

RISULTATI USANDO LO STESSO TRAIN PER TEST E VAL

```
patients_train1, patients_test, y_train1, y_test, features_train1, features_test= train_test_split(loaded_patients, labels,
patients, test_size=0.3, shuffle=False, random_state=1)
patients_train, patients_val, y_train, y_val, features_train, features_val= train_test_split(patients_train1, y_train1,
features_train1, test_size=0.3, shuffle=True, stratify=y_train1, random_state=3)
```

CLASSIFICAZIONE 2D

1) con encoder Rete pretrainata:

- a) VGG19
- b) Resnet 50
- c) InceptionV3

La rete estrae la feature map della slice con area maggiore per ogni placca

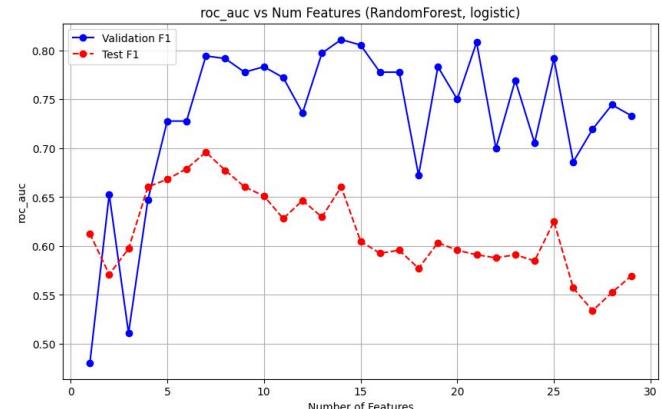
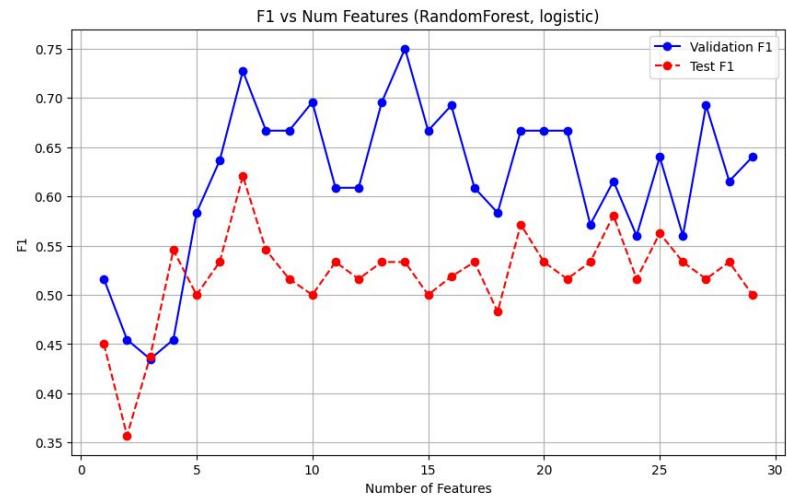
2) RADIOMIC 102 features

a) VGG19 slice maggiore

0.8, 0.05 (53) limit 30
(con stesso train)

```
Classifier: RandomForest
Selector: logistic
Num Features: 7.0
ROC AUC (Test): 0.6960
F1 Score (Test): 0.6207
Accuracy (Test): 0.7179
Confusion Matrix (Test):
[[19  8]
 [ 3  9]]
```

```
Corresponding Validation Metrics:
ROC AUC (Validation): 0.7944
F1 Score (Validation): 0.7273
Accuracy (Validation): 0.7778
Confusion Matrix (Validation):
[[13  2]
 [ 4  8]]
```

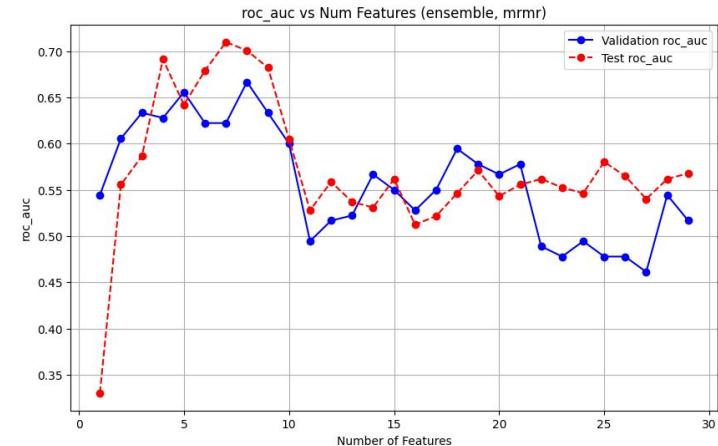
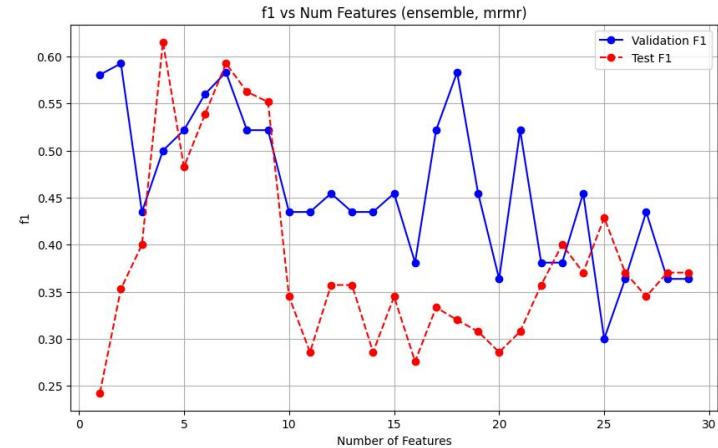


b) Resnet slice maggiore stesso train

```
Classifier: ensemble
Selector: mrmr
Num Features: 7.0
ROC AUC (Test): 0.7099
F1 Score (Test): 0.5926
Accuracy (Test): 0.7179
Confusion Matrix (Test):
[[20  7]
 [ 4  8]]
```

```
Corresponding Validation Metrics:
ROC AUC (Validation): 0.6222
F1 Score (Validation): 0.5833
Accuracy (Validation): 0.6296
Confusion Matrix (Validation):
[[10  5]
 [ 5  7]]
```

- correlation: 0.8
- p_value: 0.05
- split: 0.3
- test
- Migliore in base a f1

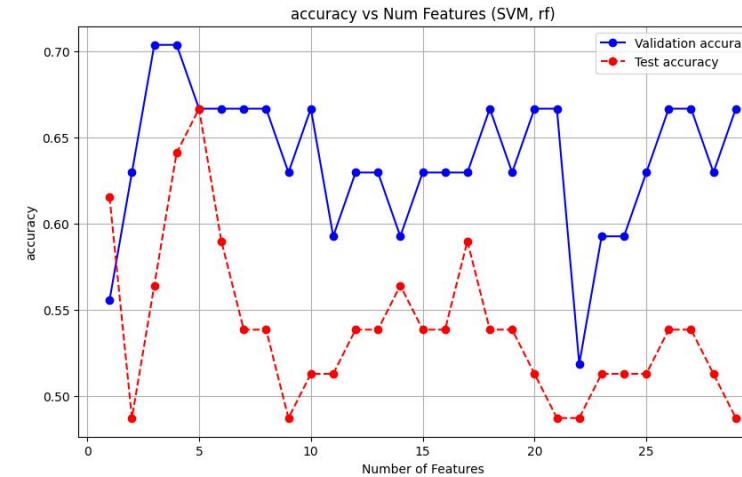
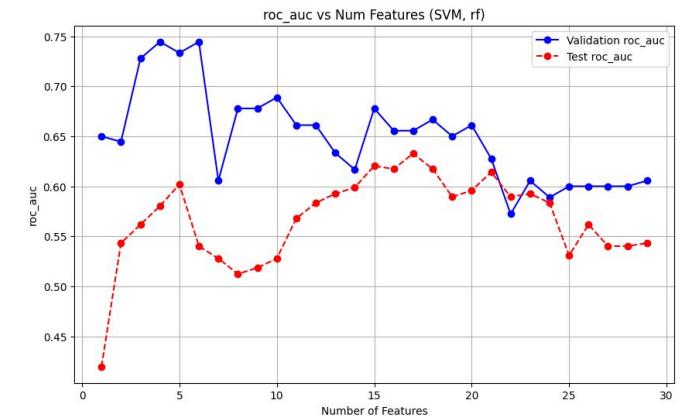


c) InceptionV3 slice maggiore nuovo test

```
Test Metrics:  
Classifier: SVM  
Selector: rf  
Num Features: 5.0  
ROC AUC (Test): 0.6019  
F1 Score (Test): 0.4800  
Accuracy (Test): 0.6667  
Confusion Matrix (Test):  
[[20  7]  
 [ 6  6]]
```

```
Corresponding Validation Metrics:  
ROC AUC (Validation): 0.7333  
F1 Score (Validation): 0.6087  
Accuracy (Validation): 0.6667  
Confusion Matrix (Validation):  
[[11  4]  
 [ 5  7]]
```

- correlation: 0.8
- p_value: 0.05
- cross val: 5 fold
- split: 0.3 test
- Migliore in base a roc auc e accuracy
- (f1 max per il test è 0.55)



2) Radiomic 2D

```
--- Test Metrics for Classifier: RandomForest,  
Selector: logistic ---
```

```
Num Features: 10.0
```

```
ROC AUC (Test): 0.6975
```

```
F1 Score (Test): 0.6154
```

```
Accuracy (Test): 0.7436
```

```
Confusion Matrix (Test):
```

```
[[21  6]  
 [ 4  8]]
```

```
--- Validation Metrics for Classifier:
```

```
RandomForest, Selector: logistic ---
```

```
Num Features: 10.0
```

```
ROC AUC (Validation): 0.7722
```

```
F1 Score (Validation): 0.8000
```

```
Accuracy (Validation): 0.8148
```

```
Confusion Matrix (Validation):
```

```
[[12  3]  
 [ 2 10]]
```

