

Master Of Real Estate Management

Prepared by
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Artificial Intelligence in Business

Lecture 10



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Chapter
07

Technological Singularity and Ethical Issues of AI
(Part 2)



Chapter

07

Learning Objectives

- ☐ Explain the ethical foundations of Artificial Intelligence (AI) and Artificial General Intelligence (AGI).
- ☐ Evaluate AI and AGI using major ethical theories, including consequentialism, deontology, and moral constructivism.
- ☐ Discuss the role of the Asilomar AI Principles in promoting responsible AI development and governance.
- ☐ Analyze the ethical challenges associated with the technological singularity and advanced AI systems.
- ☐ Apply AI ethics to business, real estate, smart buildings, smart cities, and AI governance.

As Artificial Intelligence (AI) advances toward Artificial General Intelligence (AGI), it raises important ethical, societal, and governance challenges. This chapter explores major ethical frameworks and responsible AI principles, and examines their applications in business, real estate, smart buildings, smart cities, and AI governance.

Chapter 07

6. Development and Conclusion

Bayesian reasoning explains how beliefs should be updated when new evidence appears.

Chapter
07**Thomas Bayes and Probability Updating**

- Bayes' work was published posthumously in 1763.
- His central question was how to judge the probability of an event given circumstances and limited information.
- Bayesian reasoning became important in statistical inference, decision theory, medicine, law, genetics, computing, and AI.
- The key idea is that belief should be updated when new evidence is obtained.
- This is highly relevant to AI systems that continuously learn from new data.

Business meaning

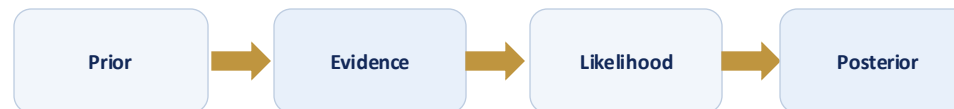
Managers should update strategic beliefs when new evidence appears, rather than relying on old assumptions.

Chapter
07**Bayes' Theorem: Core Idea**

- Bayes' theorem connects prior belief, evidence, and updated belief.
- The prior probability represents what is believed before new evidence.
- The likelihood represents how plausible the evidence is under a hypothesis.
- The posterior probability represents updated belief after evidence is observed.
- Bayesian reasoning helps quantify plausible reasoning.

Simple flow

Prior belief
Evidence
Likelihood
Updated belief



Chapter
07**Conditional Probability Can Be Counterintuitive**

- We will provide an example showing that conditional probability is often misunderstood.
- When people know one of two children is a girl, they may incorrectly assume the probability that the other is also a girl is one-half.
- With the relevant sample space, the answer is one-third.
- This illustrates that humans often reason poorly about conditional probability.
- AI and analytics can support better reasoning, but managers must understand the logic behind results.

Teaching note

Use this example to explain why intuition alone is not enough for AI governance or business analytics.

Chapter 07

Frequentist vs Bayesian Probability

- Frequentist statistics treats probability as the relative frequency of events.
- Bayesian statistics treats probability as a degree of belief based on available information.
- Frequentist approaches rely mainly on observed samples.
- Bayesian approaches combine observed evidence with prior information.
- Both are useful, but Bayesian reasoning is especially relevant when updating beliefs under uncertainty.

Business analogy

Property investment decisions
combine historical data with expert
prior knowledge about local markets.

Chapter 07

Inverse Probability

- Inverse probability recognizes that the probability of a cause given an effect is different from the probability of an effect given a cause.
- We give the example of pregnancy and womanhood to clarify this distinction.
- Bayes' theorem connects these different probabilities.
- This is important because business decisions often move from observed effects to possible causes.
- Misunderstanding inverse probability can lead to wrong conclusions.

Real estate example

If high prices are observed, the cause may be location, scarcity, speculation, amenities, or policy change—not one cause automatically.

Chapter
07**Plausibility Function**

- It explains plausibility using hypotheses and evidence.
- If evidence strongly fits one hypothesis but not another, that hypothesis becomes more credible.
- The example of observing metal and four wheels makes 'car' more plausible than 'donkey'.
- This shows how evidence can support one explanation more than alternatives.
- AI classification systems often work by comparing how well evidence fits possible categories.

Real estate example

Property features may make a listing more plausibly classified as luxury, affordable, commercial, or investment-grade.

