The Speaker Brief

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Using AI for Rapid Classification

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Presentation Outline

01

Introduction

IRCD AI automates IRB review, improving efficiency at NCKUH.

02

Methods

NLP and BERT optimize IRB case classification and explainability.

03

Data Analysis

Improved preprocessing and parameters raised classification accuracy above 90%.

04

Results

IRCD AI achieved 85% accuracy, boosting review efficiency.

05

Conclusions

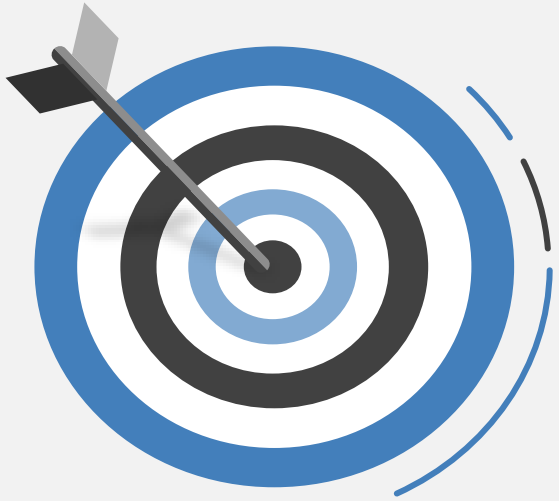
IRCD AI reduced review time, improving IRB process efficiency.

06

Future Perspectives

IRCD AI expands to further enhance IRB ethical reviews.

Introduction:

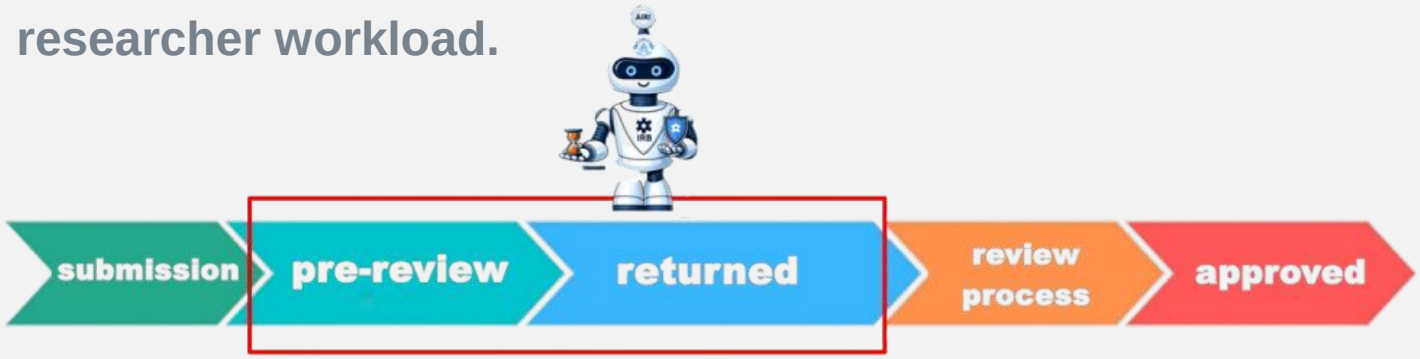


PROBLEM:

NCKUH's online IRB system aims to streamline reviews but faces delays due to frequent revisions, extending initial review process time beyond 10 days.

SOLUTION:

This study develops the Initial Review Category Determination Artificial Intelligence (IRCD AI), an explainable model for automating case categorization, improving initial review process efficiency, and reducing staff and researcher workload.



