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Data Science for Managerial Decisions (MB 511)

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References/Literature

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- MIS Management Perspective, D.P. Goyal, Macmillan Business Books.

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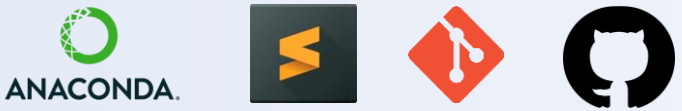
Online Resources

Software Resources



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Program Overview

- Introduction to Data Science
- Information Technology An Overview
- Applications of Data Science in various fields
- MIS and Control Systems
- Data Collection and Data Pre-Processing
- Building Information Systems
- Support Systems for Management Decisions

Information Technology An Overview

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- Foundations of Information Technology
- Information Systems and Management
- Project Management in IT
- Cybersecurity and IT Governance
- Future Trends in Information Technology

Information Technology An Overview

Emerging Technologies - Artificial Intelligence and Machine Learning

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Artificial Intelligence (AI) and Machine Learning (ML) are transformative technologies revolutionizing management practices. AI refers to the development of computer systems capable of performing tasks that typically require human intelligence, while ML enables systems to learn and improve from experience without explicit programming. In management, AI and ML streamline decision-making processes, analyze vast datasets to derive insights, and predict future trends. These technologies empower managers to make data-driven decisions, enhance operational efficiency, and optimize resource allocation. As businesses increasingly leverage AI and ML, understanding their applications becomes crucial for effective leadership in the rapidly evolving landscape of modern management.

Future Trends in AI & ML

- Explainable AI (XAI)
- Automated Machine Learning (AutoML)
- Quantum Machine Learning
- Federated Learning
- Neuromorphic Computing
- Edge AI
- Ethical AI
- Generative Models
- Transfer Learning
- Natural Language Processing (NLP) Advancements

Information Technology An Overview

Emerging Technologies - Internet of Things (IoT)

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The Internet of Things (IoT) plays a pivotal role in modern management by interconnecting devices, collecting real-time data, and facilitating informed decision-making. In management, IoT enhances efficiency by enabling remote monitoring, predictive maintenance, and data-driven insights. Through interconnected sensors and devices, organizations gain visibility into operations, optimize resource utilization, and improve overall productivity. IoT-driven data analytics empowers managers to make informed decisions, streamline workflows, and enhance customer experiences. Whether in manufacturing, logistics, or facility management, the integration of IoT fosters a more responsive and adaptive management approach, laying the foundation for a connected and intelligent business ecosystem.

Future Trends in IoT

- Next Generation Wireless Services (6G)
- Edge Computing
- AI and Machine Learning Integration
- Blockchain for Security
- Digital Twins
- IoT in Healthcare
- Smart Cities
- Energy Management
- IoT in Agriculture (AgTech)
- Human Augmentation

Information Technology An Overview

Emerging Technologies - Blockchain technology

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Blockchain technology is of paramount importance in modern management, providing a decentralized and secure framework for data transactions. Its tamper-resistant nature ensures the integrity of information, enhancing trust and transparency in various management processes. Smart contracts enable automated and self-executing agreements, streamlining operations and reducing the risk of fraud. In supply chain management, blockchain enhances traceability and accountability. Additionally, it facilitates efficient and cost-effective cross-border transactions. As a transformative tool, blockchain empowers management with a robust foundation for data governance, offering unprecedented security and efficiency in a wide array of industries.

Future Trends in Blockchain Technology

- Interoperability Protocols
- Scalability Solutions
- Smart Contracts Evolution
- Privacy and Confidentiality
- Sustainability Measures:
- Tokenization of Assets
- Decentralized Identity
- Oracles and Data Feeds
- Governance Models
- Cross-Industry Integration

Information Technology An Overview

Digital Transformation in Business

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Digital transformation in business is a strategic overhaul leveraging technology to reshape operations, enhance customer experiences, and stay competitive. It involves integrating digital technologies into all aspects of a business, fostering agility and efficiency. Cloud computing, data analytics, artificial intelligence, and automation are key drivers. This transformation not only optimizes internal processes but also creates innovative business models, reaching customers through digital channels. It's a paradigm shift that accelerates responsiveness, fosters innovation, and ensures sustained relevance in an increasingly digitalized marketplace, marking a pivotal evolution in how organizations operate and deliver value.

Information Technology An Overview

Digital Transformation – Case studies

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Notable digital transformation case studies across various industries

Amazon: E-Commerce Disruption

Transformation Focus: E-commerce and Cloud Computing

Details: Amazon's evolution from an online bookstore to a global e-commerce giant is a prime example. Its use of data analytics, machine learning, and cloud services has transformed the retail industry, setting new standards in customer experience, supply chain management, and logistics.

