*<https://chatgpt.com/share/67f432de-2fe0-8005-9a9c-b95d8cdad73b>*

**Slide 1: Title Slide**

* **Title:** *Ethical Use of Big Data and AI Technologies*
* **Subtitle:** *Balancing Innovation with Responsibility*
* *(Presenter’s Name | Date | Organization)*

**Slide 2: Introduction**

* **Why It Matters:** In our digital society, Big Data and AI touch almost every aspect of life – from social media feeds to medical diagnoses. With great power comes great responsibility in how we use these technologies.
* **A Growing Concern:** Ethical challenges are mounting. *For example, 123 AI “incidents” (ethical controversies or harms) were recorded in 2023 alone – a 32% increase from the prior year*​[lexology.com](https://www.lexology.com/library/detail.aspx?g=ef6cec37-7f7b-49e9-a28c-5feb9f45df81#:~:text=LLMs%20may%20contain%20copyrighted%20material%2C,a%20twentyfold%20increase%20since%202013). Public trust is shaken when data and algorithms misbehave.
* **Objectives:** This talk will **(1)** identify key ethical challenges in Big Data and AI, and **(2)** explore frameworks and solutions for responsible innovation. *Consider the question:* **Can we harness data and AI for good without compromising our values?** – this will guide our discussion.

**Slide 3: Defining Big Data & AI**

* **Big Data:** Refers to extremely large and complex datasets (from sources like social media, sensors, transactions) that are difficult to process with traditional methods. Often characterized by high **Volume, Velocity, Variety** (and added Vs like Veracity & Value)​[techtarget.com](https://www.techtarget.com/searchdatamanagement/definition/5-Vs-of-big-data#:~:text=Earlier%20this%20century%2C%20big%20data,variability)​[buske.com](https://www.buske.com/what-is/big-data#:~:text=Big%20Data%20refers%20to%20extremely,particularly%20relating%20to%20human). The term gained prominence in the early 2000s as businesses struggled to derive insights from massive data floods.
* **Artificial Intelligence (AI):** The field of creating machines or software that *simulate human intelligence* – enabling computers to learn, reason, and make decisions​[spiceworks.com](https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-ai/#:~:text=,imitate%20or%20mimic%20human%20capabilities). Modern AI encompasses subfields like machine learning and deep neural networks. (Historically, the concept dates back to the 1950s, but recent computing power and data growth fueled rapid advances.)
* **Evolution & Synergy:** Big Data and AI evolved hand-in-hand. **Big Data provides the “fuel” (data) that AI algorithms require to learn**, while **AI provides tools to analyze and make sense of big data**​[qlik.com](https://www.qlik.com/us/augmented-analytics/big-data-ai#:~:text=Big%20data%20and%20AI%20have,making%20processes). *(Graphic: think of Big Data as the oil and AI as the engine – together driving innovation.)*

**Slide 4: Importance of Ethics in Big Data & AI**

* **Why Ethics?** Ethical use of Big Data and AI is critical because these technologies impact real people’s lives. Decisions automated by AI – from credit approvals to job screenings – carry consequences. Without ethics, we risk violating privacy, amplifying bias, or eroding trust in technology.
* **Societal Impacts:** Consider privacy invasions: *In the Cambridge Analytica scandal, a consulting firm harvested data from ~87 million Facebook users without consent for political targeting*​[pmc.ncbi.nlm.nih.gov](https://pmc.ncbi.nlm.nih.gov/articles/PMC6073073/#:~:text=The%20recent%20scandal%20surrounding%20Facebook,consent%20and%20none%20consented%20to). The public outcry underscored how big data misuse can threaten privacy and democracy. Another concern is biased decision-making: *Amazon famously had to scrap an AI hiring tool that learned to discriminate against women*​[reuters.com](https://www.reuters.com/article/world/insight-amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK0AG/#:~:text=In%20effect%2C%20Amazon%27s%20system%20taught,the%20names%20of%20the%20schools), showing how unchecked algorithms can unfairly impact careers.
* **Setting the Tone:** These dilemmas highlight the stakes. We must ask not just “**Can** we do this with data and AI?” but “**Should** we do this?” Ethical guidelines help ensure technology benefits society and respects individual rights, rather than causing harm or injustice.

