

AI-DRIVEN MALARIA OUTBREAK PREDICTION

ADVANCING UN SDG 3: GOOD HEALTH AND WELL-BEING

Compiled By: Mike, Violet, Lukhanyo & Tshimo

Presentation outline

02

- Problem
- Solution
- Data & Approach
- Model Workflow Visual
- Key Results
- Impact & Benefits
- Ethical & Social Considerations
- How to Access & Run
- Team & Contact
- Conclusion

03

The Challenge (SDG 3 Context)

Malaria remains a major health challenge globally

Problem 1

Hundreds of thousands of deaths annually, mostly in vulnerable regions

Problem 2

Early detection critical to effective intervention and resource allocation

Problem 3

Lack of predictive tools using climate and health data to forecast outbreaks

Our Solution

AI-Powered Early Malaria Outbreak Prediction Model



Solution 1

Utilizes climate (temperature, rainfall, humidity) and disease data

Solution 2

Applies supervised machine learning (Random Forest) to predict outbreak risk

Solution 3

Enables timely, targeted public health responses

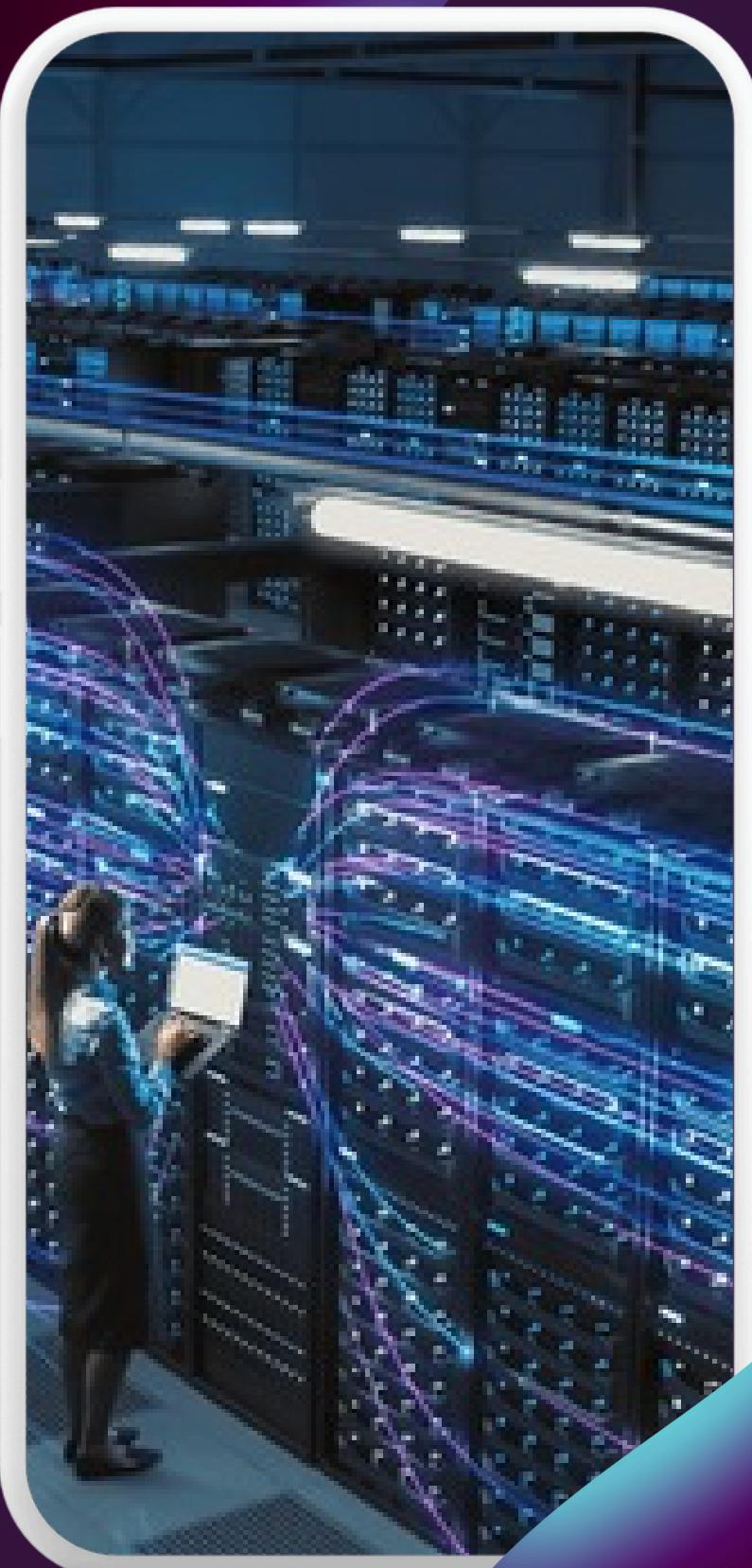
Data & Approach

Data Source: Open-source climate_disease.csv dataset

Features: Climate variables + historical malaria cases

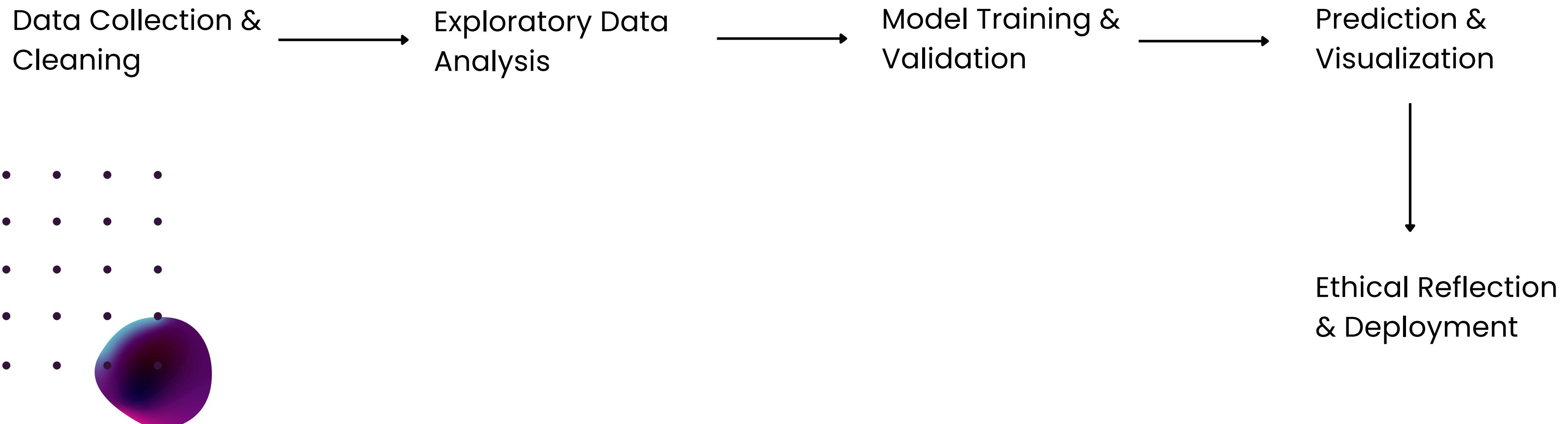
Machine Learning:

- Random Forest Classifier for binary classification (outbreak/no outbreak)
- Training with rigorous data cleaning, normalization, and EDA
- Evaluation metrics: Accuracy, Precision, Recall, F1-score



06

Model Workflow Visual



