



## ABOUT THE PROJECT

Develop a rule-based expert system for diagnosing car issues.

The system interacts with users via questions, gathers symptom data, and evaluates expert-defined rules to generate results.

Implemented using backward chaining in Prolog, the project includes:

- Symptom-driven question flow
- Categorised diagnoses
- Human-readable explanations
- Expandable rule structure

## SYSTEM ARCHITECTURE



1. Start the expert system.
2. Clear previous symptom facts from the system.
3. Ask the user about symptoms using natural language questions.
4. Collect responses, and assert each positive answer as a Prolog fact (`symptom(X)`).
5. Evaluate diagnostic rules using backward chaining.
6. Match all valid diagnoses based on the claimed symptoms.
7. Group the diagnoses by category (e.g., electrical, cooling).
8. Display diagnoses with explanations in a structured format.



## TEAM MEMBERS

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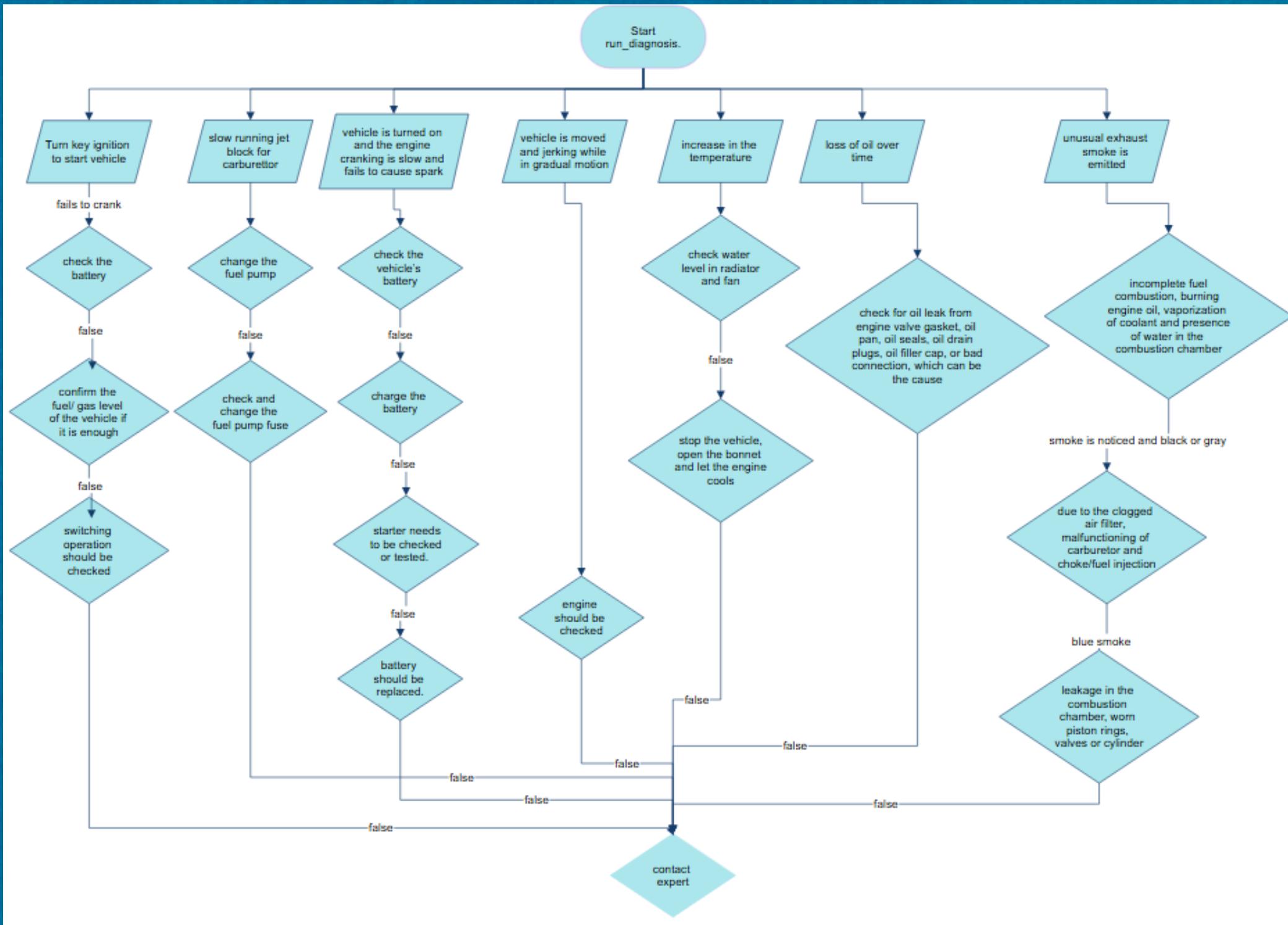
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# Car Diagnosis Expert System