**Slide 5: Key Ethical Issues**

* **Privacy:** Big Data often involves personal information. Ethical questions arise around consent, surveillance, and data protection. *Mass collection of user data – without transparency or permission – can violate privacy* (e.g., social media data sold for political profiling as seen in Cambridge Analytica)​[pmc.ncbi.nlm.nih.gov](https://pmc.ncbi.nlm.nih.gov/articles/PMC6073073/#:~:text=The%20recent%20scandal%20surrounding%20Facebook,consent%20and%20none%20consented%20to). GDPR and other laws now assert privacy as a fundamental right to be safeguarded.
* **Bias & Fairness:** AI systems can inherit or amplify biases present in their training data. This can lead to discrimination in high-stakes areas like hiring, lending, or criminal justice. *Example:* An algorithm used in U.S. courts (COMPAS) was found to falsely label Black defendants as high risk at nearly twice the rate of white defendants​[jeffreyfossett.com](https://jeffreyfossett.com/2020/02/20/compas-response.html#:~:text=particular%2C%20conditional%20on%20not%20recidivating%2C,Likewise) – a stark unfairness in outcomes. Ensuring **fairness** means actively checking and correcting bias to treat groups equitably.
* **Transparency:** Many AI models are “black boxes” – their internal logic is opaque. Lack of transparency makes it hard to understand or contest automated decisions. **Explainability** is key for trust: stakeholders should be able to know *why* an AI made a decision. *“Transparency of decision-making lifts the veil off black-box predictions,” building confidence that AI’s use is proper and ethical*​[lexology.com](https://www.lexology.com/library/detail.aspx?g=ef6cec37-7f7b-49e9-a28c-5feb9f45df81#:~:text=Fairness%20is%20best%20realised%20through,proper%2C%20genuine%2C%20and%20ethical%20purpose).
* **Accountability:** When something goes wrong – say, an algorithm causes harm – who is responsible? Developers, deployers, or the AI itself? Clear accountability mechanisms are lacking. There is growing demand to **hold AI systems and their creators accountable** for outcomes​[lexology.com](https://www.lexology.com/library/detail.aspx?g=ef6cec37-7f7b-49e9-a28c-5feb9f45df81#:~:text=There%20is%20a%20growing%20demand,criteria%20were%20used%20appropriately%20or). This means setting up oversight, audit trails, and the ability to question or appeal AI-driven decisions. Without accountability, victims of AI errors have little recourse.

