Paper 1

Link = “ Modeling of aircraft fuel consumption using machine learning algorithms “

What dataset did you use?

- Number of flights: 180,000+ flight missions
- Period: 2001–2003
- Data size: 250+ GB
- Total parameters (features): 186
- Sampling rate: 0.25 Hz to 16 Hz
- Maximum features used in modeling: 176
- Reduced features (hand-picked): 40
- Reduced features (by algorithm): 30
- Aircraft type: A fleet of four-engine jets (unknown model)
- Data source: NASA DASHlink (public research database)

Which ML model did you use?

- Neural Networks
- Decision Trees
- Model Trees (M5)
- Random Forests

What did the result show?

Model	MAE (kg/h)	MRE (%)	MSE (kg/h)	R2
Neural Network	15.88	0.8%	22.23	0.9995

Decision Tree	39.46	2.1%	66.67	0.9952

What did they say about future work / limitations at the end?

Limitations

- The data is a bit old (2001-2003)
- It takes a long time to run the neural network
- It is difficult to understand how the neural network produces results ("black box" problem)
- Working only with cruise flight data does not give the full picture

Future Work

- Improve models (using genetic algorithms).
- Teach computers to pick out important data on their own.
- Use it in the real world (evaluating new fuel-saving technologies for aircraft).
- Add this system to the software of large companies (e.g. Airbus, Lufthansa)

Paper 2

Link = " Fuel Consumption Prediction Model using Machine Learning "

What dataset did you use?

- Dataset Name: OBD-II Datasets
- Records: 8,262
- Features: 18

- Car: 2015 Chevrolet S10, 2.5L engine, 206 hp
- Data Collection: 19 drivers used OBD scanner
- Driving: Urban roads, Natal, Brazil
- Trip: 18.8 km, 34 minutes per driver

Which ML model did you use?

- Main ML Model: Support Vector Machine (SVM) (for regression)
    - RBF kernel: VS_MAF equation
    - Linear kernel: RPM_TPS equation
- Other Models (Random Forest & Decision Tree): Only for feature selection/weighting, not for final prediction

What did the result show?

Method	**R2**	**Notes**
VS_MAF-based (weighted)	0.97	RBF kernel
RPM_TPS-based (weighted)	0.96	Linear kernel
Prior work (RPM_TPS-based)	0.004624	SVM, same equation
Overall Finding	High accuracy achieved	SVM is effective for FC prediction

What did they say about future work / limitations at the end?

<u>Limitations</u>

- Only two equations (VS_MAF & RPM_TPS) were used

- Including more driving parameters and conditions could improve prediction accuracy

Future Work

- More features: Use additional features (like ENGINE_LOAD, ENGINE_RPM) for more accurate fuel prediction.
- Bigger dataset: Use a larger and more varied dataset to improve model accuracy and generalization.
- Real-time IoT: Integrate the model with IoT devices for instant fuel prediction in vehicles.