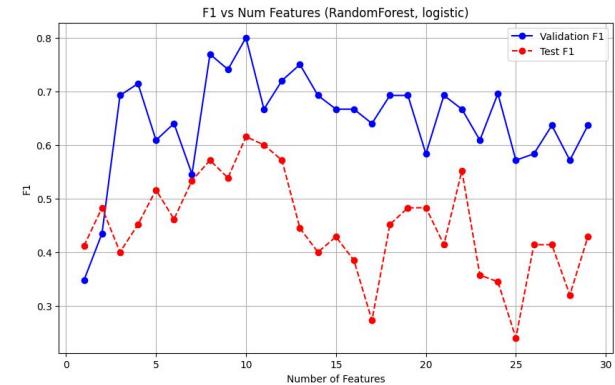
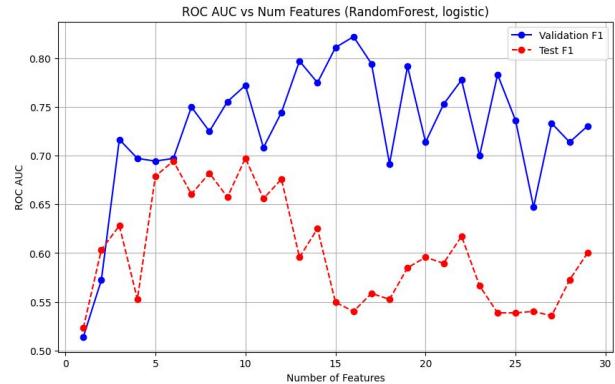


tabella risultati classificazione 2D

type of features	Classifier	Selector	number features	roc auc val	accuracy val	f1 val	roc auc test	accuracy test	f1 test	confusion matrix test
RADIOMICA	Random forest	Logistic	10	0.7722	0.8148	0.8000	0.6975	0.7436	0.6154	[[21 6] [4 8]]
VGG19	Random forest	Logistic	7	0.7944	0.7778	0.7273	0.6960	0.7179	0.6207	[[19 8] [3 9]]
Resnet50	ensemble	mrmr	7	0.6222	0.6296	0.5833	0.7099	0.7179	0.5926	[[20 7] [4 8]]
InceptionV3	SVM	rf	5	0.7333	0.6667	0.6087	0.6019	0.6667	0.4800	[[20 7] [6 6]]

CLASSIFICAZIONE 2.5D

- 1) con encoder Rete pretrainata:**
 - a) VGG19**
 - b) Resnet 50**
 - c) InceptionV3**

La rete estrae la feature map da tutte le slice
poi applica MV/ Mean per ottenere la
predizione finale per la placca

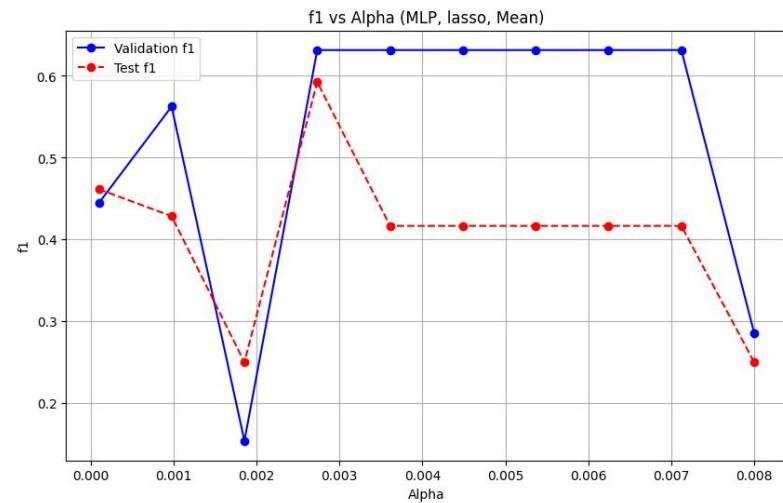
- 2) RADIOMICA 102 features**

RADIOMICA 2.5 D

- 107 features di partenza
- correlation 0.9 (42)
- no p_value
- num_features con limit di 30
- tutte le slice

Classifier: MLP
Selector: lasso
Alpha: 0.002733333333333337
Num Features: 5.0
Mode: Mean
ROC AUC (Test): 0.6481
PR AUC (Test): 0.4877
F1 Score (Test): 0.5926
Accuracy (Test): 0.7179
Confusion Matrix (Test):
[[20 7]
 [4 8]]

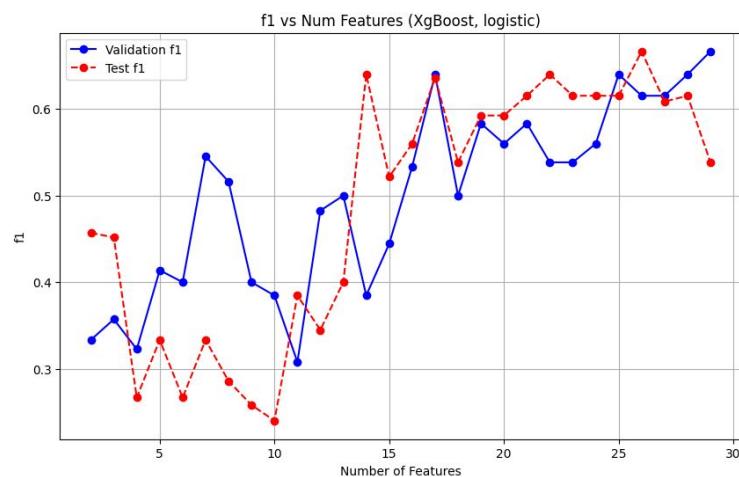
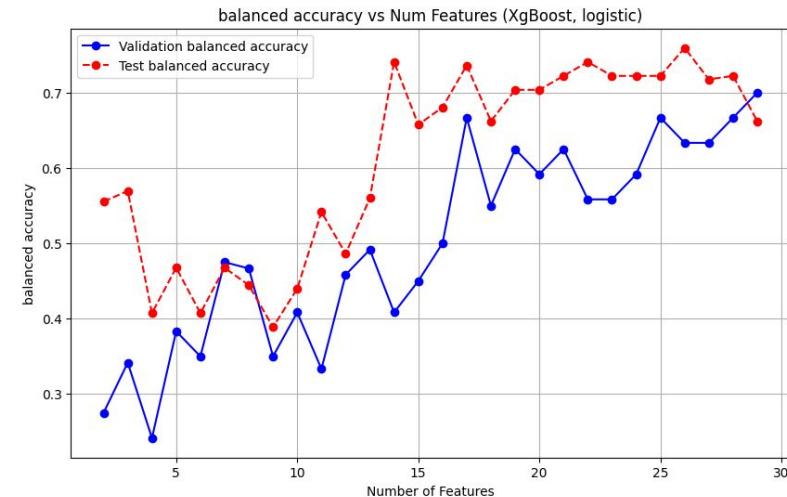
Corresponding Validation Metrics:
ROC AUC (Validation): 0.6167
PR AUC (Validation): 0.7231
F1 Score (Validation): 0.6316
Accuracy (Validation): 0.7407
Confusion Matrix (Validation):
[[14 1]
 [6 6]]



a) VGG19 2.5

```
Validation Metrics:  
Classifier: XgBoost  
Selector: logistic  
Num Features: 29.0  
Mode: Mean  
ROC AUC (Validation):  
0.6556  
PR AUC (Validation):  
0.6726  
F1 Score (Validation):  
0.6667  
Accuracy (Validation):  
0.7037  
Confusion Matrix  
(Validation):  
[[11  4]  
 [ 4  8]]  
=====  
=====  
Test Metrics:  
Classifier: XgBoost  
Selector: logistic  
Num Features: 29.0  
Mode: Mean  
ROC AUC (Test): 0.7037  
PR AUC (Test): 0.4845  
F1 Score (Test): 0.5385  
Accuracy (Test): 0.6923  
Confusion Matrix (Test):  
[[20  7]  
 [ 7  23]]
```

```
Validation Metrics:  
Classifier: XgBoost  
Selector: logistic  
Num Features: 17.0  
Mode: Mean  
ROC AUC (Validation):  
0.5889  
PR AUC (Validation):  
0.5338  
F1 Score (Validation):  
0.6400  
Accuracy (Validation):  
0.6667  
Confusion Matrix  
(Validation):  
[[10  5]  
 [ 4  8]]  
=====  
=====  
=====  
Test Metrics:  
Classifier: XgBoost  
Selector: logistic  
Num Features: 17.0  
Mode: Mean  
ROC AUC (Test): 0.7160  
PR AUC (Test): 0.5833  
F1 Score (Test): 0.6364  
Accuracy (Test): 0.7949  
Confusion Matrix  
(Test):  
[[24  3]  
 [ 5  7]]  
=====  
=====  
=====  
=====
```

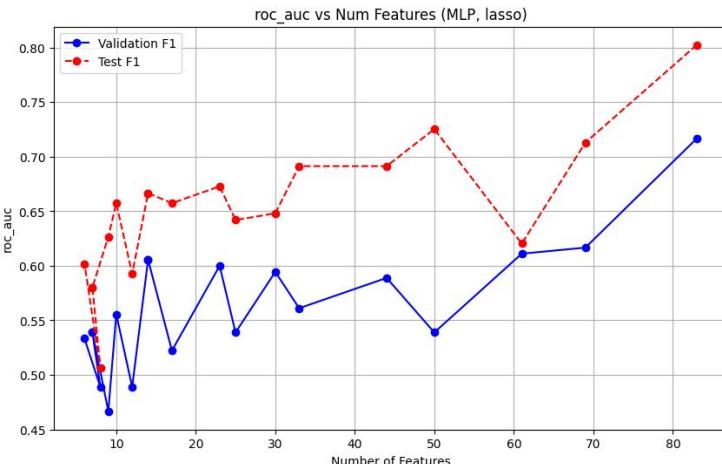
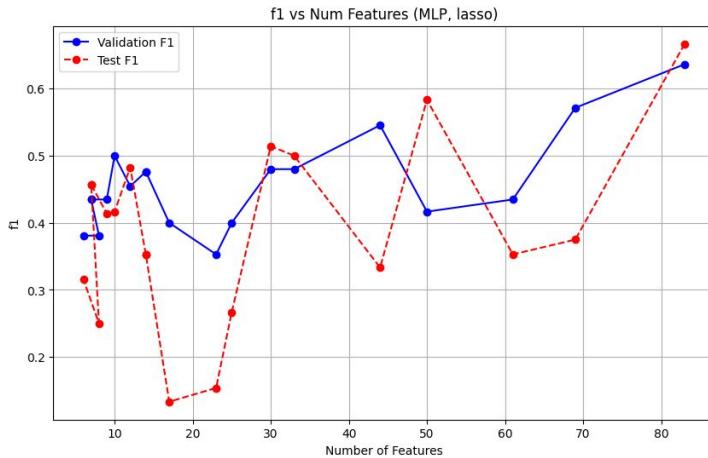


b) Resnet50 2.5

Classifier: MLP
Selector: lasso
Alpha: 0.05
Num Features: 83.0
Mode: Mean
ROC AUC (Test): 0.8025
PR AUC (Test): 0.6657
F1 Score (Test): 0.6897
Accuracy (Test): 0.7692
Confusion Matrix (Test):
[[20 7]
 [2 10]]

