PHASE-WISE WRITTEN PLAN (BINA ROBOT)

PHASE 1: Problem Definition & System Design

Goal: Project ka scope aur flow clear karna

Tum kya karogi: Autonomous navigation problem define karogi

Decide karogi: Input: voice command | Output: navigation action (LEFT / RIGHT / FORWARD / STOP)

System architecture: Voice → ML → Action

Simple flowchart banaogi (jo ab tumhare paas hai)

Deliverables: Problem statement, Architecture diagram, Flowchart

PHASE 2: Dataset Creation (Synthetic)

Goal: ML ke liye data tayaar karna

Features decide karogi: front_distance, left_distance, right_distance

Value ranges define karogi (5–100 cm)

Logic ke base par labels assign karogi: LEFT / RIGHT / FORWARD / STOP

CSV file banaogi (500–800 rows)

Deliverables: navigation_dataset.csv, Dataset description

PHASE 3: Data Preprocessing & Feature Analysis

Goal: ML ke liye data ready karna

Dataset load karogi (Python)

Missing / invalid values check karogi

Feature–label relation samjhogi

Data split: Training set, Testing set

Deliverables: Clean dataset, Train/Test split

PHASE 4: Machine Learning Model Development

Goal: Intelligent decision-making system banana

ML algorithm choose karogi: Decision Tree (primary)

Model train karogi

Predictions check karogi

Model accuracy calculate karogi

Deliverables: Trained ML model, Accuracy score

PHASE 5: Model Evaluation

Goal: Model kitna achha kaam kar raha hai ye prove karna

Confusion matrix generate karogi

Different scenarios test karogi

Optional: KNN ke saath comparison

Deliverables: Confusion matrix, Evaluation results

PHASE 6: Voice Command Processing

Goal: Natural language se system ko control karna

Speech-to-text implement karogi

Commands define karogi: “go to destination A”, “go to destination B”

Voice command ko destination variable me convert karogi

Deliverables: Voice → text demo, Command mapping logic

PHASE 7: Navigation Logic (Simulation)

Goal: Autonomous behavior simulate karna

Predefined routes define karogi

Har step par synthetic sensor values generate karogi

ML model se next action predict karogi

Console / log me autonomous movement dikhana

Deliverables: Autonomous navigation logs, Simulation screenshots

PHASE 8: Result Analysis & Discussion

Goal: Project ka outcome clearly explain karna

Accuracy aur performance discuss karogi

Successful scenarios explain karogi

Limitations likhogi

Deliverables: Result analysis section

PHASE 9: Documentation & Conclusion

Goal: Final submission ready karna

Complete project report likhogi

Conclusion likhogi

Future scope add karogi: Real robot deployment, Computer vision, Deep learning

Deliverables: Final report, PPT

ONE-LINE SUMMARY (Viva ke liye)

The project was developed as a simulation-based autonomous navigation system using machine learning and voice commands, and is deployment-ready for real-world robotic platforms.

Important baat (yaad rakhna)

Ye AI/DS project hai

Hardware secondary hai

Intelligence ML aur logic me hai