**Slide 6: Ethical Frameworks & Guidelines**

* **Ethical Theories – Utilitarianism vs. Deontology:** These classic frameworks guide moral reasoning in tech. *Utilitarianism* focuses on outcomes – an action is ethical if it produces the greatest good for the greatest number. In AI, this might mean maximizing overall benefit (e.g., improving overall healthcare with data, even if there are some privacy trade-offs). *Deontology* focuses on duties/rights – some actions are wrong *in themselves* regardless of outcome. From this view, using personal data without consent is unethical even if it yields useful insights, because it violates individual rights. Balancing these perspectives helps in evaluating AI decisions (e.g., a utilitarian might favor broad data use for public safety, while a deontologist stresses privacy rights).
* **Laws & Regulations (External Guidelines):** Governments have begun codifying ethical principles into law. A prime example is the **EU’s General Data Protection Regulation (GDPR, 2018)**, which enforces *privacy by design and default*​[pmc.ncbi.nlm.nih.gov](https://pmc.ncbi.nlm.nih.gov/articles/PMC6073073/#:~:text=about%20data%20protection%2C%20consent%20and,step%20in%20the%20right%20direction). GDPR requires transparency about data use, user consent, and gives people rights over their data (like the right to be forgotten). Such regulations set clear boundaries (with hefty fines for violators) to steer companies toward ethical data practices. Another emerging legal framework is the proposed **EU AI Act**, which will classify AI systems by risk and impose requirements (e.g., strict rules for “high-risk” AI like facial recognition). These laws aim to prevent harm before it happens.
* **Industry Guidelines & Standards:** Beyond laws, professional organizations offer ethical guidance. **IEEE’s “Ethically Aligned Design” (2019)** and related standards (IEEE P7000 series) urge developers to embed ethics into AI from the start. This includes ensuring well-being, fairness, transparency, and *“data agency” (individuals’ control over their data)*​[paloaltonetworks.com](https://www.paloaltonetworks.com/cyberpedia/ieee-ethically-aligned-design#:~:text=The%20Ethically%20Aligned%20Design%20is,recommendations%20for%20their%20practical%20implementation)​[paloaltonetworks.com](https://www.paloaltonetworks.com/cyberpedia/ieee-ethically-aligned-design#:~:text=The%20EAD%20also%20places%20significant,and%20use%20in%20AI%20systems). Similarly, the **EU High-Level Expert Group’s Guidelines for Trustworthy AI (2019)** outline principles like human agency, fairness, and accountability, and the **OECD AI Principles (2019)** – endorsed by 40+ countries – emphasize inclusive growth, robustness, and accountability. *Visual aid:* A flowchart could illustrate how an AI project might be evaluated through an ethical lens (start with stakeholder rights, check compliance with laws, then align with principles like fairness and transparency at each decision point).
* **Brief Example – Applying a Framework:** Suppose a company wants to deploy an AI hiring tool. A **deontological check** might flag that the tool should not discriminate (hiring must respect equal rights). A **utilitarian check** asks if the tool improves hiring outcomes for the company without harming groups. GDPR provides legal checks: are candidates informed? Is their data handled properly? IEEE guidelines would encourage the company to audit the algorithm for bias and ensure explanations for its rankings. This combined approach (theory + guidelines) helps translate ethics into practical design choices.

**Slide 7: Best Practices for Ethical Implementation**

* **Data Anonymization & Privacy-by-Design:** Protecting personal data should be a default. Remove or obfuscate identifiers in big datasets (through anonymization or pseudonymization) so individuals can’t be re-identified. Limit data collection to what is truly needed (**data minimization**). Implement privacy safeguards from the start – *not* as an afterthought – in line with laws like GDPR. *By building privacy into systems, organizations respect user consent and reduce the risk of harmful exposure of sensitive information.*
* **Algorithmic Audits and Bias Testing:** Regularly **audit AI models and data** to uncover bias or errors​[brookings.edu](https://www.brookings.edu/articles/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/#:~:text=Operators%20of%20algorithms%20should%20regularly,audit%20for%20bias). This can involve statistical checks (e.g., comparing outcomes across demographics) and third-party reviews. *“Operators of algorithms should regularly audit for bias,”* as one Brookings report recommends, to catch problems early​[brookings.edu](https://www.brookings.edu/articles/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/#:~:text=Operators%20of%20algorithms%20should%20regularly,audit%20for%20bias). If a hiring algorithm, for instance, is disproportionately filtering out candidates of a certain gender or race, an audit should detect that so developers can adjust the model or data. Documentation (like *ethical impact assessments* or *bias statements*) can help maintain accountability.
* **Explainability & Transparency Tools:** Incorporate **explainable AI (XAI)** techniques so that decisions can be interpreted by humans. This might mean using simpler models where appropriate, or adding explanation modules that translate complex model outputs into understandable reasons (e.g., a loan AI might output: “rejected due to short credit history”). Providing users and stakeholders with clear explanations builds trust and allows for feedback. *Explanations can also serve as a debugging tool – they “expose information about specific decisions” and help* ***rectify errors*** *or unfair outcomes, increasing trust in the system*​[lexology.com](https://www.lexology.com/library/detail.aspx?g=ef6cec37-7f7b-49e9-a28c-5feb9f45df81#:~:text=There%20is%20a%20growing%20demand,criteria%20were%20used%20appropriately%20or). In sensitive applications, consider a “human-in-the-loop” approach, where AI provides a recommendation but a human decision-maker can review and override it, ensuring final accountability.
* **Ethical Governance & Accountability in Organizations:** Embed ethics into company culture and processes. Establish oversight bodies like **AI Ethics Committees** or **Data Ethics Boards** that include diverse stakeholders (not just engineers, but also legal, compliance, and representatives of affected groups). These bodies can review projects for ethical risks. Define clear responsibility: who signs off that an AI system is ethically sound? Assign “owners” for datasets and models to ensure continuous monitoring. Training programs can raise awareness among developers about biases and ethical coding practices. *A cross-functional, diverse team is more likely to foresee ethical blind spots and address them*​[brookings.edu](https://www.brookings.edu/articles/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/#:~:text=algorithm%20has%20no%20choice%20but,the%20data%20collected%20for%20the)​[brookings.edu](https://www.brookings.edu/articles/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/#:~:text=Operators%20of%20algorithms%20must%20rely,functional%20work%20teams%20and%20expertise). Also, engage external stakeholders – for example, consult with user advocacy groups or ethicists when deploying AI that affects the public. In short, **make ethics part of the AI development lifecycle** (from design to deployment and maintenance).