Corresponding Validation Metrics:
ROC AUC (Validation): 0.7167
PR AUC (Validation): 0.6560
F1 Score (Validation): 0.6364
Accuracy (Validation): 0.7037
Confusion Matrix (Validation):
[[12 3]
 [5 7]]

- Pvalue 0.01
- Corr 0.8
- Circa 900 features tra cui ne sceglie 30 massime 0.3 test
- Migliore per f1



salvato in results_val_Resnet50_2.5 e results_test_Resnet50_2.5

PARAMETRI MIGLIORI

```
Best params for random_forest: {'bootstrap': False, 'max_depth': 20, 'min_samples_leaf': 2, 'min_samples_split': 2, 'n_estimators': 50}
```

```
Best params for mlp MV: {'activation': 'tanh', 'alpha': 0.0001, 'hidden_layer_sizes': (100, 100), 'learning_rate': 'adaptive', 'learning_rate_init': 0.1, 'max_iter': 300, 'solver': 'adam'}
```

```
Best params for logistic: {'C': 100, 'max_iter': 5000, 'penalty': 'l2', 'solver': 'liblinear'}
```

```
Best params for xgboost: {'colsample_bytree': 0.7, 'gamma': 0, 'learning_rate': 0.05, 'max_depth': 6, 'min_child_weight': 3, 'n_estimators': 100, 'subsample': 0.7}
```

```
Best params for mlp: {'activation': 'tanh', 'alpha': 0.01, 'hidden_layer_sizes': (128,), 'learning_rate': 'constant', 'learning_rate_init': 0.1, 'max_iter': 300, 'solver': 'sgd'}
```


test con train intero e scegliendo il seed migliore
variandolo da 1 a 7

IN GIALLO SEED = 3

risultati calcolati prendendo la miglior balanced accuracy

CLASSIFICAZIONE 2D

InceptionV3 2D

Seed: 7

Classifier: XgBoost

Selector: mrmr

Num Features: 4

--- Validation Set Metrics (Seed 7) ---

Balanced Accuracy (Validation): 0.6750

ROC AUC (Validation): 0.5556

F1 Score (Validation): 0.6667

Accuracy (Validation): 0.6667

Confusion Matrix (Validation):

`[[9 6]`

`[3 9]]`

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7037

ROC AUC (Test): 0.6265

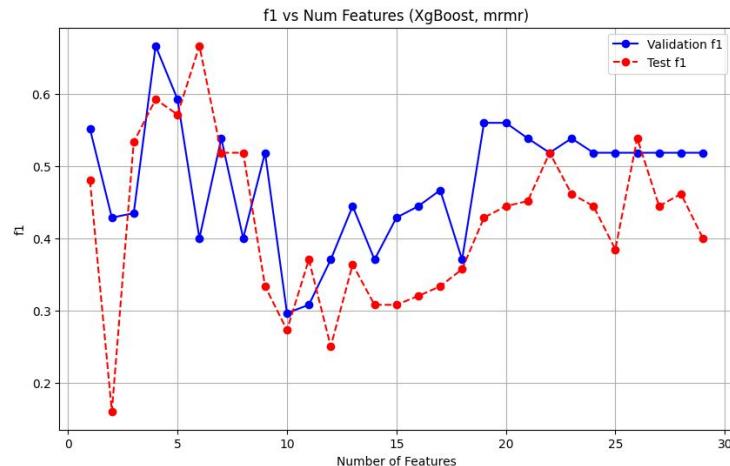
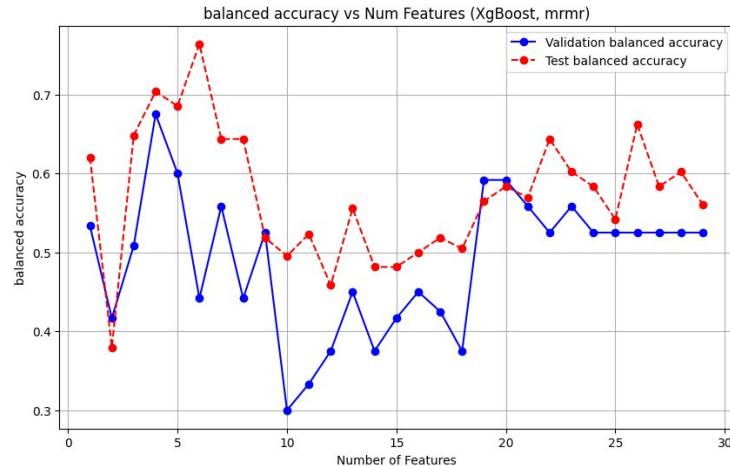
F1 Score (Test): 0.5926

Accuracy (Test): 0.7179

Confusion Matrix (Test):

`[[20 7]`

`[4 8]]`



InceptionV3 2D seed 3

--- Positive Case 3 ---

Seed: 3

Classifier: MLP

Selector: mrmr

Num Features: 16

--- Validation Set Metrics (Seed 3) ---

Balanced Accuracy (Validation): 0.7750

ROC AUC (Validation): 0.8278

F1 Score (Validation): 0.7500

Accuracy (Validation): 0.7778

Confusion Matrix (Validation):

```
[[12  3]
 [ 3  9]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.6296

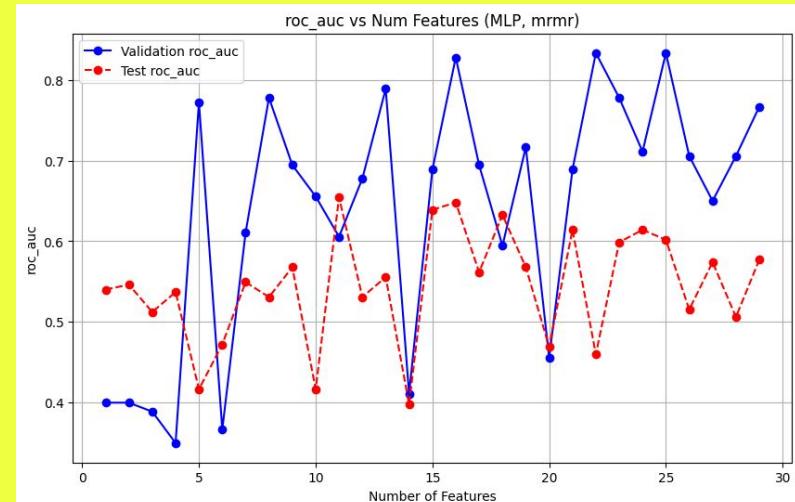
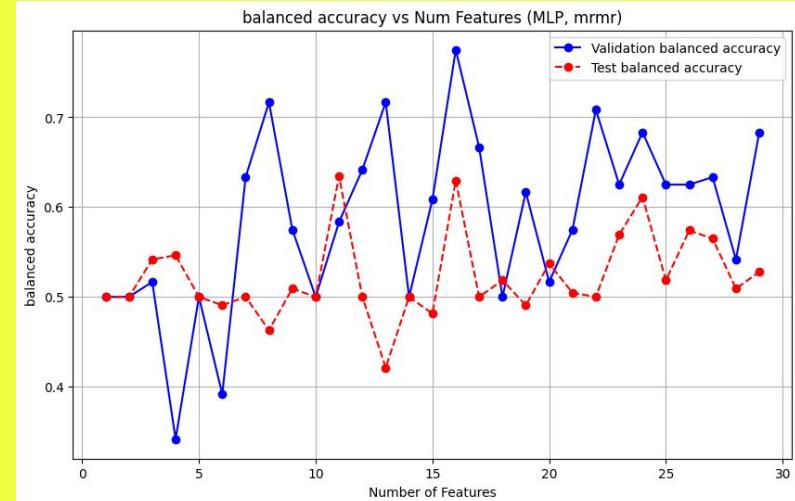
ROC AUC (Test): 0.6481

F1 Score (Test): 0.5161

Accuracy (Test): 0.6154

Confusion Matrix (Test):

