Introduction

- Antimicrobial resistance, or AMR, is what we call the development of antibiotic immunity in microbes and pathogens, and has quickly become one of the greatest threats to global health
  - The GRAM Study, published in the Lancet in 2022, predicts nearly 40 million AMR deaths by 2050
- ML is a form of AI that allows computers to learn otherwise obscure patterns and trends in data
  - We could potentially leverage this to create a clinical tool for optimizing treatments and unveiling key insights about AMR onset

Meropenem

(1 of several antibiotics tested)

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Model Performance:
Accuracy: 0.966327329678935
Precision: 0.9411713457703018
Recall: 0.966327329678935
F1 Score: 0.9532520004441043
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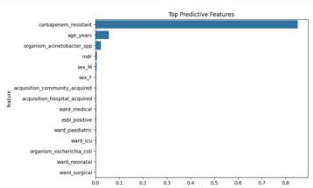
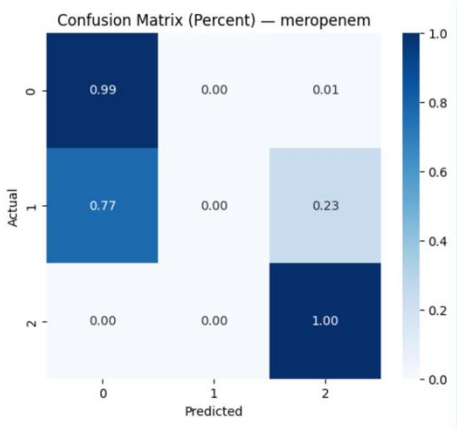
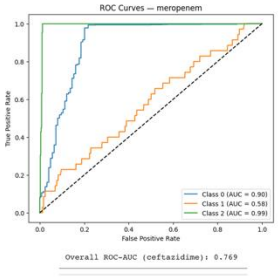
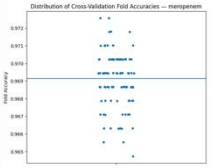
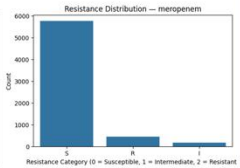






Overall ROC-AUC (ceftazidime): 0.769





Methodology/Steps

- 1. Data collection
- 2. Cleaning/Curation
- 3. Feature Selection
- 4. Data Encoding
- 5. Build Random Forest
- 6. Model Comparison
- 7. Hyper-Parameter/Threshold Tuning
- 8. Model Evaluation

Conclusion (Application, limitations, expansion)

- The developed model:
  - Successfully predicts AMR to a high degree of accuracy
    - This can be used in a clinical setting
      - Patients will receive more effective treatment
  - Revealed trends and biomarkers for AMR
    - Mapped certain antibiotics to specific characteristics
      - Provides key insight
      - Baseline for future research
  - Will help to slow overall mitigation of AMR onset
- This could contribute to saving millions of lives