**Slide 8: Case Studies & Examples**

* **Data Privacy Violation – *Cambridge Analytica*** (2018): A now-infamous example where Big Data ethics went wrong. Cambridge Analytica, a political consulting firm, illicitly collected personal data from Facebook users on a massive scale (tens of millions) without their informed consent​[pmc.ncbi.nlm.nih.gov](https://pmc.ncbi.nlm.nih.gov/articles/PMC6073073/#:~:text=The%20recent%20scandal%20surrounding%20Facebook,consent%20and%20none%20consented%20to). This data was used to micro-target voters with political ads. **Outcome:** Public outrage and loss of trust in Facebook; Facebook faced legal repercussions (including a $5 billion FTC fine) and globally companies became much more serious about data consent and transparency. **Lesson:** Privacy and consent are paramount – just because data is accessible doesn’t mean it’s ethical to use. Organizations must obtain clear permission and ensure data is not repurposed in deceitful ways. This scandal also accelerated regulatory actions worldwide to rein in data abuse.
* **Algorithmic Bias – *COMPAS Recidivism Risk Tool***: COMPAS is an AI used in the U.S. justice system to predict the likelihood that a defendant will reoffend. In 2016, an investigative report by ProPublica revealed significant racial bias in COMPAS’s predictions. *Black defendants who did not re-offend were nearly twice as likely to be misclassified as high risk compared to white defendants (45% vs 23% false positive rate)*​[jeffreyfossett.com](https://jeffreyfossett.com/2020/02/20/compas-response.html#:~:text=particular%2C%20conditional%20on%20not%20recidivating%2C,Likewise). **Outcome:** This finding sparked intense debate about fairness and transparency in AI. Northpointe (the company behind COMPAS) disputed some claims, citing different definitions of “fairness,” which itself became a philosophical discussion – how do we define fairness in algorithms? The case led to calls for independent audits of criminal justice algorithms and influenced guidelines (e.g., some jurisdictions now demand bias testing for such tools). **Lesson:** Even well-intentioned algorithms can perpetuate inequality if trained on historical data reflecting societal biases. We must continuously test and refine AI for fairness, especially in high-impact domains like justice. It also showed the need for transparency – if ProPublica hadn’t analyzed the black-box model, the bias might have gone undiscovered.
* **Ethical Restraint in AI Deployment – *Facial Recognition Moratorium***: In 2020, amid rising concerns about racial bias and mass surveillance, several tech giants voluntarily halted or limited their facial recognition (FR) technology for law enforcement use. **IBM** announced it would stop offering general-purpose FR software, **Amazon** issued a one-year moratorium on police use of its “Rekognition” service, and **Microsoft** pledged not to sell FR to police until adequate laws are in place​[businessinsider.com](https://www.businessinsider.com/amazon-microsoft-ibm-halt-selling-facial-recognition-to-police-2020-6#:~:text=,Insider%27s%20homepage%20for%20more%20stories)​[businessinsider.com](https://www.businessinsider.com/amazon-microsoft-ibm-halt-selling-facial-recognition-to-police-2020-6#:~:text=Three%20of%20the%20world%27s%20biggest,ongoing%20protests%20against%20police%20brutality). This was unprecedented – companies stepping back from a lucrative technology because of ethical concerns (spurred in part by the Black Lives Matter movement and evidence that FR algorithms misidentify people of color at higher rates). **Outcome:** These moves pressured policymakers to consider regulations for facial recognition and highlighted the importance of racial justice in AI applications. It also showed a positive example of the tech industry engaging in self-regulation when there’s risk of harm. **Lesson:** Proactive ethical action is possible – companies can choose “not to do” something with AI if it conflicts with values or human rights. This case underscores the role of public advocacy and civil society in pushing for ethical tech (activist campaigns were key) and suggests that waiting for laws is not the only path – ethical leadership by organizations matters.