```
[[16 11]
 [ 4  8]]
```

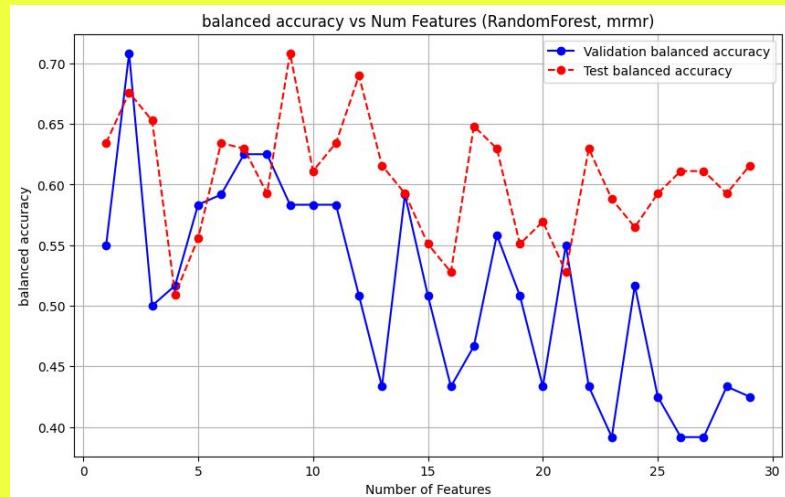
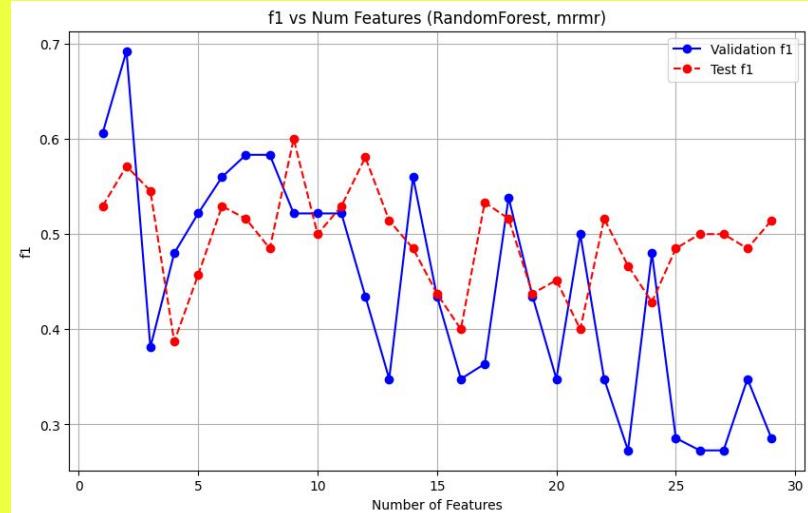


Resnet 50 2D 1 scelta

Seed: 3
Classifier: RandomForest
Selector: mrmr
Num Features: 2

--- Validation Set Metrics (Seed 3) ---
Balanced Accuracy (Validation): 0.7083
ROC AUC (Validation): 0.6583
F1 Score (Validation): 0.6923
Accuracy (Validation): 0.7037
Confusion Matrix (Validation):
[[10 5]
 [3 9]]

--- Test Set Metrics ---
Balanced Accuracy (Test): 0.6759
ROC AUC (Test): 0.7423
F1 Score (Test): 0.5714
Accuracy (Test): 0.6154
Confusion Matrix (Test):
[[14 13]
 [2 10]]

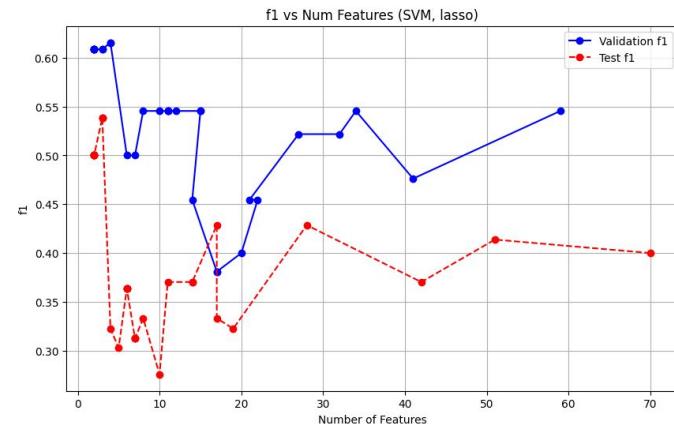
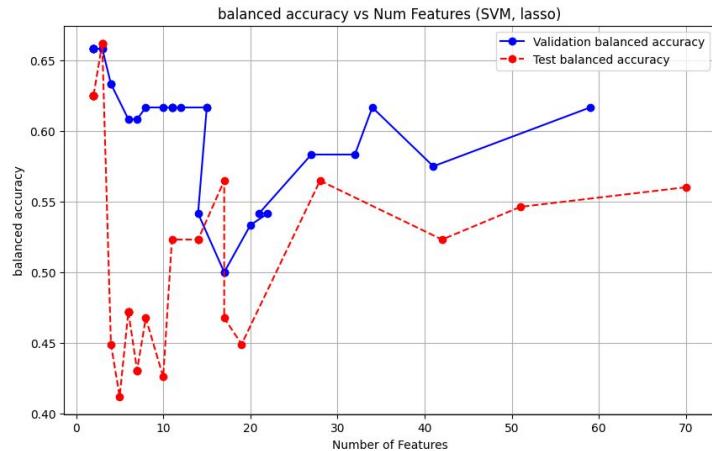


Resnet 50 2D 2 scelta

Seed: 4
Classifier: SVM
Selector: lasso
Alpha: 0.4779310344827586
Num Features: 3

--- Validation Set Metrics (Seed 4) ---
Balanced Accuracy (Validation): 0.6583
ROC AUC (Validation): 0.7222
F1 Score (Validation): 0.6087
Accuracy (Validation): 0.6667
Confusion Matrix (Validation):
[[11 4]
 [5 7]]

--- Test Set Metrics ---
Balanced Accuracy (Test): 0.6620
ROC AUC (Test): 0.5895
F1 Score (Test): 0.5385
Accuracy (Test): 0.6923
Confusion Matrix (Test):
[[20 7]
 [5 7]]



VGG 19

1 scelta

Seed: 2
Classifier: ensemble
Selector: mrmr
Num Features: 26

--- Validation Set Metrics (Seed 2) ---

Balanced Accuracy (Validation): 0.7167

ROC AUC (Validation): 0.6778

F1 Score (Validation): 0.6316

Accuracy (Validation): 0.7407

Confusion Matrix (Validation):

```
[[14  1]
 [ 6  6]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7130

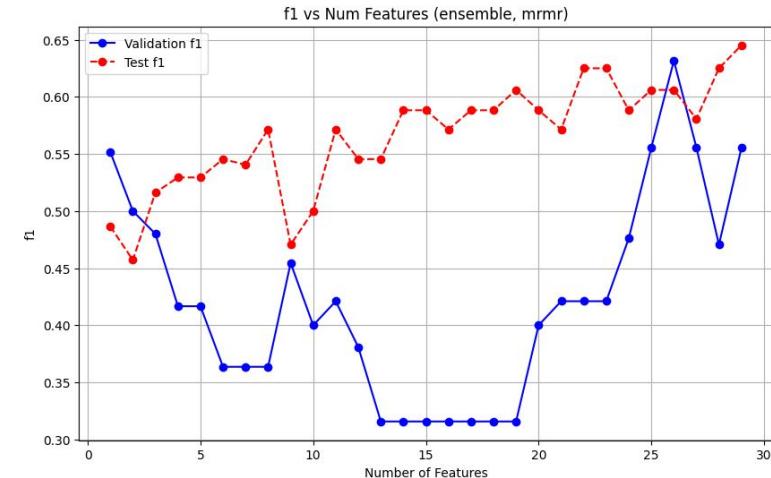
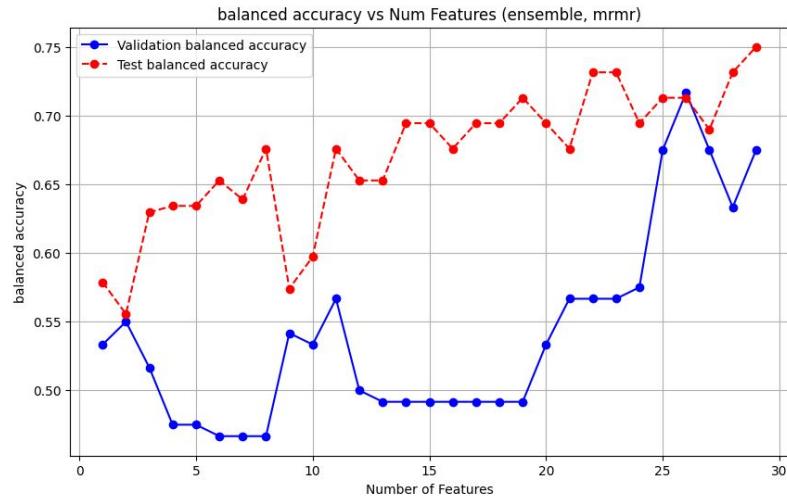
ROC AUC (Test): 0.7222

F1 Score (Test): 0.6061

Accuracy (Test): 0.6667

Confusion Matrix (Test):

```
[[16 11]
 [ 2 10]]
```



VGG 19

2 scelta

Seed: 5
Classifier: RandomForest
Selector: mrmr
Num Features: 25

--- Validation Set Metrics (Seed 5) ---
Balanced Accuracy (Validation): 0.7167

ROC AUC (Validation): 0.6722

F1 Score (Validation): 0.7143

Accuracy (Validation): 0.7037

Confusion Matrix (Validation):

```
[[ 9  6]
 [ 2 10]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7083

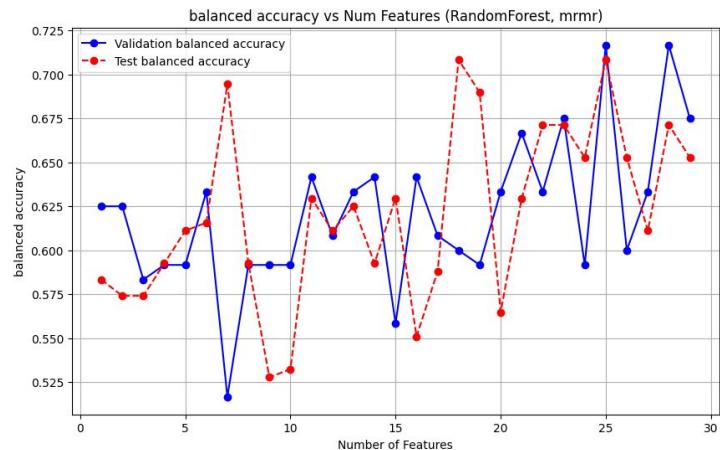
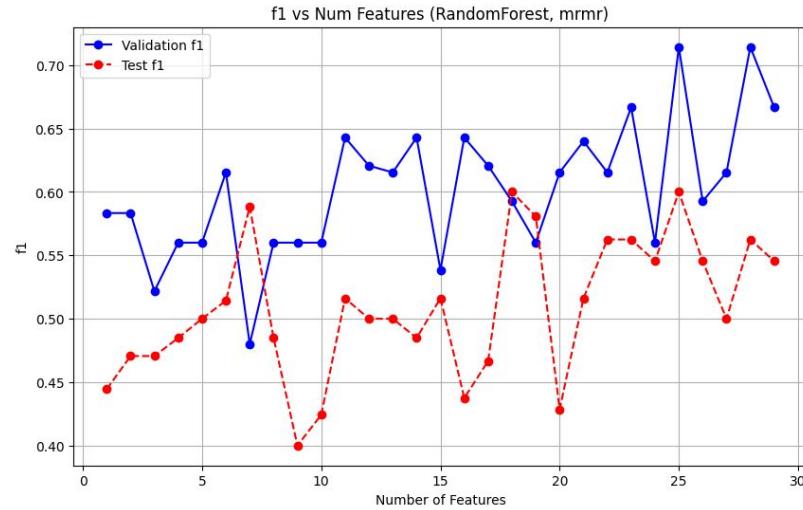
ROC AUC (Test): 0.6497

F1 Score (Test): 0.6000

Accuracy (Test): 0.6923

Confusion Matrix (Test):

