

MANUAL VS AI-ASSISTED APPROACH

RESEARCH GAP IDENTIFICATION OF BITCOIN
PRICE PREDICTION USING MACHINE LEARNING

ITS 4202 Emerging Technologies

Faculty of Technology, University of Sri Jayewardenepura



GROUP MEMBERS

Group - 07

- ✓ G.S. Chamika (ICT/20/818)
- ✓ Y.N.S. Dissanayake (ICT/20/837)
- ✓ B.G.D.T.T. Jeerasinghe (ICT/20/863)
- ✓ S.A. Dilanka Sandeepa (ICT/20/926)



TABLE OF CONTENTS

- ✓ Introduction
- ✓ Overview of Research Papers
- ✓ Manual Analysis Approach
- ✓ AI-Assisted Approach
- ✓ Comparison - Manual vs AI-Assisted Approach
- ✓ Conclusion
- ✓ Recommendation



INTRODUCTION

- Bitcoin is a highly volatile cryptocurrency with growing global investment interest.
- Accurate price prediction helps investors make informed decisions in a dynamic market.
- This study explores two strategies for identifying research gaps in Bitcoin price prediction journal papers:
 - ✓ **Manual Analysis:** Human-driven review of research papers.
 - ✓ **AI-Assisted Analysis:** ChatGPT and DeepSeek to automate analysis.
- The aim is to evaluate the effectiveness, accuracy, and efficiency of both methods in extracting key insights and proposing future research directions.



OVERVIEW OF RESEARCH PAPERS

Paper 1: Bitcoin price prediction using machine learning: An approach to sample dimension engineering

Explores how different sample dimensions and feature sets affect prediction performance. Finds that simple statistical models outperform complex ML models for daily prices, while advanced models like LSTM excel in high-frequency prediction.

Paper 2: Prediction of Bitcoin Price Using Bi-LSTM Network

Uses a Bidirectional LSTM model to predict daily Bitcoin prices based on minute-level data. Achieves a Mean Absolute Percentage Error (MAPE) of 13%, showing Bi-LSTM's effectiveness for time series forecasting.

Paper 3: Bitcoin Price Prediction Using Machine Learning and Deep Learning Algorithm

Compares various ML and DL models, including LSTM, GRU, and ARIMA. Concludes that ARIMA performs best for short-term forecasting, with the lowest prediction error among tested models.

MANUAL ANALYSIS APPROACH

Process

- ✓ Team members read and summarized each research paper independently.
- ✓ Extracted objectives, methodology, findings, limitations, and research gaps.
- ✓ Notes were discussed and structured into comparison tables manually.

Key Characteristics:

- ✓ Human Interpretation: Rich understanding based on context and experience.
- ✓ Time-Intensive: Requires extensive reading, note-taking, and collaboration.
- ✓ Flexible Structure: Enables tailored summaries for each paper.



MANUAL ANALYSIS APPROACH CONT...

Key Strengths:

- ✓ Deep contextual understanding and critical reasoning.
- ✓ Better at identifying real-world implications and hidden insights.
- ✓ Helps find gaps between fields and spot new ideas.

Challenges:

- ✓ Inconsistent style and detail level across team members.
- ✓ Prone to subjective bias and overlooking certain patterns.
- ✓ Requires more time and effort for accurate synthesis.



AI-ASSISTED APPROACH

Process

- ✓ Used ChatGPT and DeepSeek with structured prompts for analysis
- ✓ AI-generated summaries, research gap identifications, and comparisons

Key Characteristics:

- ✓ Automated Insight Extraction: Fast processing of text and datasets.
- ✓ Comparative Focus: Highlights similarities/differences across studies.
- ✓ Prompt-Driven: Quality of output depends on input prompt structure.



AI-ASSISTED APPROACH CONT...

Key Strengths:

- ✓ High consistency and speed in generating structured summaries.
- ✓ Efficient in identifying recurring patterns, gaps, and contradictions.
- ✓ Great for rapid literature review and tabular comparisons.

Challenges:

- ✓ Lacks domain-specific depth or human critical thinking.
- ✓ May overlook implicit or contextual information.
- ✓ Accuracy depends heavily on prompt clarity and AI limitations.