## FLOWCHART



## SAMPLE OUTPUT

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?-
|_ run_diagnosis.
Is the ignition turning on when you try to start the car? (yes/no): y.
Does the engine fail to crank (turn over)? (yes/no): |: y.
|:
Is there enough fuel in the tank? (yes/no): |: y.
Does the engine crank slowly when trying to start? (yes/no): |: y.
Is there no spark from the spark plugs? (yes/no): |: y.
Does the battery weak or low on charge? (yes/no): |: y.
Does the vehicle jerk while driving or accelerating gradually? (yes/no): |: n.
Does the temperature gauge show an unusual increase? (yes/no): |: d.
Please answer with yes, y, no, or n.
Does the temperature gauge show an unusual increase? (yes/no): |: n.
Is the radiator leaking coolant? (yes/no): |: n.
Is the radiator fan not functioning at all? (yes/no): |: n.
Has there been a noticeable loss of oil over time? (yes/no): |: n.
Is there unusual smoke coming from the exhaust? (yes/no): |: n.
Do you suspect the slow running jet block might be clogged or faulty? (yes/no): n.
Is there a lack of fuel reaching the engine? (yes/no): |: n.
Does the problem persist after trying previous solutions? (yes/no): |: n.

--- Grouped Diagnoses ---
electrical issues:
- charge_battery
- check_battery_due_to_slow_cranking
- check_or_test_starter
- check_starter
- check_switching_operation
- clean_and_tighten_battery_terminals
- major_electrical_issue_contact_expert
- replace_battery_and_starter_contact_expert
-- Both battery and starter may be faulty. Expert inspection recommended.

fuel issues:
- check_fuel_level
-- Ensure the vehicle has enough fuel to start.
true.
?-
  
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electrical SYSTEM ISSUES
| Diagnosis: charge_battery
| -- "The battery is weak and needs charging."
| Diagnosis: check_battery_due_to_slow_cranking
| -- "The battery may be weak and unable to crank the engine effectively."
| Diagnosis: check_or_test_starter
| -- "The starter motor might need testing or repair."
| Diagnosis: check_switching_operation
| -- "The ignition or fuel system switch may not be working properly."
| Diagnosis: clean_and_tighten_battery_terminals
| -- "The battery terminals may be dirty or loose, which prevents proper starting."
| Diagnosis: major_electrical_issue_contact_expert
| -- "There may be a significant electrical problem. Contact an expert."
| Diagnosis: replace_battery_and_starter_contact_expert
| -- "Both battery and starter may be faulty. Expert inspection recommended."

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engine_oil SYSTEM ISSUES
| Diagnosis: check_oil_leak_with_expert_help
| -- "Oil leaks can lead to engine damage. Seek professional inspection."

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exhaust SYSTEM ISSUES
| Diagnosis: black_or_gray_smoke_issue_contact_expert
| -- "Black or gray smoke suggests combustion issues. See a technician."
| Diagnosis: blue_smoke_oil_leak_issue_contact_expert
| -- "Blue smoke indicates oil leakage into the engine."
| Diagnosis: observe_exhaust_smoke_color
| -- "Check the exhaust smoke color; it can indicate engine issues."
| Diagnosis: white_smoke_coolant_leak_issue_contact_expert
| -- "White smoke may mean coolant is leaking into the engine."
  
```