```
[[18  9]
 [ 3  9]]
```



VGG 19

seed 3

Seed: 3
Classifier: SVM
Selector: rf
Num Features: 12

--- Validation Set Metrics (Seed 3) ---

Balanced Accuracy (Validation): 0.7667

ROC AUC (Validation): 0.7222

F1 Score (Validation): 0.7273

Accuracy (Validation): 0.7778

Confusion Matrix (Validation):

```
[[13  2]
 [ 4  8]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7454

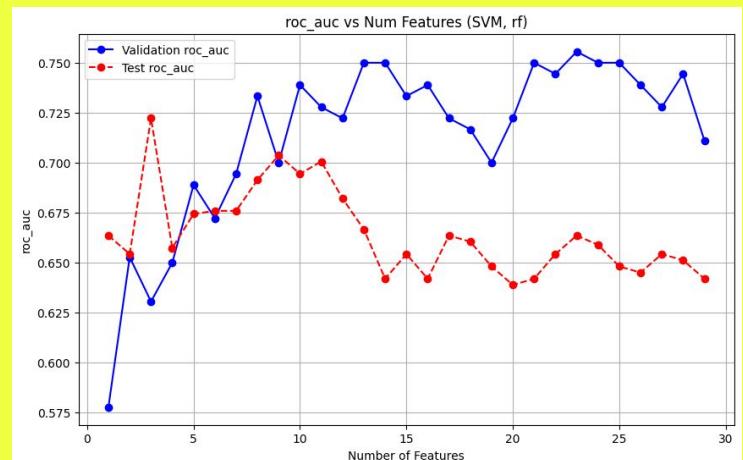
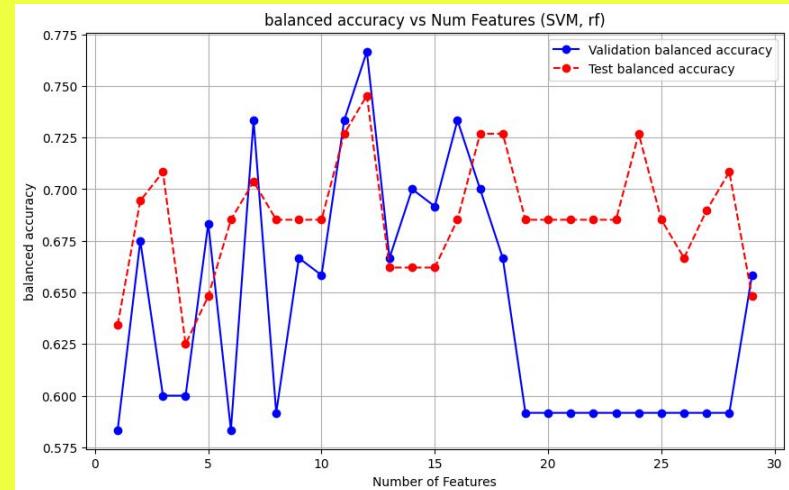
ROC AUC (Test): 0.6821

F1 Score (Test): 0.6429

Accuracy (Test): 0.7436

Confusion Matrix (Test):

```
[[20  7]
 [ 3  9]]
```



radiomica 2d

Seed: 2

Classifier: Logistic

Selector: mrmr

Num Features: 8

--- Validation Set Metrics (Seed 2) ---

Balanced Accuracy (Validation): 0.6917

ROC AUC (Validation): 0.7056

F1 Score (Validation): 0.6364

Accuracy (Validation): 0.7037

Confusion Matrix (Validation):

```
[[12  3]]
```

```
[ 5  7]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7315

ROC AUC (Test): 0.7716

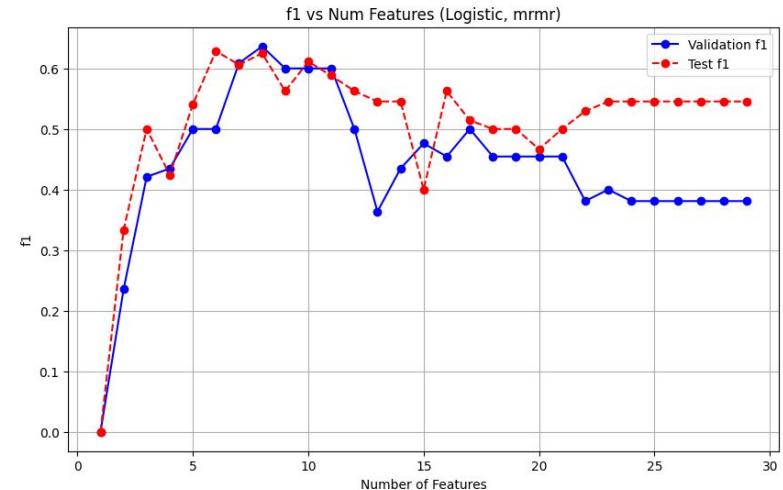
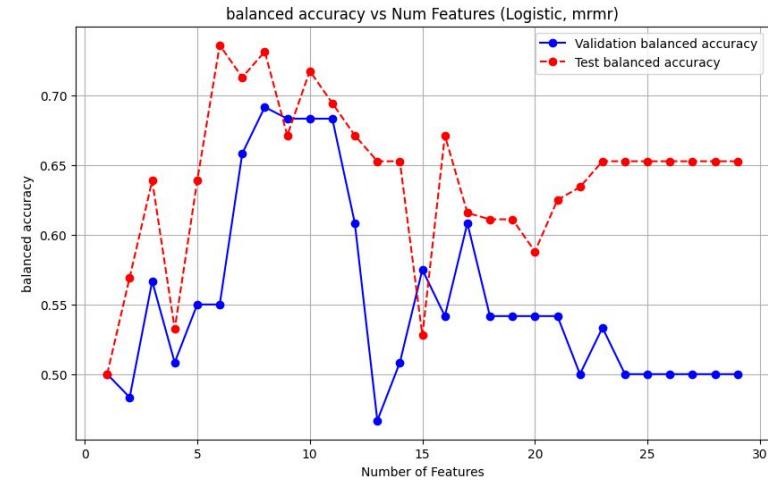
F1 Score (Test): 0.6250

Accuracy (Test): 0.6923

Confusion Matrix (Test):

```
[[17 10]]
```

```
[ 2 10]]
```

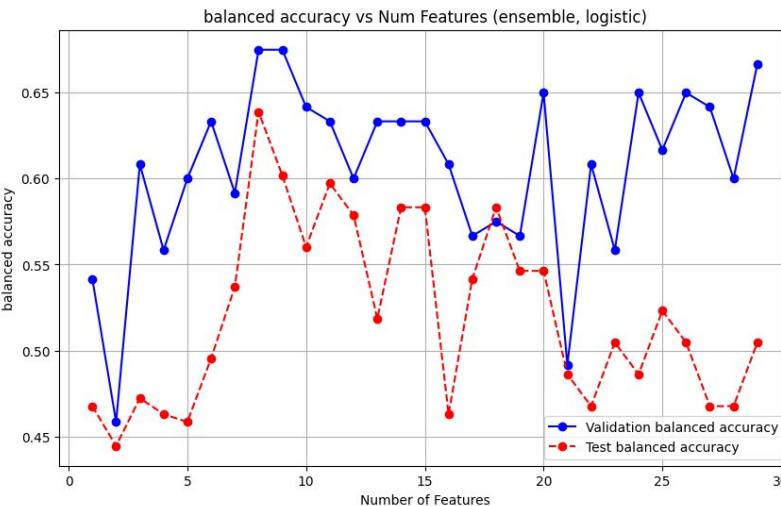
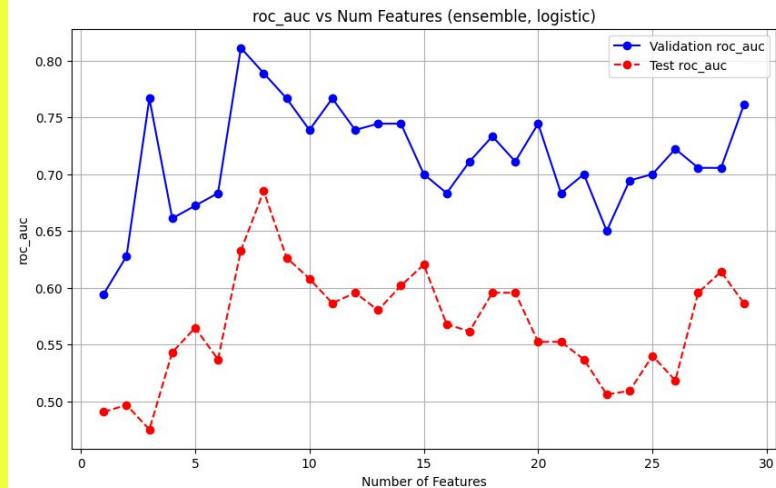


radiomic 2d seed 3 no standard

Seed: 3
Classifier: ensemble
Selector: logistic
Num Features: 8

--- Validation Set Metrics (Seed 3) ---
Balanced Accuracy (Validation): 0.6750
ROC AUC (Validation): 0.7889
F1 Score (Validation): 0.5556
Accuracy (Validation): 0.7037
Confusion Matrix (Validation):
[[14 1]
 [7 5]]

--- Test Set Metrics ---
Balanced Accuracy (Test): 0.6389
ROC AUC (Test): 0.6852
F1 Score (Test): 0.5000
Accuracy (Test): 0.6923
Confusion Matrix (Test):
[[21 6]
 [6 6]]



radiomica 2d wavelet

Classifier: XgBoost
Selector: lasso
Alpha: 0.003
Num Features: 31

--- Validation Set Metrics
Balanced Accuracy (Validation): 0.

ROC AUC (Validation): 0.7889

F1 Score (Validation): 0.7273

Accuracy (Validation): 0.7778

Confusion Matrix (Validation):