Key Results

- Top Predictive Features: Temperature, Rainfall, Humidity, Previous Case Counts
- Visualization Samples:
 - Feature Importance Plot
 - Correlation Heatmap
 - Regional Malaria Case Distribution Map





Impact & Benefits

- Enables early warning for malaria outbreaks
- Supports efficient resource allocation (medicines, personnel, awareness campaigns)
- Helps reduce disease burden and improve community health
- Aligns with SDG 3 targets on ending epidemics of communicable diseases

Ethical & Social Considerations

01

Data bias concerns: underreporting in remote areas may affect predictions

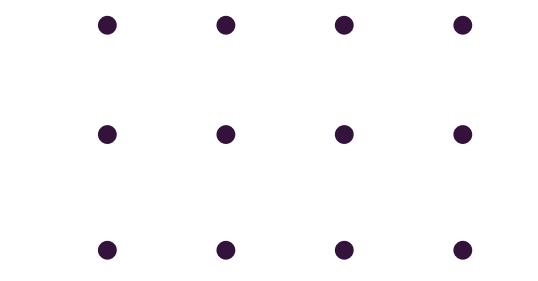
03

Sustainability: AI tool designed to be scalable and adaptable for ongoing use

02

Commitment to fairness: model updates with diverse, inclusive data needed

10



How to Access & Run

01

Open-source code
available on GitHub:
<https://github.com/MykeShale/Executive-Simulation-AI>

02

Step-by-step Jupyter
Notebook for
reproduction and
customization

03

Open invitation for
collaboration and
enhancement

Team & Contact

Contact us via GitHub for questions, partnerships, or contributions.



Mike

Data Acquisition & EDA



Violet

Model Training & Evaluation



Lukhanyo

Visualization & Ethics



Tshimo

Documentation & Coordination

**“AI can be the bridge
between innovation
and sustainability.” —
UN Tech Envoy**

Join us in leveraging AI to improve global health and
achieve SDG 3.