Chapter 07

Normalizing Constant and Bayes' Rule

- Bayes' formula includes a normalizing constant that ensures probabilities sum properly.
- The theorem of total probability helps calculate the denominator in Bayes' rule.
- The posterior probability can be calculated using prior probability and plausibility.
- If prior probabilities are equal, posterior probabilities become proportional to plausibility.
- This logic underlies many classification and decision systems.

Study focus

Students do not need advanced mathematics here; they should understand that Bayesian AI updates belief using evidence.

Chapter
07**Bayesian Reasoning and AGI Probability**

- It applies plausible and Bayesian reasoning to the likelihood of AGI.
- Based on AI achievements and core characteristics of intelligence, the authors conclude that AGI has a high probability of becoming real.
- They suggest an 85% chance of AGI, while cautioning that the date cannot be established by a simple calculation.
- The argument is not a deterministic proof but a probabilistic evaluation.
- This illustrates how plausible reasoning is used to discuss uncertain technological futures.

Critical thinking

Students should evaluate assumptions behind probability claims rather than accept them uncritically.

Chapter 07

AI Achievements as Evidence

- The chapter cites achievements such as AlphaZero, AlphaGo, Deep Blue, DeepMind, theorem-proving systems, music-generation systems, game-playing systems, chatbots, and translators.
- These systems demonstrate capabilities related to learning, reasoning, creativity, disambiguation, and problem-solving.
- Each achievement is narrow but provides evidence of progress.
- The authors argue that many pieces are available, but integration into full AGI is still missing.
- This is compared to digital computers before Turing's universal machine.

Key analogy

Many separate AI successes exist; the challenge is integrating them into a general system.

Chapter
07**The Missing Basket Analogy**

- The idea is illustrated using the analogy that almost all the wickerwork is available, but the final touch needed to complete the basket is still missing
- This means many AI components exist but are not yet unified into AGI.
- Current AI systems solve specific problems extremely well.
- AGI would require integration across domains and capabilities.
- The analogy helps students understand why progress in narrow AI does not automatically mean AGI has arrived.

Real estate analogy

A firm may have CRM, valuation AI, chatbots, and IoT systems, but still lack an integrated intelligence platform.

Chapter 07

7. Ethical Issues

The discussion concludes with a fundamental ethical question: Are we doing the right thing, and are we doing it the right way?

Chapter 07

Ethics in AI Development

- Ethics refers to the principles that guide intended human behavior.
- It treats ethics from a scientific and pragmatic perspective in software and AI development.
- The practical ethical questions are: Are we doing the right thing? Are we doing things in the right way?
- AI ethics is not only philosophy; it affects business decisions, system design, user rights, and social outcomes.
- Ethical AI requires translating principles into governance, standards, audits, and everyday management.

Business meaning

Ethics must be built into AI strategy before deployment, not added after problems appear.

Chapter 07

Ethics vs Metaethics

- Ethics asks what is right, wrong, and what moral guidelines should govern behavior.
- Metaethics asks what it means to say something is right or wrong and why one ethical system should be adopted.
- An ethical statement may say that harming sentient beings is wrong.
- A metaethical statement may claim that ethical systems should improve the well-being of sentient beings.
- Understanding the difference helps students see why AI ethics is deeper than compliance checklists.

Study focus

Ethics = what should be done;
metaethics = why that standard
should guide action.

**Chapter
07****Hume and the Is–Ought Problem**

- Hume argued that philosophers often move suddenly from describing what is true to saying what should be true.
- What is the case does not automatically tell us what ought to be done.
- This is known as the is–ought problem.
- Scientific facts can inform moral decisions, but they cannot alone determine moral obligations.
- This matters in AI because technical capability does not automatically justify deployment.

AI example

The fact that AI can monitor employees does not mean organizations ought to monitor employees.

Chapter
07

Syllogism and Moral Reasoning

- A syllogism is used to demonstrate why it is difficult to derive what ought to be from what is.
- A valid syllogism requires the conclusion to follow logically from the premises.
- When a conclusion states what should be done, at least one premise usually must also contain a normative statement.
- Therefore, purely descriptive facts cannot by themselves produce moral obligations.
- AI ethics requires explicit values, not only technical evidence.

Chapter 07

Science and Morality

- Science can tell us how to achieve a goal, but it cannot decide the goal by itself.
- For example, science can help people live longer, but the value that people should live longer is a normative assumption.
- Scientific claims are testable and refutable; moral claims involve values and judgment.
- This does not mean ethics is irrational, but it means ethics requires more than empirical measurement.
- AI governance should combine evidence, values, law, human rights, and stakeholder dialogue.

Business implication

AI managers should not hide value choices behind technical language.