**Slide 9: Challenges & Future Directions**

* **Pace of Innovation vs. Lagging Regulation:** AI and big data technologies are evolving at break-neck speed, often outpacing the creation of laws and standards. *Innovation tends to outpace government regulation in emerging fields*​[ibm.com](https://www.ibm.com/think/topics/ai-ethics#:~:text=experience%20some%20of%20the%20consequences,human%20rights%20and%20civil%20liberties), which means we often rely on voluntary ethics in the interim. This gap is a challenge – without clear rules, some actors may push boundaries unethically, while others are unsure of the “right” standards to follow. Moving forward, more agile and adaptive policy-making is needed. Regulatory bodies are exploring new approaches (regulatory *sandboxes*, algorithm audits, etc.) to keep up, but it’s a constant race between tech advances and rule-setting.
* **Global Ethics Disparities:** Ethical norms and regulations vary widely across the globe. The EU might ban certain AI practices on privacy grounds, while another country encourages them for innovation’s sake. For instance, Europe’s strict data protection vs. looser approaches elsewhere, or differing cultural views on surveillance (consider China’s extensive use of facial recognition in public security). This **fragmentation** makes it hard to set universal ethical standards. However, there are efforts to bridge this gap: UNESCO’s **Recommendation on AI Ethics (2021)** was adopted by almost all member states as a first global framework, and the OECD principles have international support. Still, without broad agreement, there’s a risk of “ethics shopping” – companies moving to jurisdictions with fewer restrictions. *Ultimately, AI ethics must be* ***universally adopted*** *to be truly effective, creating trust for all users*​[zendata.dev](https://www.zendata.dev/post/ai-ethics-101" \l ":~:text=" \t "_blank). International collaboration (through the UN or other forums) will be crucial to address transnational issues like autonomous weapons or cross-border data flows.
* **Emerging Technologies – Generative AI:** The rise of generative AI (AI that creates content, such as text, images, deepfakes) presents new ethical questions. Models like GPT-4 can generate human-like text; while powerful, they can also produce misinformation, hateful speech, or plagiarized content. Deepfake algorithms can fabricate realistic videos – raising concerns about fraud and defamation. Intellectual property and ownership become cloudy when an AI trained on millions of artworks produces a new image in a similar style. *Already, observers note that generative AI outputs have included copyrighted material without permission​*[*lexology.com*](https://www.lexology.com/library/detail.aspx?g=ef6cec37-7f7b-49e9-a28c-5feb9f45df81#:~:text=LLMs%20may%20contain%20copyrighted%20material%2C,a%20twentyfold%20increase%20since%202013), posing legal and ethical challenges. We must develop norms around content disclosure (so users know when they’re seeing AI-generated media), policies for AI and intellectual property, and techniques to detect deepfakes. This is a fast-moving area – e.g., in 2023, there were instances of deepfake political videos going viral, prompting discussions on “authenticity labels” for AI content. Expect regulators and industry to focus heavily on generative AI ethics in the coming years to combat misuse (like disinformation campaigns) while harnessing the creative benefits responsibly.
* **Emerging Technologies – Autonomous Systems:** AI is increasingly giving machines the ability to act *autonomously* in the physical world – from self-driving cars to drones and weapons. This raises profound safety and ethical issues. With autonomous vehicles, a classic dilemma is the “trolley problem”: how should a car be programmed to act in an unavoidable accident – prioritize the driver’s safety or pedestrians? Society has to decide what ethical rules we imbue in these machines. Even more stark is the case of **lethal autonomous weapons** (“killer robots”): AI-powered systems that can select and engage targets without human intervention. Many argue that decisions over life and death should never be ceded to algorithms. In fact, there’s a growing global movement to ban such weapons – *in late 2024, an overwhelming majority of UN member states (166 countries) voted for a resolution to begin negotiating a treaty on autonomous weapons, citing the grave ethical and security risks of removing human control from the use of force*​[hrw.org](https://www.hrw.org/news/2024/12/05/killer-robots-un-vote-should-spur-treaty-negotiations#:~:text=On%20December%202%2C%202024%2C%20166,processing%20rather%20than%20human%20input). The future likely holds more debates on robot rights and AI personhood as well – for example, if an autonomous AI behaves illegally, can the AI itself be liable, or only its creators? Ensuring **safety, human oversight, and clear lines of responsibility** in all autonomous systems is a key challenge moving forward.
* **Call to Action – Ongoing Ethical Engagement:** The journey doesn’t end here. Ethical AI and Big Data use is not a one-time checkbox but a continuous commitment. All stakeholders have a role: governments must craft forward-looking policies and close the gap between tech and law; companies and researchers should commit to “do no harm” principles and be transparent about their practices; educators and institutions need to train the next generation of technologists in ethics as rigorously as in coding. *We as users and citizens should stay informed and demand accountability*. By participating in the dialogue – whether it’s asking how our data is used or supporting initiatives for ethical tech – we help steer innovation in a direction that aligns with human values. The future of AI is being written now; through collective vigilance and action, we can ensure it’s a future we all trust and benefit from.