Netflix: Streaming Revolution

Transformation Focus: Media and Entertainment

Details: Netflix's transition from a DVD rental service to a global streaming platform is a digital transformation success story. Leveraging big data analytics, recommendation algorithms, and a cloud-based infrastructure, Netflix disrupted traditional television and changed how people consume content worldwide.

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Digital Transformation – Case studies

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Maersk: Blockchain in Supply Chain

Transformation Focus: Logistics and Shipping

Details: Maersk, a global shipping company, implemented blockchain to enhance transparency and efficiency in its supply chain. The solution, developed in collaboration with IBM, streamlined documentation processes, reducing delays, and preventing fraud.

Starbucks: Mobile Payment and Customer Engagement

Transformation Focus: Retail and Customer Experience

Details: Starbucks embraced digital transformation by integrating mobile payment solutions into its app. This not only simplified transactions but also allowed for personalized marketing and loyalty programs, significantly enhancing the overall customer experience.

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Digital Transformation – Case studies

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General Electric (GE): Industrial IoT

Transformation Focus: Industrial Manufacturing

Details: GE's digital transformation involved adopting Industrial Internet of Things (IIoT) technologies. By embedding sensors and connectivity in its industrial equipment, GE could monitor performance in real-time, optimize maintenance schedules, and enhance overall efficiency.

Walmart: Omnichannel Retail

Transformation Focus: Retail and E-commerce

Details: Walmart's digital transformation strategy involved integrating online and offline retail channels. Investments in e-commerce platforms, supply chain optimization, and in-store technology innovations have allowed Walmart to offer a seamless omnichannel experience to customers.

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Digital Transformation – Case studies

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DBS Bank: Digital Banking Transformation

Transformation Focus: Banking and Finance

Details: DBS Bank in Singapore embarked on a digital transformation journey to become a "digital bank." They introduced a cloud-first strategy, revamped their online and mobile banking platforms, and embraced data analytics to provide personalized and efficient financial services.

Airbnb: Peer-to-Peer Hospitality

Transformation Focus: Hospitality and Travel

Details: Airbnb disrupted the traditional hospitality industry by creating a platform that connects hosts with travelers. Leveraging digital technologies, Airbnb transformed the way people find accommodations, fostering a peer-to-peer sharing economy.

Information Technology An Overview

Digital Transformation – Case studies

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Delta Airlines: Predictive Maintenance

Transformation Focus: Aviation and Transportation

Details: Delta Airlines employed predictive maintenance powered by data analytics and IoT sensors. This approach allowed the airline to predict potential equipment failures, optimize maintenance schedules, and improve overall fleet reliability.

AstraZeneca: Data-Driven Drug Discovery

Transformation Focus: Healthcare and Pharmaceuticals

Details: AstraZeneca implemented digital technologies, including artificial intelligence and machine learning, to enhance drug discovery and development processes. This data-driven approach accelerates research, identifies potential drug candidates more efficiently, and reduces time to market.

Information Technology An Overview

Digital Transformation – Frameworks

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- McKinsey 7S Framework
- Prosci ADKAR Model
- Kotter's 8-Step Change Model
- TOGAF (The Open Group Architecture Framework)
- Digital Capability Framework (DCF)
- ITIL (Information Technology Infrastructure Library)
- NIST Cybersecurity Framework
- Six Ds of Exponentials (by Peter Diamandis)
- Gartner's Pace-Layered Application Strategy
- IDC's 3rd Platform Model
- Agile Transformation Framework

MIS and Control Systems

- Introduction to MIS and Control Systems
- Design and Implementation of MIS
- Control Systems in Action
- Challenges and Future Trends

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MIS and Control Systems

Introduction to MIS and Control Systems

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Definition

- MIS, or Management Information System, is a crucial element in contemporary organizational structures. It refers to a system that collects, processes, stores, and disseminates information to support decision-making and control within an organization. MIS integrates people, processes, and technology to provide managers with relevant information for efficient planning, coordination, and control of business operations.

- Key components
  - Key components of MIS include data collection, processing, storage, and retrieval. It often involves the use of specialized software and hardware systems to analyze and present information in a format that aids managerial decision-making. MIS encompasses various sub-systems, such as decision support systems, executive information systems, and transaction processing systems.

MIS and Control Systems

Introduction to MIS and Control Systems

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Objectives

- The primary objectives of MIS are to enhance organizational efficiency, facilitate informed decision-making, support strategic planning, and improve overall communication within an organization. In the modern business landscape, where information is a valuable asset, a well-implemented MIS can provide a competitive advantage by ensuring timely and accurate information is available to the right people at the right time.

Designing an MIS

Quiz and Assignment

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Dear Class your first quiz and assignment will be due as per following schedule.

- Quiz February 25, 2024 (1:30 PM – 02:00 PM) – Link will be shared before the Quiz
- Assignment February 25, 2024 (1200 AM) - March 2, 2024 (1159 PM) - Link

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Have a question?

Feel Free to Reach out at

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