COMPARISON - MANUAL VS AI-ASSISTED APPROACH

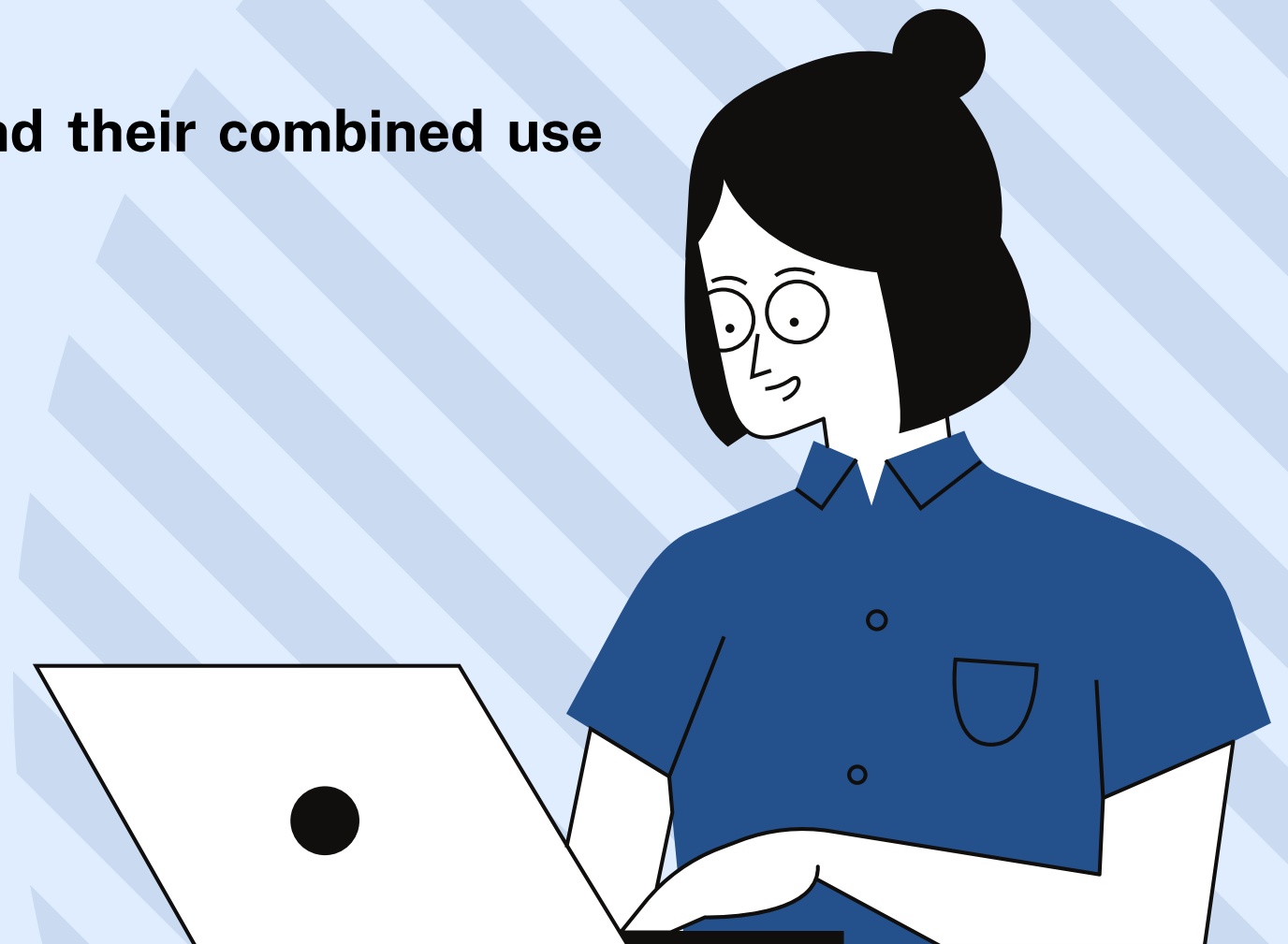
Aspect	Manual Approach	AI-Assisted Approach
Structure & Readability	Straightforward summaries but in different formats	Highly structured output (tables, bullet points)
Depth vs. Breadth	Deeper contextual insights on individual papers	Broad coverage; may miss nuanced insights
Time & Resource Use	More time-consuming (requires reading, discussion)	Fast and efficient once prompt is prepared
Critical Thinking	High-human judgment applied to real-world relevance	Lacks genuine reasoning; depends on training data

COMPARISON - MANUAL VS AI-ASSISTED APPROACH CONT...

Aspect	Manual Approach	AI-Assisted Approach
Identification of Research Gaps	Highlights missing points (e.g., real-time data, external factors)	Consistently identifies common and technical gaps. Depending on trained data
Consistency	Varies with team members' interpretation	Outputs are uniform and standardized
Bias & Errors	Prone to human bias or oversight	Outputs are uniform and standardized
Overall Outcome	Rich, detailed understanding but slow	Fast and structured but needs human validation

CONCLUSION

- ✓ Both strategies effectively identified research gaps in Bitcoin price prediction studies
- ✓ Manual analysis provided deeper, context-rich insights but was time-consuming and prone to inconsistency
- ✓ The AI-assisted analysis was fast, consistent, and well-structured but dependent on prompt quality and lacked contextual judgment.
- ✓ Overall, each method has unique strengths and limitations, and their combined use can yield the most comprehensive results.



RECOMMENDATIONS

- ✓ **Hybrid Approach:** Use AI tools for initial literature analysis, then refine insights through manual expert review.
- ✓ **Prompt Optimization:** Design clear and structured prompts to guide AI tools for more accurate outputs.
- ✓ **Validation Framework:** Combine AI-generated gaps with expert validation to ensure practical and research relevance.



THANK YOU