Chapter
07**Instrumental Rationality**

- Instrumental rationality asks: if a goal is chosen, what means should be used to achieve it?
- AI is extremely powerful for instrumental rationality because it optimizes tasks and processes.
- However, AI does not decide ultimate goals unless humans encode or delegate those goals.
- The ethical challenge is choosing goals responsibly.
- An AI system can efficiently pursue harmful goals if those goals are poorly chosen.

Real estate example

If the only goal is maximum rent, AI may recommend actions that harm affordability, fairness, or tenant well-being.

Chapter 07

Consequentialism

- Consequentialism argues that the morality of an action depends on its consequences.
- Utilitarian thinking often seeks the greatest good for the greatest number.
- In AI, consequentialism asks whether deployment produces beneficial outcomes overall.
- This can support AI applications that improve safety, health, efficiency, or accessibility.
- However, consequentialism may conflict with individual rights if harms to minorities are justified by majority benefits.

AI question

Should an AI system be allowed if it helps many users but harms a small group unfairly?

Chapter
07**Deontology**

- Deontology argues that actions can be right or wrong in themselves, regardless of consequences.
- It is associated with duties, rules, rights, and principles.
- The Golden Rule and Kant's categorical imperative are examples of duty-based moral thinking.
- In AI, deontology emphasizes human rights, privacy, dignity, fairness, and consent.
- Deontological principles may restrict AI applications even if they produce efficiency gains.

Real estate example

Tenant privacy should be respected even if intensive monitoring could optimize building operations.

Chapter
07**Consequentialism vs Deontology in AI**

- Consequentialism focuses on outcomes, benefits, and harms.
- Deontology focuses on rights, duties, and principles.
- AI ethics often requires balancing both perspectives.
- An AI system may produce efficient results but violate privacy or dignity.
- Responsible AI governance should consider both consequences and non-negotiable rights.

Ethics framework

Outcomes

Rights

Fairness

Governance

Outcomes**Rights****Fairness****Governance**

Chapter
07**Moral Constructivism**

- Moral constructivism argues that moral principles are constructed by human beings and societies.
- Ethical systems are not simply found in nature; they are built through human judgment and dialogue.
- This does not make ethics arbitrary because people can still debate and improve ethical systems.
- Moral constructivism helps explain why different societies or organizations may develop different AI ethics frameworks.
- AI ethics therefore requires inclusive discussion and shared principles.

Business meaning

Corporate AI ethics policies are human constructions and should be revised through learning, debate, and stakeholder feedback.

Chapter
07**Kantian and Humean Constructivism**

- Kantian constructivism suggests rational people should converge on similar moral frameworks if they reason clearly.
- Humean constructivism accepts that different people may construct different moral frameworks because values and passions differ.
- Historical evolution is presented as evidence supporting David Hume's view.
- Humans do not have objective external guidelines that automatically settle right and wrong.
- This makes AI ethics challenging because values can differ across cultures, sectors, and stakeholders.

Discussion prompt

Should global AI ethics be universal, culturally adaptable, or both?

Chapter
07**Implications for Traditional AI and AGI**

- If ethics is a human construction, AI systems must be designed around human-chosen values.
- Traditional AI can be governed through policies, audits, and design principles.
- AGI creates a deeper challenge because it may become autonomous and develop goals beyond initial human control.
- The discussion questions whether human-defined principles would be sufficient to control a fully developed AGI.
- This is why value alignment and human control are central AI safety concerns.

Business implication

Even narrow AI systems should be aligned with organizational values, stakeholder rights, and legal responsibilities.

Chapter 07

AI Ethical Principles

The Asilomar AI Principles provide ethical guidelines for responsible AI development and long-term AI safety.

Chapter 07

Security and Failure Transparency

- Security means AI systems should be safe throughout their operational life.
- Systems should be verifiable whenever possible and feasible.
- Failure transparency means that if an AI system causes harm, it should be possible to find out why.
- These principles require logging, testing, monitoring, and auditability.
- Without failure transparency, organizations cannot learn from harm or assign responsibility.

Real estate example

If an AI tenant screening system rejects applicants unfairly, the firm must be able to investigate why.

Chapter
07

Legal Transparency and Accountability

- Legal transparency requires that autonomous system interventions in decision-making be accompanied by satisfactory explanations.
- These explanations should be reviewable by competent human authorities.
- Accountability means developers and organizations are responsible for moral implications of AI use and abuse.
- Organizations cannot avoid responsibility by blaming the algorithm.
- Accountability requires governance, documentation, oversight, and clear decision ownership.