```
[[13  2]
 [ 4  8]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.6898

ROC AUC (Test): 0.7099

F1 Score (Test): 0.5806

Accuracy (Test): 0.6667

Confusion Matrix (Test):

```
[[17 10]
 [ 3  9]]
```

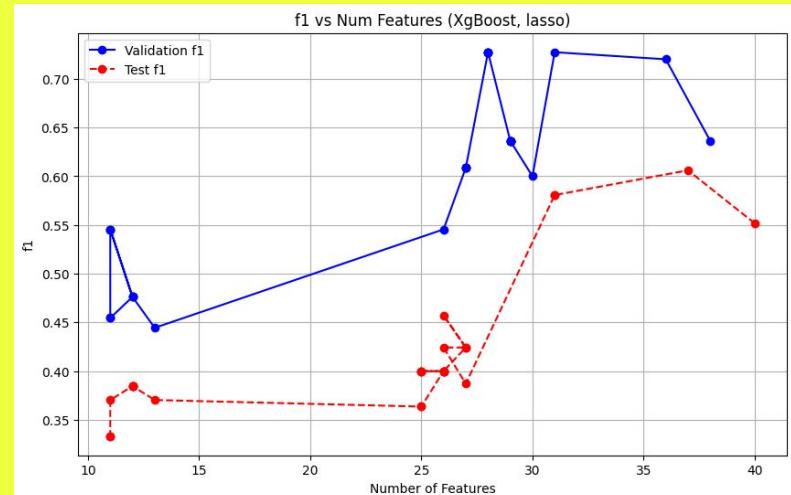
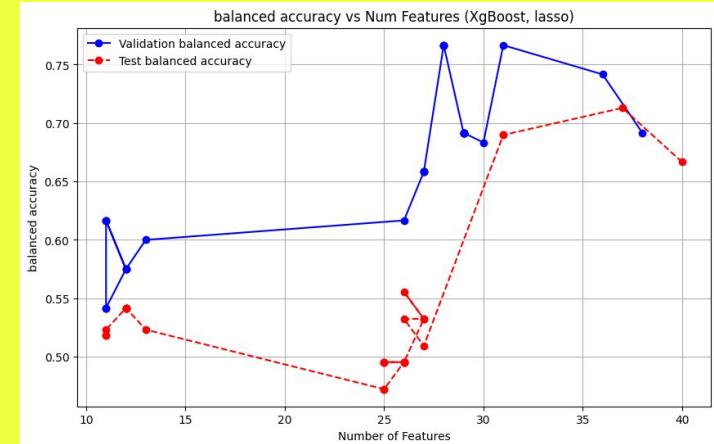
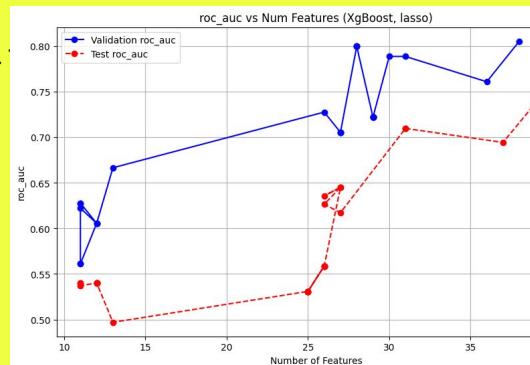


tabella risultati classificazione 2D

type of features	Classifier	Selector	number features	roc auc val	bal accuracy val	f1 val	roc auc test	bal accuracy test	f1 test	confusion matrix test
RADIOMICA	ensemble	Logistic	8	0.7889	0.6750	0.5556	0.6852	0.6389	0.5000	$\begin{bmatrix} 21 & 6 \\ 6 & 6 \end{bmatrix}$
Radiomic Wavelet	XgBoost	lasso	31							
VGG19	SVM	rf	12	0.7222	0.7667	0.7273	0.6821	0.7454	0.6429	$\begin{bmatrix} 20 & 7 \\ 3 & 9 \end{bmatrix}$
Resnet50	RandomForest	mrmr	2	0.6583	0.7083	0.6923	0.7423	0.6759	0.5714	$\begin{bmatrix} 14 & 13 \\ 2 & 10 \end{bmatrix}$
InceptionV3	MLP	mrmr	16	0.8278	0.7750	0.7500	0.6481	0.6296	0.5161	$\begin{bmatrix} 16 & 11 \\ 4 & 8 \end{bmatrix}$

CLASSIFICAZIONE 2.5D

VGG 19

Classifier: RandomForest
Selector: logistic
Mode: MV
Num Features: 23

--- Validation Set Metrics ---

Balanced Accuracy (Validation): 0.6333

ROC AUC (Validation): 0.5556

F1 Score (Validation): 0.6154

Accuracy (Validation): 0.6296

Confusion Matrix (Validation):

```
[[9 6]
 [4 8]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.6019

ROC AUC (Test): 0.6235

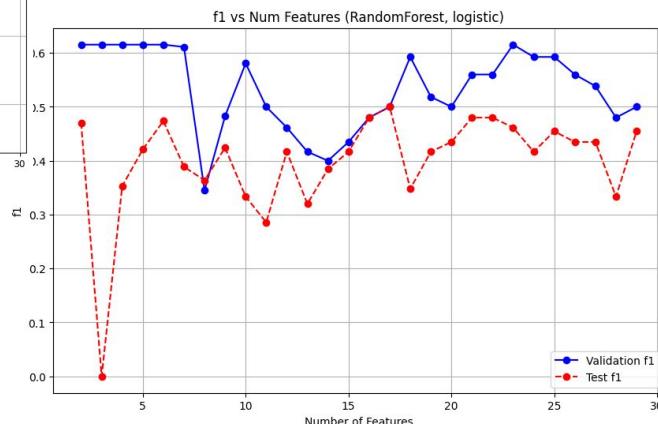
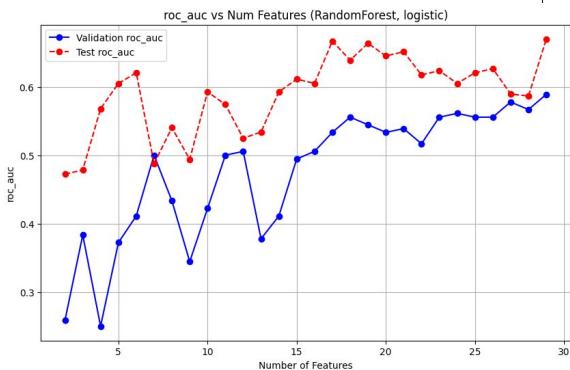
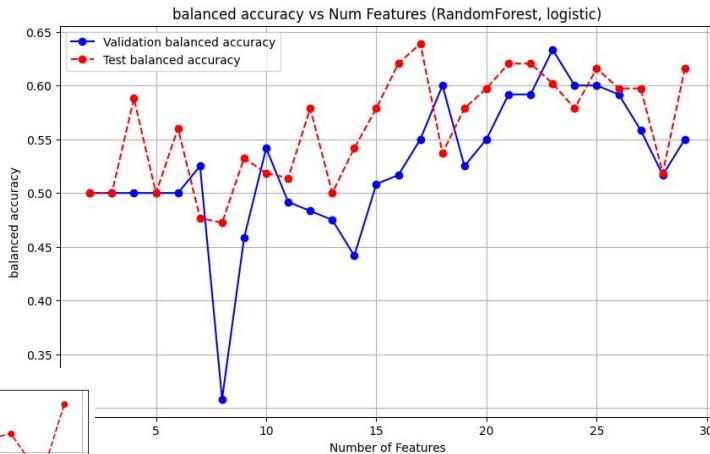
F1 Score (Test): 0.4615

Accuracy (Test): 0.6410

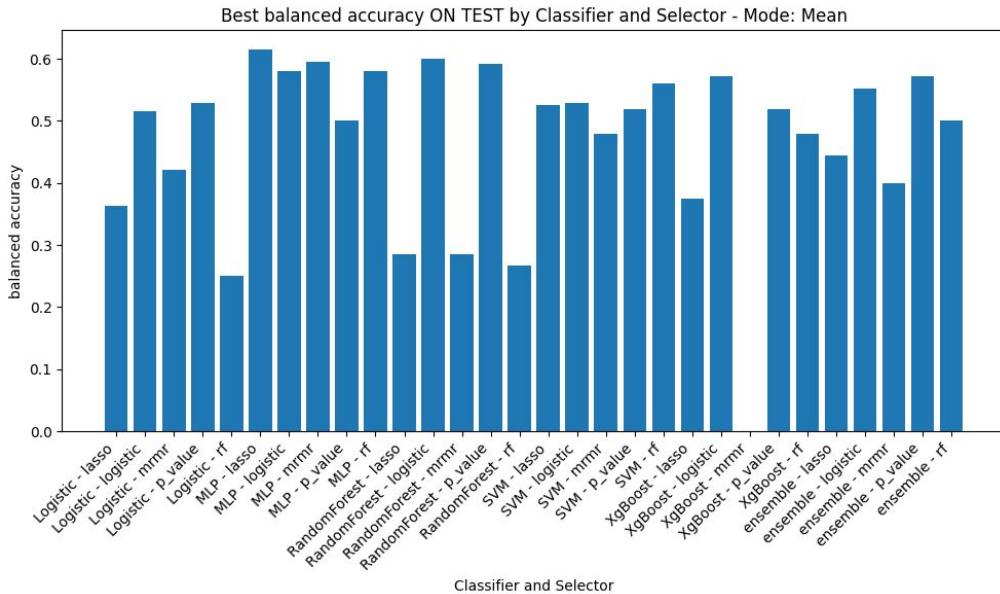
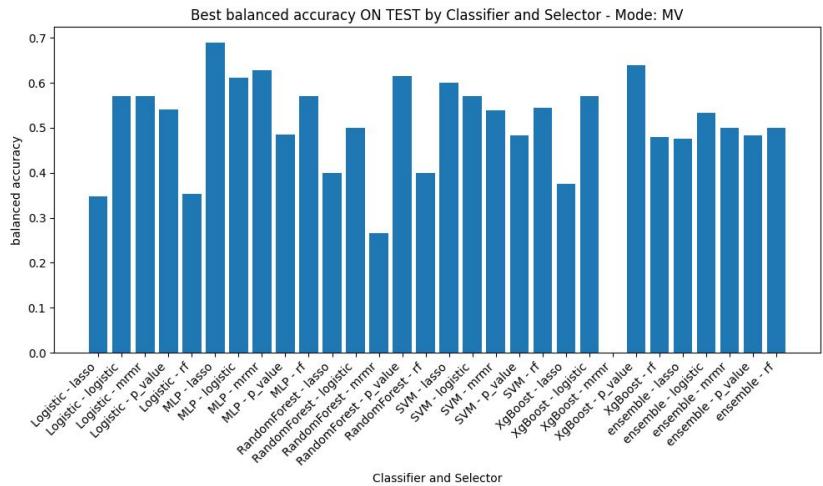
Confusion Matrix (Test):