Initial review process

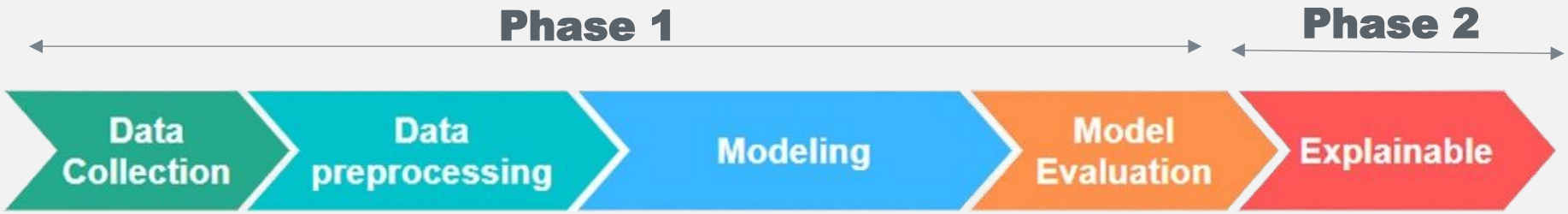
Methods

Phase 1: Data Preprocessing and NLP Techniques

Applied *Natural language processing* (NLP) and *Bidirectional Encoder Representations from Transformers* (BERT) models to convert unstructured review data into structured datasets, extracting key factors. Fine-tuned BERT for the IRB domain to improve accuracy.

Phase 2: Deep Learning and Interpretability Analysis

Implemented the BERTopic model, combining transformer architecture with topic modeling to categorize long texts. Used Llama 3 to generate explainable IRB outputs, ensuring ethical compliance.



Data Analysis

Initial Data Processing Results:

- Initial iteration revealed that irrelevant data impaired model performance. Model accuracy improved significantly after implementing character limits and streamlining key feature selection (Sample Size: 3,000).
- Subsequent iteration achieved over 90% accuracy through enhanced training dataset diversity and optimized model parameters via random sampling methodology (Sample Size: 1,000)."

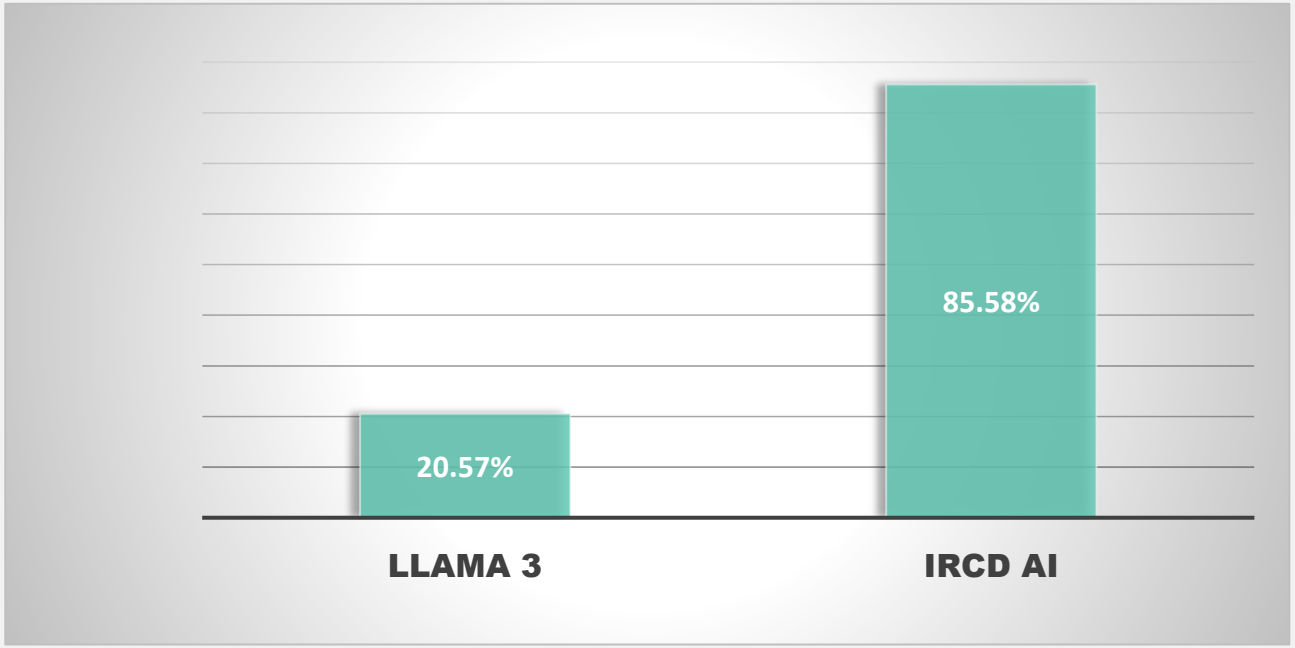
	Text Accuracy	Precision	Recall	F1 Score
FOLD 1	90.75%	87.86%	86.01%	86.93%
FOLD 2	90.73%	88.32%	85.21%	86.77%
FOLD 3	89.72%	91.06%	78.87%	84.75%

Dataset Validation Performance

Efficiency Gains:

- Implementation of IRCD AI system reduced the proportion of administrative processing delays (>10 days) from 39.58% to 29.89%(Sample Size: 300).

