BV.12	Did you use any sensitive data/ attributes in the model? If so, justify the use of sensitive personal data attributes or their proxies?	Yes	Fairness
BV.13	Are there AI approaches and algorithms that allow and facilitate decision-making alignment with human rights and KSA's cultural values?	Yes	Humanity

AI System Lifecycle Phase 4: Deploy & Monitor

Phase	Question	Binding for Third-party	Principles
DM.1	In case of a chatbot or other communication systems, are the end-users aware that they are interacting with a non-human correspondent?	Yes	Accountability & Responsibility
DM.2	Has the team assessed the AI system's vulnerabilities to potential attacks, revelation of sensitive data, or breaking the confidentiality?	Yes	Privacy & Security
DM.3	Are there mechanisms to measure if the system is producing an unacceptable amount of inaccurate predictions?	No	Accountability & Responsibility
DM.4	Is there a set strategy in place to monitor and measure if the AI system is meeting the goals, purposes, and intended applications?	No	Reliability & Safety
DM.5	Are the persons who are accessing the data quali ed with the necessary competences to understand the details of data protection requirements?	No	Privacy & Security
DM.6	Are there mechanisms in place to assess the level of in uence the AI system may have on end-users' decision-making?	No	Transparency & Explainability
DM.7	Is there a process set in place, which is clear and explainable, to inform end-users of the reasons, criteria, and benefits behind the outcomes and results of the AI system? Are there clear steps of communication on how and to whom issues can be raised?	No	Transparency & Explainability
DM.8	Is there a process set in place to collect and consider the end-users' feedback and adopt it into to the system?	Yes	Transparency & Explainability
DM.9	Are there established processes and quantitative analysis to monitor biases and the overall fairness of the system during the deployment of the system?	Yes	Fairness
DM.10	In the case of variability, did you establish a measurement or assessment mechanism of the potential impact of such variability on fundamental rights?	No	Fairness

Phase	Question	Binding for Third-party	Principles
DM.11	Are there established mechanisms to ensure fairness in your AI systems?	No	Fairness
DM.12	Is the information about the AI system accessible to end-users of assistive technologies?	No	Fairness
DM.13	Are there established mechanisms to measure the social and environmental impact of the AI system's deployment and use?	Yes	Social & Environmental Benefits
DM.14	Are there established mechanisms to ensure the application of fundamental human rights?	Yes	Accountability & Responsibility
DM.15	Are there established processes for third parties or workers to report potential vulnerabilities, risks, or biases in the AI system?	Yes	Accountability & Responsibility
DM.16	Are there established mechanisms to demonstrate your compliance with the principles set out in this document?	No	Accountability & Responsibility
DM.17	Are there established mechanisms that allow for redress in case of the occurrence of any harm or adverse impact?	Yes	Accountability & Responsibility
DM.18	Are there established mechanisms that provide information to end-users/third parties about opportunities for redress?	Yes	Accountability & Responsibility
DM.19	Are there continuous monitoring techniques to ensure that the AI system maintains privacy and security?	Yes	Privacy & Security
DM.20	Are there periodic assessments of the deployed artificial intelligence systems to ensure the implementation of fundamental human rights and cultural values of the Kingdom?	Yes	Humanity

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Saudi Data & AI Authority

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