```
[[19  8]
 [ 6  6]]
```

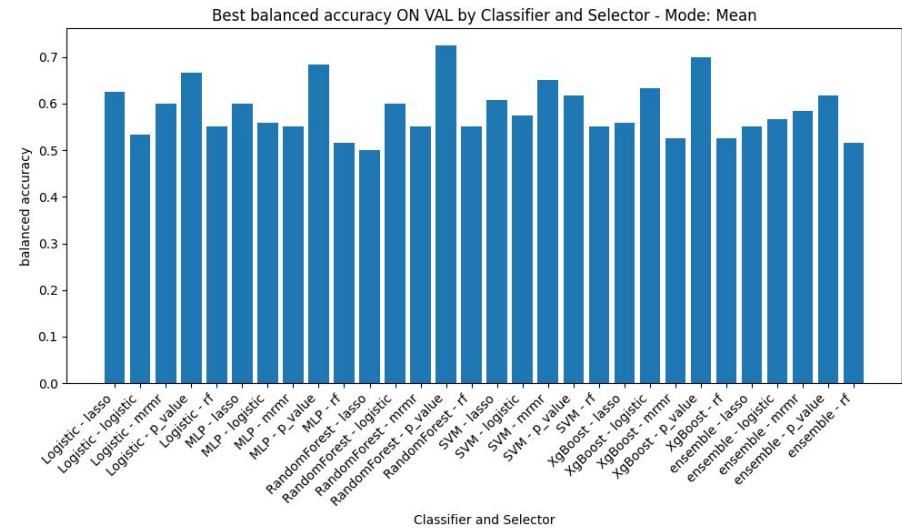
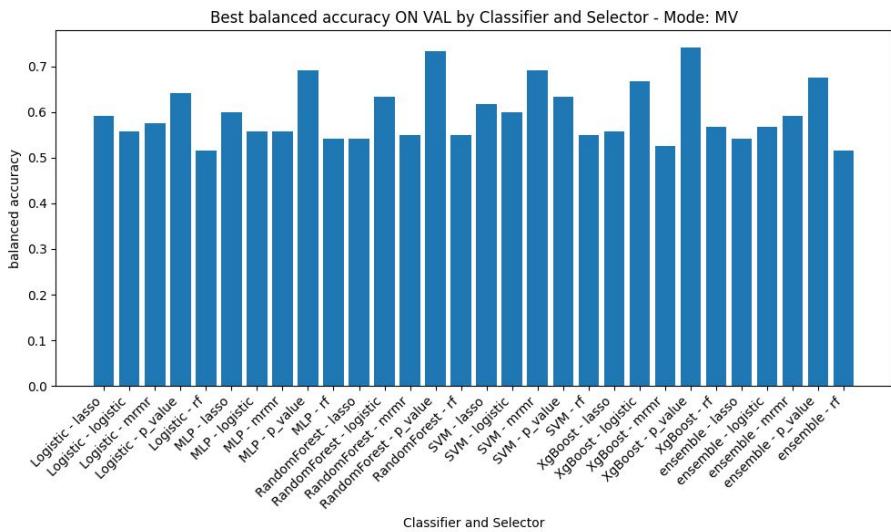
=====



VGG NUOVO analisi test



analisi val



NON SO COSA METTERE

osservazioni

da evitare per test:

- LOGISTIC RF
- LOGISTIC LASSO
- MLP PVALUE
- RF LASSO
- RF MRMR
- RF RF
- XGBOOST
-

da evitare per val:

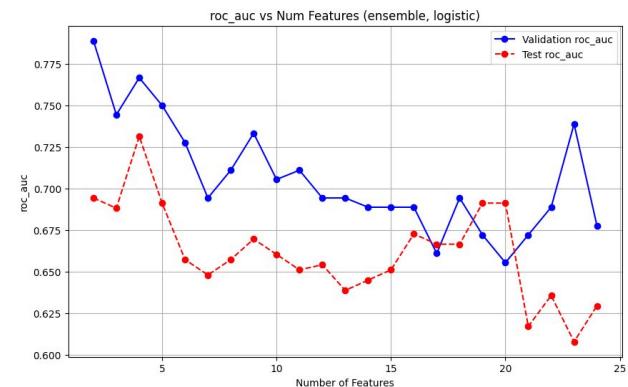
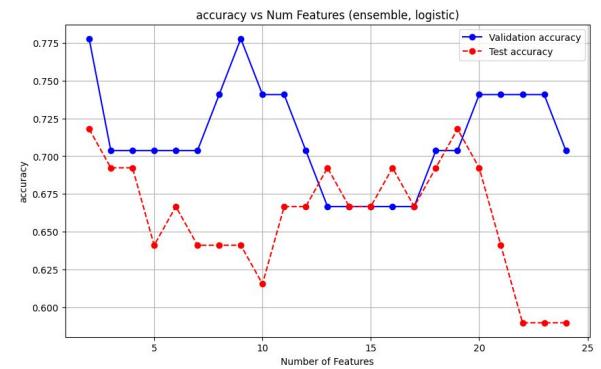
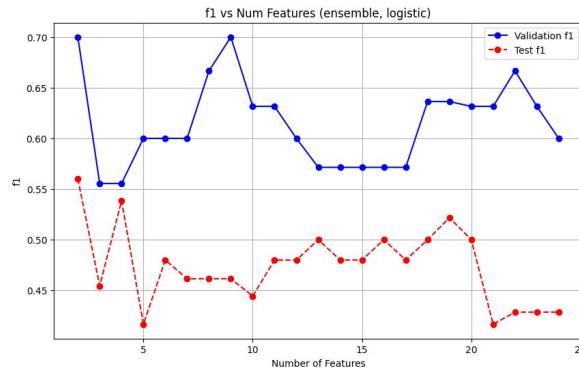
- funziona bene
- p_value
-

Radiomica (solo correlation 0.8)

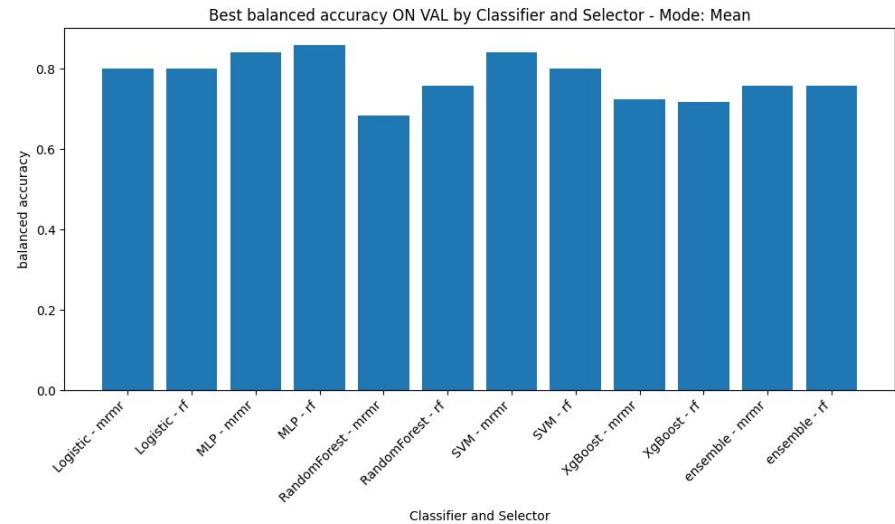
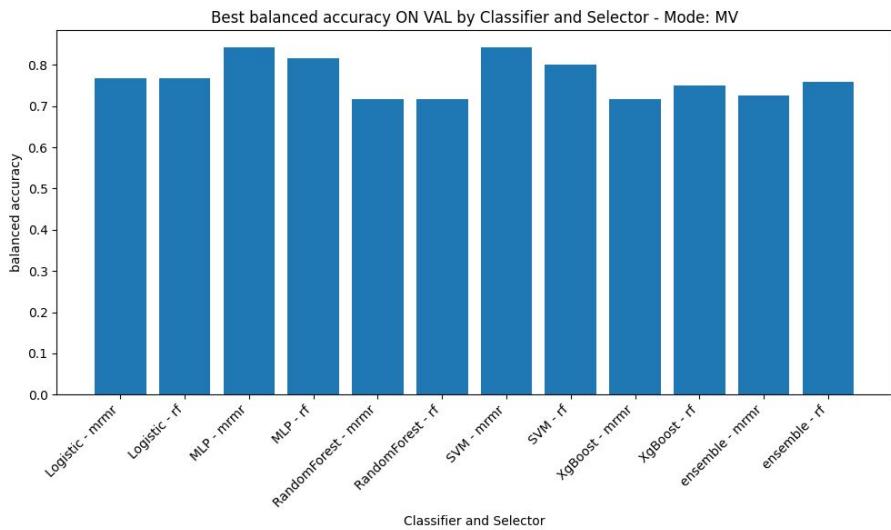
Classifier: ensemble
Selector: logistic
Mode: Mean
Num Features: 2

--- Validation Set Metrics --
Balanced Accuracy (Validation): 0.7583
ROC AUC (Validation): 0.7889
F1 Score (Validation): 0.7000
Accuracy (Validation): 0.7778
Confusion Matrix (Validation):
[[14 1]
 [5 7]]

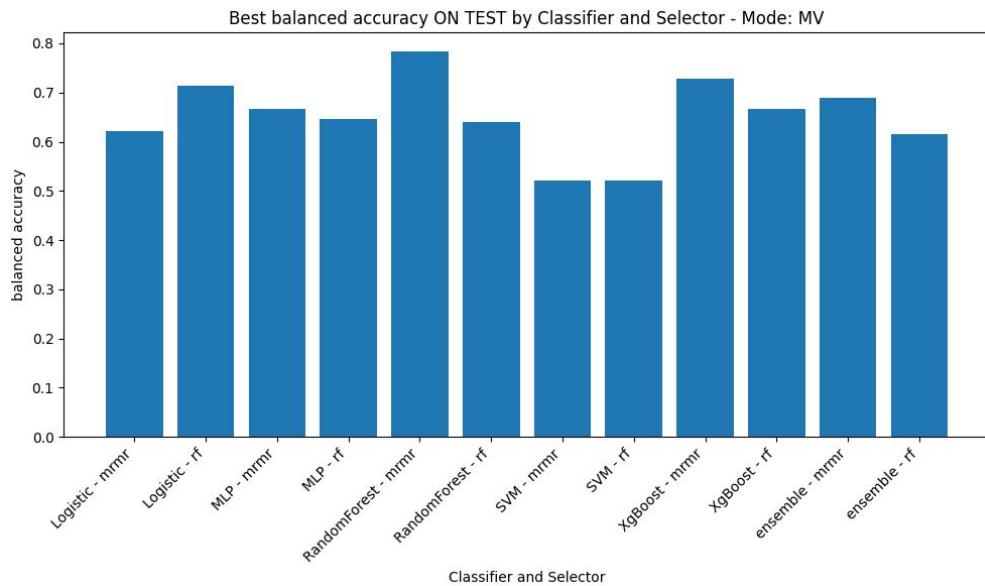
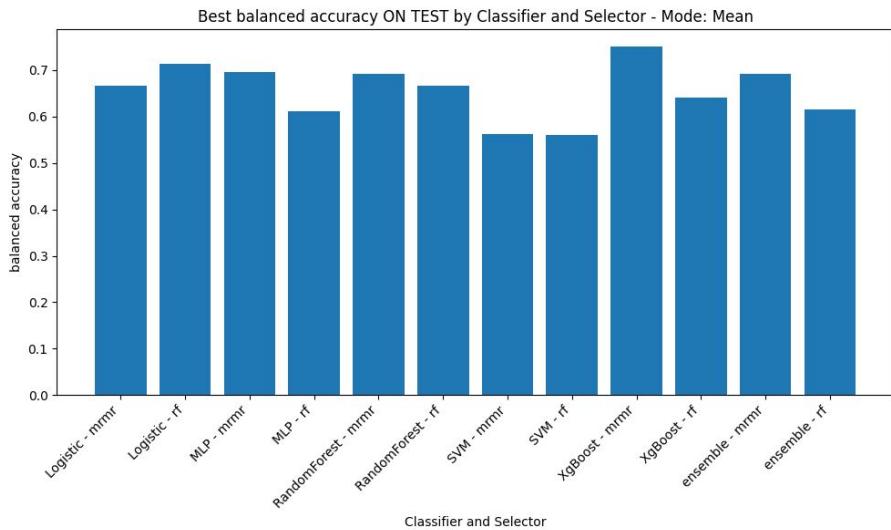
--- Corresponding Test Set Metrics --
Balanced Accuracy (Test): 0.6806
ROC AUC (Test): 0.6944
F1 Score (Test): 0.5600
Accuracy (Test): 0.7179
Confusion Matrix (Test):
[[21 6]
 [5 7]]



analisi bal acc su val



analisi bal acc su test



radiomic Wavelet

- risultato trovato togliendo SVM e MLP come classificatori
- teniamo mrmr e rf come migliori selectors

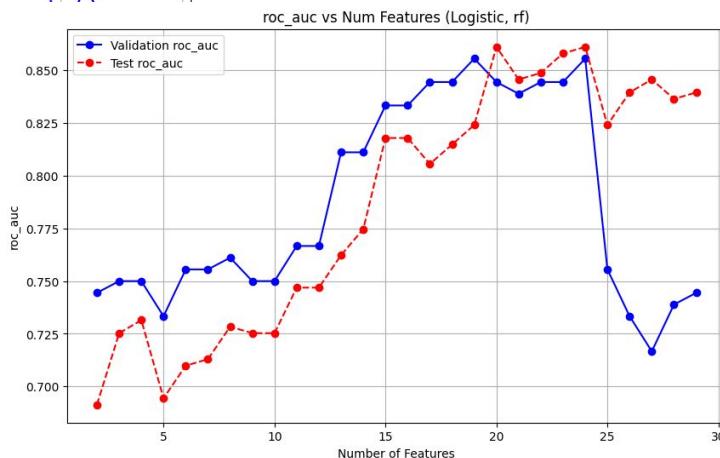
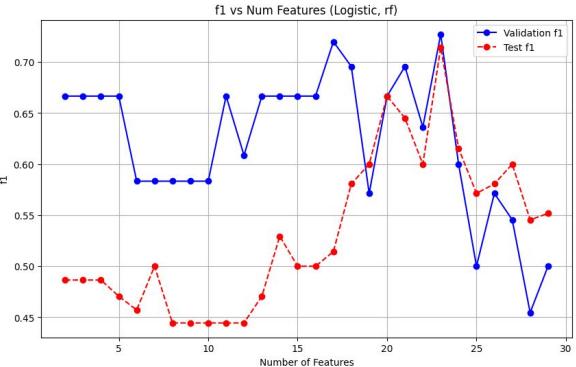
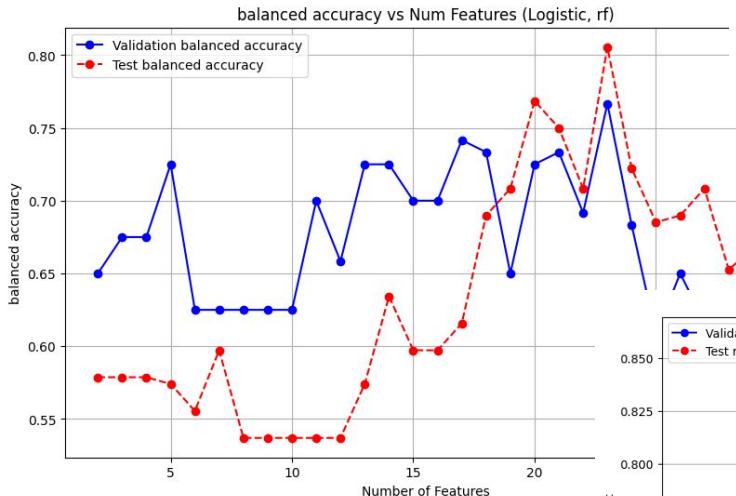
```
Classifier: Logistic  
Selector: rf  
Mode: MV  
Num Features: 23
```

--- Validation Set Metrics ---