Result 1



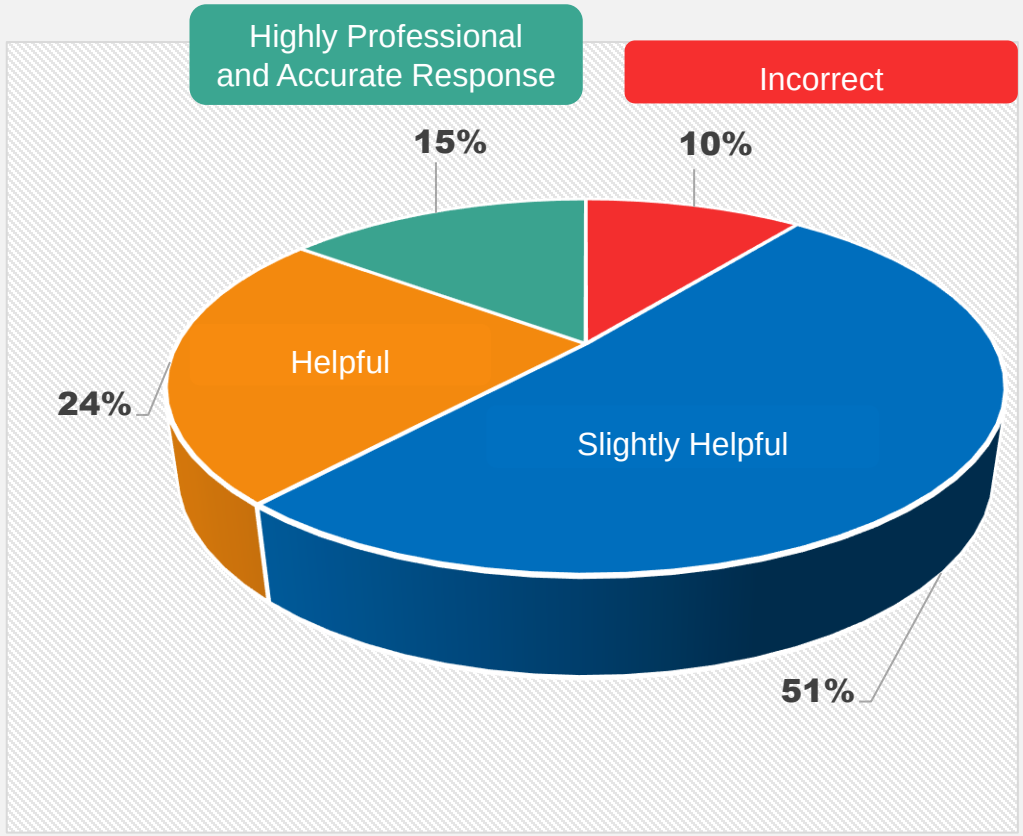
Comparative Analysis of Prediction Accuracy: Traditional AI Models versus Llama-3 Large Language Model (Sample Size: 1,200 Cases, March 2023 - September 2024)

IRCD AI Performance

The IRCD AI demonstrated an accuracy rate of over 85%, significantly outperforming the general-purpose language model Llama 3, which only achieved about 20%.

Result 2

User Feedback: 90% of users found IRCD AI helpful for faster case submissions.



90%

Conclusions and Future Perspectives

Conclusions

Summary:
IRCD AI successfully optimizes the IRB review process with automated case classification methodology..

Practical Value:
AI enhances ethics review efficiency and workflow management.

Future Perspectives

Future Applications:
IRCD AI extends capabilities to identify issues and process amendments beyond case sorting.

Future Outlook:
AI technology enhances ethical review quality to strengthen medical research protection.

THANKS

Any questions?

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