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DA 3 (RESEARCH)
RE ROUTING SYSTEM
TEST CASE
IMPLEMENTATION

Test Case Implementation for 3 Modules Merged (18 cases)

Test Case ID	Test Objective	Precondition	Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
TC-01	Reroute to Safe Road - Success	System is operational	1. Enter destination 2. Start navigation	Destination: City Center	Route avoids high-risk areas and traffic obstructions	Route is displayed	Same as expected	Pass
TC-02	Reroute to Safe Road - Error	System is operational	1. Enter destination 2. Start navigation	Destination: Known risky area	Error message displayed	No route displayed	Error displayed	Pass
TC-03	Avoid Dangerous Areas - Success	System is operational	1. Enter destination 2. Start navigation	Destination: Suburban area	Route avoids crime-prone spots	Route is displayed	Same as expected	Pass
TC-04	Avoid Dangerous Areas - Error	System is operational	1. Enter destination 2. Start navigation	Destination: Crime hotspot	Warning or reroute suggested	Alert is displayed	Error displayed	Pass
TC-05	Avoid Lonely Roads at Night - Success	System is operational	1. Enter destination 2. Start navigation	Time: Night, Destination: Busy area	Route avoids lonely roads	Route is displayed	Same as expected	Pass
TC-06	Avoid Lonely Roads at Night - Error	System is operational	1. Enter destination 2. Start navigation	Time: Night, Destination: Lonely road	Alert for lack of nearby facilities	Alert is displayed	Error displayed	Pass
TC-07	Detect Road Quality - Success	System is operational	1. Enter destination 2. Start navigation	Destination with known good roads	High-quality road detected	Route is displayed	Same as expected	Pass

TC-08	Detect Road Quality - Error	System is operational	1. Enter destination 2. Start navigation	Destination with bad roads	Error in road quality detection	No route displayed	Error displayed	Pass
TC-09	Crime Data Integration - Success	System is operational	1. Enter destination 2. Start navigation	Destination: Residential area	Crime data correctly integrated; safe route chosen	Route is displayed	Same as expected	Pass
TC-10	Crime Data Integration - Error	System is operational	1. Enter destination 2. Start navigation	Destination: High crime area	Failure in crime data integration	No data displayed	Error displayed	Pass
TC-11	Real-time Traffic Feedback - Success	System is operational	1. Enter destination 2. Start navigation	Destination: Downtown during peak hours	Traffic data integrated; less congested route suggested	Route is displayed	Same as expected	Pass
TC-12	Real-time Traffic Feedback - Error	System is operational	1. Enter destination 2. Start navigation	Destination: Downtown during peak hours	Failure to integrate traffic data	Incorrect route suggested	Error displayed	Pass
TC-13	Data Preprocessing - Success	System is operational	Analyze incoming data	Mixed traffic and road data	Data correctly processed for analysis	Ready for next step	Same as expected	Pass
TC-14	Data Preprocessing - Error	System is operational	Analyze incoming data	Incorrect or corrupted data	Error in data preprocessing	Process halted	Error displayed	Pass
TC-15	Model Training and Evaluation - Success	System is operational	Train model on dataset	Well-labeled dataset	Model accurately predicts traffic conditions	Model updated	Same as expected	Pass
TC-16	Model Training and Evaluation - Error	System is operational	Train model on dataset	Poorly labeled dataset	Model fails to learn patterns	Model not updated	Error displayed	Pass

TC-17	Update Road Data in Datastore - Success	System is operational	Update datastore with new road conditions	Recent road condition data	Datastore updated with latest information	Datastore is current	Same as expected	Pass
TC-18	Update Road Data in Datastore - Error	System is operational	Update datastore with new road conditions	Recent road condition data	Datastore update failed	Datastore is outdated	Error displayed	Pass

Algorithm Implementation

Pseudocode-

```

function reroute_vehicle(current_location, destination):
    routes = find_possible_routes(current_location, destination)
    safe_routes = []

    for route in routes:
        safety_score = calculate_safety_score(route)
        if safety_score is acceptable:
            safe_routes.append(route)

    if not safe_routes:
        return notify_driver("No safe routes available")

    best_route = select_best_route(safe_routes)
    return best_route

function calculate_safety_score(route):
    road_condition_score = assess_road_conditions(route)
    crime_rate_score = check_crime_rates(route)
    traffic_score = predict_traffic(route)

    safety_score = weighted_average(road_condition_score, crime_rate_score, traffic_score)
    return safety_score

function select_best_route(routes):
    highest_score = 0
    best_route = None

    for route in routes:
        if route.safety_score > highest_score:
            highest_score = route.safety_score
            best_route = route

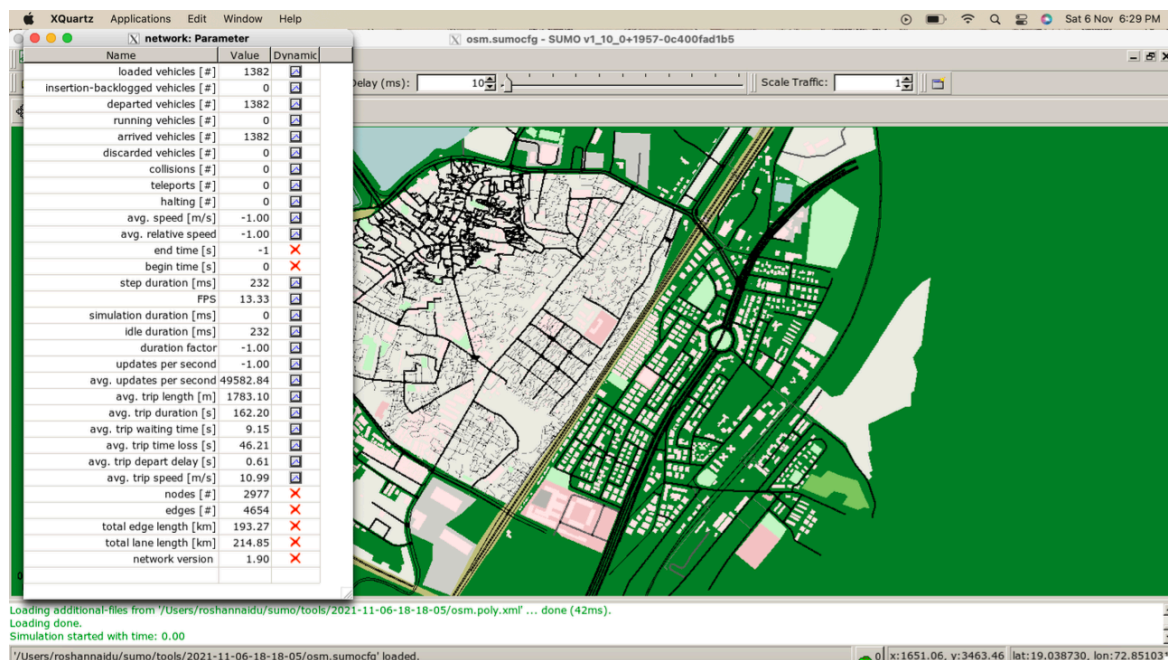
    return best_route

```


Proposed Project Output-



Proposed vehicular description overlay showing the in-vehicle navigation system displaying two route options. one highlighted in red for higher risk and the other in green for a safer route.



SUMO Simulation for the traffic and real time world case scenario depiction.