**Slide 10: Conclusion**

* **Summary of Key Points:** We explored how Big Data and AI, powerful tools reshaping society, come with significant ethical responsibilities. We defined the technologies and saw that data and algorithms are deeply interlinked. We discussed major ethical pitfalls (privacy breaches, bias, opacity, lack of accountability) and examined frameworks – from philosophical theories to concrete regulations – that guide us in addressing these issues. Real-world examples, from Cambridge Analytica to biased algorithms, underscored that these are not theoretical concerns but present-day challenges. And we noted best practices and case studies that light the way forward, showing both cautionary tales and positive leadership.
* **The Imperative of Ethical Innovation:** A clear theme emerged: **ethics must keep pace with innovation**. If we charge ahead with Big Data and AI without ethical guardrails, we risk undermining the very benefits we seek – people will not trust, adopt, or allow technologies that harm or discriminate. Conversely, by embedding ethical principles into design and deployment, we *enhance* innovation – we create AI that is **trustworthy**, data practices that respect individuals, and outcomes that are fair. In short, doing the right thing is not just morally sound but also crucial for sustainable progress.
* **Final Thought – Balancing Promise and Responsibility:** Big Data and AI hold immense promise to improve lives: curing diseases, making services more efficient, uncovering insights to solve global problems. Realizing this promise requires that we also embrace the responsibility that comes with these tools. As we leave here, let’s remember that *technology doesn’t have values – people do*. It’s up to us – policymakers, professionals, and the public – to insist on and build **ethical AI**. By holding ourselves to high standards, we ensure that **innovation remains aligned with humanity’s core values**. *The goal is not to slow down progress, but to guide it so that in the quest for smarter machines and bigger data, we never lose sight of the human impact.*

*“Ethical technology is the only sustainable technology.”* By striving for this ideal, we can confidently harness Big Data and AI for the benefit of all.

**Slide 11: Q&A**

* **Questions & Discussion:** Thank you for your attention! Now, I invite your questions, thoughts, or examples. How do *you* think we can further balance innovation with responsibility in Big Data and AI? Let’s discuss.

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