Business lesson

AI can recommend, but organizations remain accountable.

Chapter 07

Value Conformity and Human Values

- Value conformity means highly autonomous AI systems should be designed so their goals and behaviors comply with human values.
- AI systems should be compatible with human dignity, human rights, freedoms, and cultural diversity.
- Value alignment becomes more important as AI autonomy increases.
- Organizations should define values clearly before deploying AI.
- Human values should guide AI design, procurement, deployment, and evaluation.

Real estate application

Smart building AI should respect comfort, privacy, accessibility, safety, and dignity—not only cost reduction.

Chapter 07

Personal Privacy and Freedom

- People should be able to access, manage, and control data generated by them.
- AI systems can analyze large amounts of personal information, increasing privacy risk.
- AI applications should not unjustifiably restrict real or perceived personal freedom.
- Data protection and consent become central to responsible AI.
- Privacy must be considered in system design, not only legal compliance.

Smart city risk

Smart buildings and smart cities can collect occupancy, movement, energy use, and behavioral data.

Chapter
07

Shared Benefits and Shared Prosperity

- AI technologies should benefit and empower as many people as possible.
- Economic prosperity created by AI should be widely shared.
- These principles respond to concerns that AI benefits may concentrate among a few firms, countries, or social groups.
- Shared prosperity requires education, access, inclusion, and fair distribution of AI gains.
- Businesses should consider social value, not only private profit.

Real estate implication

AI-driven real estate innovation should not deepen housing exclusion or unequal access to urban services.

Chapter 07

Human Control and No Disruption

- Human beings should decide whether and how they delegate decisions to AI systems.
- AI systems should support previously chosen human goals.
- Control over advanced AI should respect and improve civil and social processes rather than undermine them.
- Human control requires meaningful oversight, not symbolic approval.
- Organizations should define which decisions may be automated and which require human authority.

Business example

AI may support property valuation, but final decisions involving people's rights should include human review.

Chapter
07

Arms Race and Precaution Regarding Capacity

- AI principles warn against arms races involving lethal autonomous weapons.
- They also warn against strong assumptions about upper limits of future AI capability.
- Because there is no consensus on future AI capacity, precaution is necessary.
- Organizations should avoid dismissing risks simply because they appear unlikely today.
- Precaution is especially important for systems with high autonomy, broad scale, or irreversible consequences.

Managerial lesson

Risk management should consider low-probability but high-impact outcomes.

Chapter 07

Recursive Self-Improvement and Common Good

- AI systems designed for recursive self-improvement or self-replication require strict security and control measures.
- Such systems may produce rapid quantitative or qualitative improvement.
- Superintelligence should be developed only for shared ethical ideals and the benefit of humanity as a whole.
- The chapter notes skepticism about whether these principles could control a completed AGI.
- Nevertheless, they provide important guidance for current AI governance.

Key warning

Recursive self-improvement is the central technical concern behind singularity risk.

Chapter 07

Applied Business and Real Estate Ethics

Advanced AI ethics becomes practical when applied to real organizations, smart cities, and property systems.

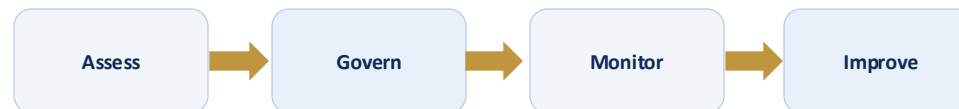
Chapter 07

Ethical AI in Business Management

- Businesses should integrate ethics into AI strategy from the beginning.
- Ethical AI protects trust, brand reputation, customer rights, and long-term sustainability.
- Managers should assess bias, transparency, privacy, security, accountability, and social impact.
- AI governance should be cross-functional, involving business leaders, data experts, legal teams, HR, and affected users.
- Responsible innovation means balancing efficiency, profitability, and human well-being.

Managerial checklist

Bias audit
Privacy review
Human oversight
Documentation
Stakeholder impact



Chapter
07**Ethical AI in Real Estate**

- AI in real estate may influence pricing, valuation, tenant screening, mortgage access, neighborhood investment, and urban services.
- Bias in AI models could reinforce social inequality or geographic discrimination.
- Smart buildings collect sensitive data about movement, occupancy, behavior, and comfort.
- Real estate firms should use transparent, fair, and privacy-protective AI systems.
- Ethical real estate AI requires human oversight, data quality, and clear explanation of important decisions.

