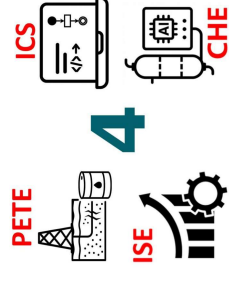


# Automatic Classification of Drilling Particles Using AI and Data-Driven Techniques

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## Problem Statement

Real-time drilling lacks a fast and reliable method for cuttings classification. Manual analysis is slow, subjective, and affected by mud conditions, leading to inaccurate results and delayed decisions.

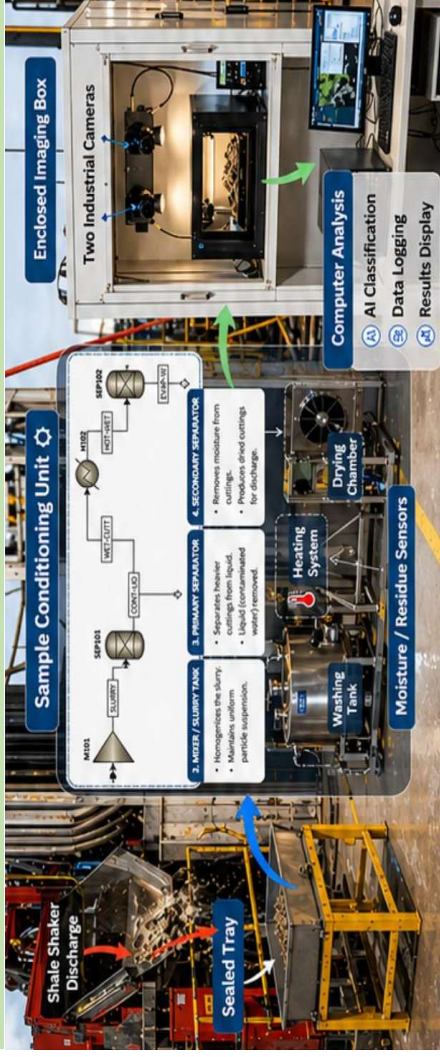
## Objective

Develop an AI system for faster, more accurate lithology classification to improve drilling decisions while reducing time, cost, and errors.

## Novelty/uniqueness

This project reimagines drilling cuttings analysis as a real-time, field-ready intelligence system instead of a delayed manual task. By integrating sample conditioning, enclosed imaging, and lightweight AI classification it provides faster lithology identification using a standard PC without requiring a GPU. Its uniqueness lies in combining practical deployment with well-log validation, reducing subjectivity, time decision delays in drilling operations.

## Prototype Design



## Constraints / Specifications

### Constraints

- Web-based with on-site prototype
- Must run on a PC (8GB RAM, 100GB HDD)
- High system availability & uptime (99.9%)
- Must be compatible with well logs

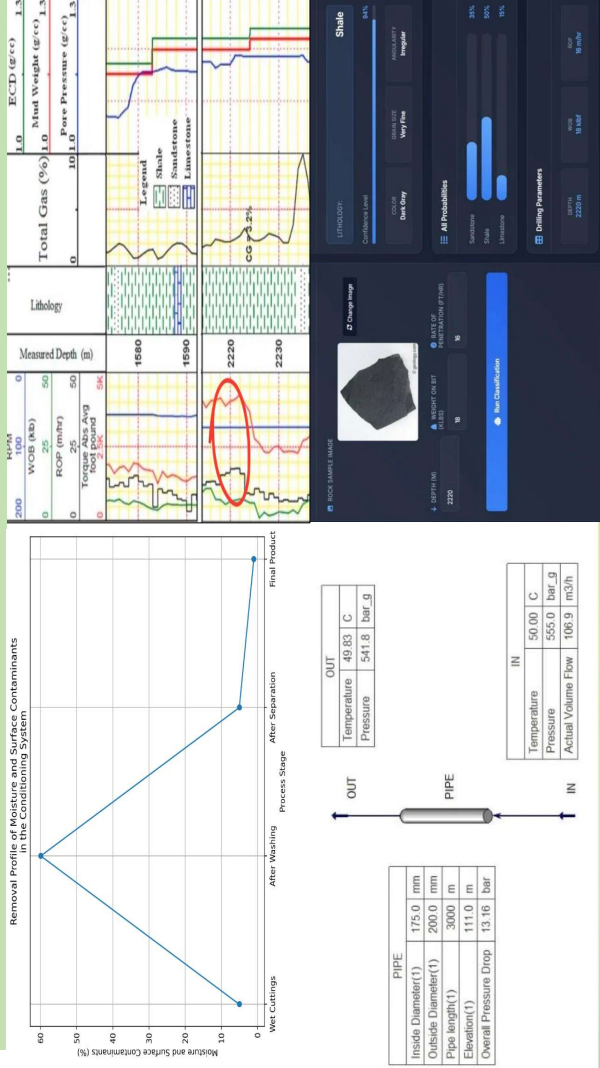
### Specifications

- Report generated in 15 sec. 20000+ images per hour
- Supports 1000+ types of cuttings
- 80% accuracy & 95% log match
- Supports 100+ types of cuttings
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### Integrated Specifications

- Modular & scalable
- Easy to maintain
- Intuitive & user-friendly

## Testing / Validation



## Conclusion

This project was validated through simulations and data analysis. It confirms the system's reliability and effectiveness. The project delivers a practical, scalable, and field-deployable approach that enhances decision-making in drilling operations.

