DIAGNOSI DI GUASTI

- 1. Dataset
  - Train
    - data — Case001 - Case177 — In each CSV file, the first column is time, and the remaining columns are pressure at the measurement points P1 – P7
    - labels.csv — Describes detailed information on training data such as case name, spacecraft number, and experimental condition. Please note that there is no Spacecraft-4 data in the training data.
  - Test
    - data — Case178 - Case223
    - labels.csv — `labels_spacecraft.xlsx` describes the information of case name and spacecraft number. The opening ratio of the valve is randomly chosen between 0% and 100% in case of fault.
- 2. Spettro del segnale — Scelta frame policy — Calcolo spettro — The solenoid valve opens at 100 ms and closes at 300 ms. To account for individual differences of solenoid valve appearing in actual equipment, the valve movement has an uncertainty of 1 ms. The opening and closing times remain at 400 ms, even with the uncertainty (e.g., open for 99.7 ms and close for 300.3 ms). This sequence is conducted three times successively, resulting in a total measurement of 1200 ms.
- 3. Feature Selection — Selezione feature da utilizzare
- 4. Classificatori 'a cascata'
  - 1. Determine normal or abnormal for all test data. — NORMAL or ANORMAL
  - 2. For the data detected as abnormal, determine if it is an anomaly due to bubble contamination, solenoid valve fault, or unknown fault. — BUBBLE CONTAMINATION or SOLENOID VALVE or UNKNOWN
  - 3. For the data identified as bubble contamination, determine the location of the bubble from eight locations, BV1, and BP1 to BP7. — BUBBLE locations -> BV1, BP1, BP2, BP3, BP4, BP5, BP6, BP7
  - 3. For the data identified as solenoid valve fault, determine which of the four solenoid valves (SV1 to SV4) failed. — SOLENOID VALVE locations -> SV1, SV2, SV3, SV4
  - 3. For the solenoid valve identified as a fault, predict the opening ratio. (0% <= Opening ration < 100%) — SOLENOID VALVE Opening Ratio
- 5. Risolvere Anomaly Detection — In the practical operation, completely unforeseen and unknown anomalies or faults may occur. It is also required to distinguish unknown anomalies without confusing them with known anomalies and faults. Some unknown anomalies or faults are mixed in the test data. Identifying them is also part of the task in this competition.
- 6. Scelta Regressore finale
- 7. Testing del modulo di Diagnosi — Dataset di 'testing'
- 8. Prestazioni e metriche — Valutazione modello

Presented with xmind

es. Train data

	A	B	C	D	E
1	TIME,P1,P2,P3,P4,P5,P6,P7				
2	0.0,2.0,2.0,2.0,2.0,2.0,2.0,2.0				
3	0.0009999999999999,2.0,2.0,2.0,2.0,2.0,2.0,2.0				
4	0.0019999999999999,2.0,2.0,2.0,2.0,2.0,2.0,2.0				
5	0.0029999999999999,2.0,2.0,2.0,2.0,2.0,2.0,2.0				
6	0.004,2.0,2.0,2.0,2.0,2.0,2.0,2.0				
7	0.005,2.0,2.0,2.0,2.0,2.0,2.0,2.0				
8	0.006,2.0,2.0,2.0,2.0,2.0,2.0,2.0				
9	0.007,2.0,2.0,2.0,2.0,2.0,2.0,2.0				

train labels es. (Spacecrafts 1 or 2 or 3)

Case#	Spacecraft#	Condition	Solenoid valves Opening Ratio /%				Bubble						
			SV1	SV2	SV3	SV4	BP1	BP2	BP3	BP4	BP5	BP6	BP7	BV1
1	1	Normal	100	100	100	100	No	No	No	No	No	No	No	No
2	1	Normal	100	100	100	100	No	No	No	No	No	No	No	No
3	1	Normal	100	100	100	100	No	No	No	No	No	No	No	No
4	1	Normal	100	100	100	100	No	No	No	No	No	No	No	No
5	1	Normal	100	100	100	100	No	No	No	No	No	No	No	No

es. test labels (Spacecrafts 1 or 4)

198	1
199	1
200	1
201	4
202	4
203	4

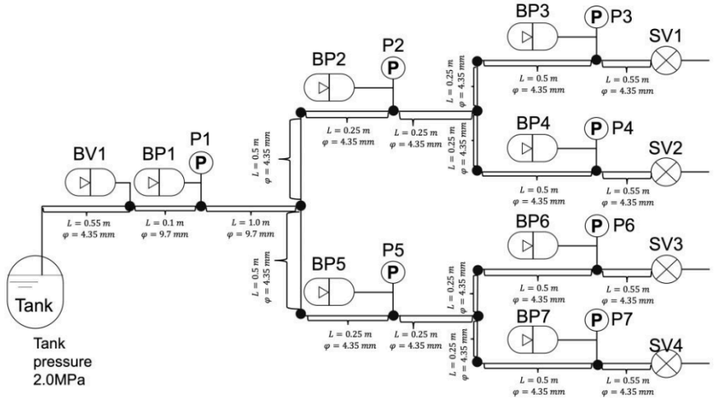

Fig. 1 Schematic of experimental propulsion system.

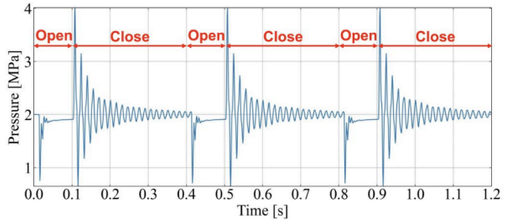

Fig. 2 Typical pressure profile.