Real estate risks

Tenant screening bias

Valuation bias

Privacy invasion

Automated exclusion

Chapter
07**Case Study: AI Tenant Screening**

- AI tenant screening systems can evaluate payment history, income, rental records, and risk indicators.
- Such systems may reduce administrative time and support consistency.
- However, biased or incomplete data may unfairly disadvantage certain applicants.
- Ethical implementation requires transparency, appeal mechanisms, data relevance, and human review.
- This case illustrates the tension between efficiency and fairness.

Discussion prompt

What information should not be used in tenant screening, even if it improves prediction?

**Chapter
07****Case Study: Smart Building Surveillance**

- Smart buildings may use AI cameras, access control, occupancy sensors, and behavioral analytics.
- These systems can improve safety, energy efficiency, and operational management.
- However, they may also create surveillance and privacy risks for tenants, employees, and visitors.
- Ethical design requires data minimization, clear consent, purpose limitation, and cybersecurity.
- Building intelligence should not become hidden behavioral control.

Real estate principle

Smart buildings should be intelligent, but also respectful of human privacy and dignity.

Chapter
07**Case Study: AI Property Valuation**

- AI valuation models can analyze transactions, locations, building characteristics, and market trends.
- They improve speed and scalability compared with purely manual processes.
- However, valuation models may reproduce historical market bias or fail in rapidly changing areas.
- Users may overtrust AI estimates if uncertainty is not communicated.
- Ethical valuation AI should provide confidence ranges, explanation, human review, and regular validation.

Managerial lesson

AI valuation is a decision-support tool, not an unquestionable truth.

**Chapter
07****Case Study: Smart Cities and Urban AI**

- Smart cities use AI for traffic, energy, security, public services, and urban planning.
- They can improve sustainability, efficiency, and quality of life.
- However, smart cities may increase surveillance, data concentration, inequality, and algorithmic governance risks.
- Real estate development is increasingly connected to smart city infrastructure.
- Ethical smart city planning requires citizen participation, transparency, privacy, and inclusive access.

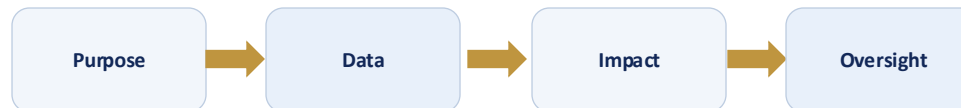
Real estate link

Smart city maturity can influence property values, investment attractiveness, and urban inequality.

Chapter 07

Responsible AI Governance Framework

- Define the purpose of the AI system clearly before deployment.
- Assess data sources for quality, bias, privacy, and representativeness.
- Evaluate the system's potential impact on customers, employees, communities, and vulnerable groups.
- Ensure explainability and human review for high-stakes decisions.
- Monitor model performance continuously and update governance as conditions change.



Practical framework

Purpose
Data
Impact
Explanation
Monitoring

Chapter
07**Managerial Recommendations**

- Do not treat AI ethics as only a legal or technical issue.
- Create an AI governance committee or cross-functional review process.
- Require documentation for high-impact AI decisions.
- Train managers and employees in AI literacy and digital ethics.
- Implement audit systems for bias, privacy, security, and performance.
- Use pilots before scaling AI systems into sensitive business processes.

Real estate recommendation

Use stronger governance for AI systems affecting housing access, tenant selection, pricing, and surveillance.

**Chapter
07****Chapter 7: Part 2 - Summary**

- ❑ Bayes' theorem and plausible reasoning enable AI systems to update beliefs and improve decision-making as new evidence becomes available.
- ❑ Probabilistic reasoning provides a practical foundation for addressing uncertainty and evaluating the likelihood of Artificial General Intelligence (AGI).
- ❑ Ethical AI requires careful consideration of ethics, metaethics, and moral reasoning to guide responsible AI development.
- ❑ Frameworks such as moral constructivism and the Asilomar AI Principles promote transparency, safety, fairness, and human-centered AI.
- ❑ The future of AI depends on combining advanced reasoning techniques with strong ethical governance to ensure AI systems benefit society while minimizing potential risks.

Chapter
07**Discussion Questions**

- ❖ Why is ethics important when discussing AI and AGI?
- ❖ How can consequentialism and deontology lead to different decisions about AI use?
- ❖ What does moral constructivism add to our understanding of ethical AI?
- ❖ How can the Asilomar AI Principles guide responsible AI development?
- ❖ What ethical risks may appear when AI is used in real estate, smart buildings, or smart cities?
- ❖ How should businesses and governments prepare for the ethical and governance challenges of advanced AI and AGI?





Thank You