AI IN DATA ANALYSIS: SHIFTING WORKLOADS AND EVOLVING ROLES

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Class Name: Introduction to Research

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RESEARCH QUESTION

Exploring the impact of AI data pre-processing tools and techniques on the workload distribution and job responsibilities of data analysts.

BACKGROUND INFO:

- AI has become one of the most prominent topics globally, transforming industries with its efficiency.
- Data analytics is significantly impacted by AI, automating complex processes, enhancing data interpretation, and enabling data-driven decisions.
- Data preprocessing, traditionally a time-consuming task, is being revolutionized by AI.

MOTIVATION

- Data Science and AI are prominent topics in the tech industry
- Exploration of career options in Data Science as a Computer Science undergraduate
- Curios about AI's impact on the data analyst role.
- Recognition of AI as a transformative force across professions.
- Aim to educate readers on how AI is revolutionizing job functions.
- Focus on data analysts to highlight how AI is redefining job functions and skill requirements.
- Importance of understanding these changes for both current and future professionals

METHODOLOGY

Table 1. Methodology for Analyzing the Impact of AI on Data Analysts' Jobs

Method	Description
Qualitative Analysis	- Collected information from articles found on Google and Google Scholar. - Used keywords such as "artificial intelligence," "data preprocessing," and "data analyst." - Thorough examination of articles to identify patterns in claims related to the impact of AI preprocessing tools on data analysts' jobs. - Formulated claims based on identified patterns and addressed the limitations of using AI in data analysts' roles. - Additional research conducted on limitations using keywords such as "limitations," "AI," and "data analyst."
Quantitative Analysis	- Searched for numerical datasets and graphs online to provide evidence for claims. - Focused on data sets related to the time spent on preprocessing tasks before and after AI implementation. - Sourced statistics from Pragmatic Institute and Microsourcing.com to illustrate the percentage of time data analysts spend on various tasks, including data preprocessing. - Demonstrated how the percentages of time spent on preprocessing tasks are expected to change with AI integration.

RESULTS

- AI-Driven Shift: AI tools like TensorFlow and Azure ML have reduced the time data analysts spend on preprocessing tasks, allowing them to focus more on analysis and providing valuable insights.
- Evolving Skillsets: Data analysts now need to have knowledge in AI and ML principles in addition to their technical skills in data management and analytics, along with strong strategic and critical thinking abilities.
- Human Supervision Required: Despite AI's efficiency in data preprocessing, it still has limitations, such as generating incorrect results, requiring multiple prompts, and needing human oversight to validate outcomes.
- Balance Between Automation and Human Expertise: While AI automates many tasks, human input remains crucial for managing expertise, stakeholder interactions, and addressing ethical concerns, ensuring that automated tools are balanced with human insights.

Table 4. Evolving Roles and Skills of Data Analysts with AI Integration

Aspect	Pre-AI Integration	Post-AI Integration
Primary Responsibilities	Data Collection, Cleaning, and Preprocessing	Data Interpretation, Contextual Analysis, and Strategic Insights
Technical Skills	Proficiency in Data Cleaning Tools, Basic Statistical Analysis	Advanced Data Analytics, Machine Learning Fundamentals, AI Tool Integration
Soft Skills	Analytical Thinking, Problem Solving	Strategic Thinking, Critical Evaluation of AI Outputs, Communication with Stakeholders
Tools Used	Excel, SQL, Basic ETL Tools	Advanced AI Tools, Data Visualization Platforms, Cloud-Based Solutions
Training and Education	Basic Data Science Courses, On-the-Job Training	Advanced Courses in AI and Machine Learning, Continuous Learning and Upskilling

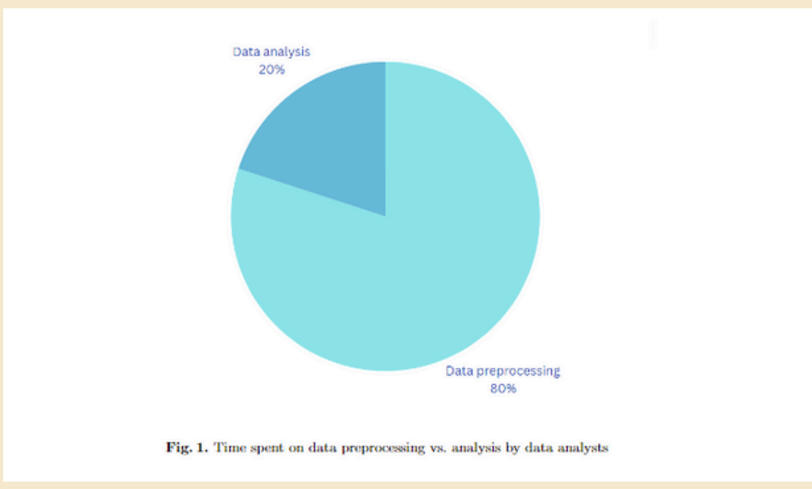

Fig. 1. Time spent on data preprocessing vs. analysis by data analysts

Table 2. Limitations of Using AI for Data Preprocessing Tasks

Limitation	Description
Need for Human Supervision	AI requires human analysts to validate outputs, as AI-generated results can be incorrect or misleading.
Multiple Prompting	Analysts must often prompt AI multiple times to get accurate results, indicating the need for precise and iterative communication.
Accuracy and Reliability	AI can generate wrong outputs, necessitating human oversight to ensure data accuracy and reliability.
Complex Instructions	AI may struggle with complex instructions and require detailed and specific prompting to understand tasks properly.