Proposal for DV2573 Decision Support Systems (IDSS)

Group Members

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Problem Description

Goal

The goal of this Decision Support System is to help small ports in the EU select the optimal drones for their monitoring and inspection tasks. The DSS will evaluate various drone models available on the market and propose the best ones based on the port's needs and requirements.

Criterias

1. Flight Radius (2-5-10 km)
2. Flight height (100-500-1000 m)
3. Thermal/Night Camera
4. Max wind resistance (2 m/s to 15 m/s)
5. Budgets options (5K / 10K / 15K €)
6. Camera Quality (480p / 720p / 1080p / 4K)
7. ISO range (100 - 3200 / 6400 / 12800 / 25600)
8. Battery Life (minutes)
9. Payload Capacity (maximum weight the drone can take)
10. Dimensions
11. Real-time data transmission
12. Transmission bandwidth (MHz)
13. Data storage ability (32GB / 64GB / 128GB)
14. Air/Water quality sensor availability
15. Noise level (dB)
16. Operating Temperature (C)
17. Class Identification Label
18. Charging Time (min)
19. Automatic Landing/Takeoff
20. GPS Supported Systems
21. Automated Path Finding

General Architecture of the IDSS

Database description

The preliminary design for the database is a single table with different attributes for each of the criteria.

SQL **DRONE** TABLE:

ATTRIBUTE	TYPE
Flight Radius	Numeric
Flight height	Numeric
Thermal/Night Camera	Boolean
Max wind resistance	Numeric
Budgets options	Numeric
Camera Quality	Numeric
ISO range	Numeric
Battery Life	Numeric
Payload Capacity	Numeric
Dimensions	Numeric
Real-time data transmission	Boolean
Transmission bandwidth	Numeric
Data storage ability	Numeric
Air/Water quality sensor availability	Boolean
Noise level	Numeric
Operating Temperature	Numeric
Class Identification Label	Varchar
Charging Time	Numeric
Automatic Landing/Takeoff	Boolean
GPS Supported Systems	Varchar
Automated Path Finding	Boolean

Model (base) description
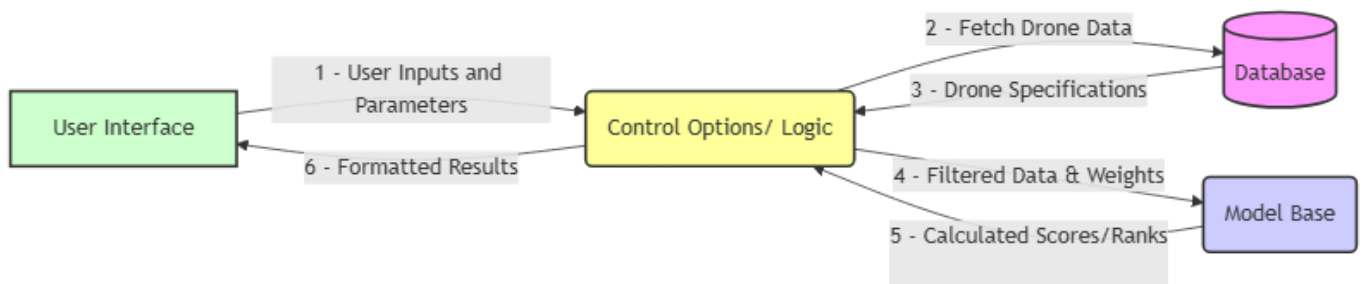
Explanation of the implementation

Tools

- **Programming Language**: Python
- **DB**: SQL/SQLite
- **Libraries**: NumPy, Pandas, MatPlotLib, Seaborn, TensorFlow, Keras, SciKitLearn
- **VCS**: Git, GitHub
- **IDEs**: VSCode, PyCharm

Techniques

- **Data Normalization**
- **One-Hot Encoding**
- **Database Querying and Designing**
- **Modular Programming**