```
Balanced Accuracy (Validation): 0.761  
ROC AUC (Validation): 0.8444  
F1 Score (Validation): 0.7273  
Accuracy (Validation): 0.7778  
Confusion Matrix (Validation):  
[[13  2]  
 [ 4  8]]
```

--- Corresponding Test Set Metrics --

```
Balanced Accuracy (Test): 0.8056  
ROC AUC (Test): 0.8580  
F1 Score (Test): 0.7143  
Accuracy (Test): 0.7949  
Confusion Matrix (Test):  
[[21  6]  
 [ 2 10]]
```



radiomic Wavelet

- risultato trovato togliendo SVM e MLP come classi
- teniamo mrmr e rf come migliori selectors

--- Logistic Validation Result 1 ---

Classifier: Logistic

Selector: mrmr

Mode: Mean

Num Features: 23

--- Validation Set Metrics ---

Balanced Accuracy (Validation): 0.8000

ROC AUC (Validation): 0.8500

F1 Score (Validation): 0.7619

Accuracy (Validation): 0.8148

Confusion Matrix (Validation):

`[[14 1]`

`[4 8]]`

--- Corresponding Test Set Metrics ---

Balanced Accuracy (Test): 0.7454

ROC AUC (Test): 0.7747

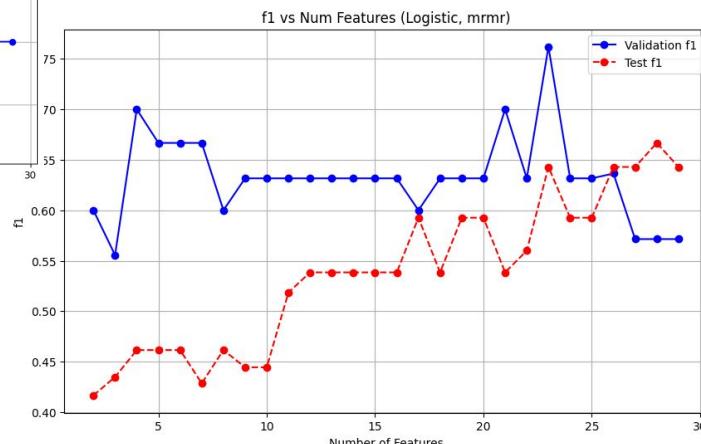
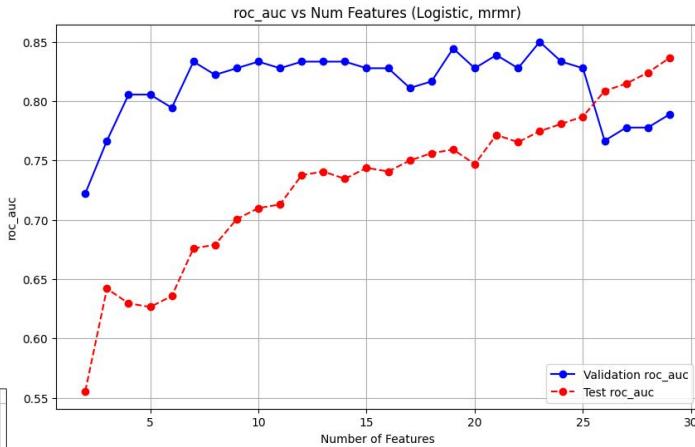
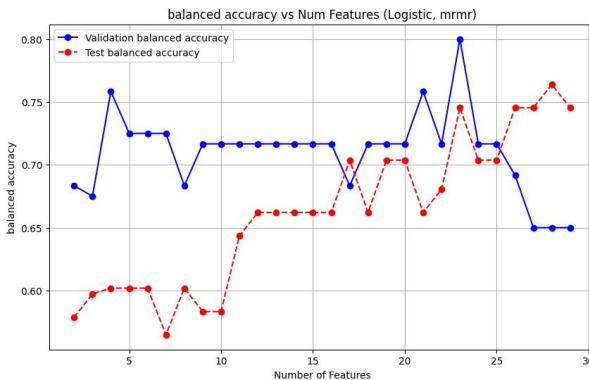
F1 Score (Test): 0.6429

Accuracy (Test): 0.7436

Confusion Matrix (Test):

`[[20 7]`

`[3 9]]`



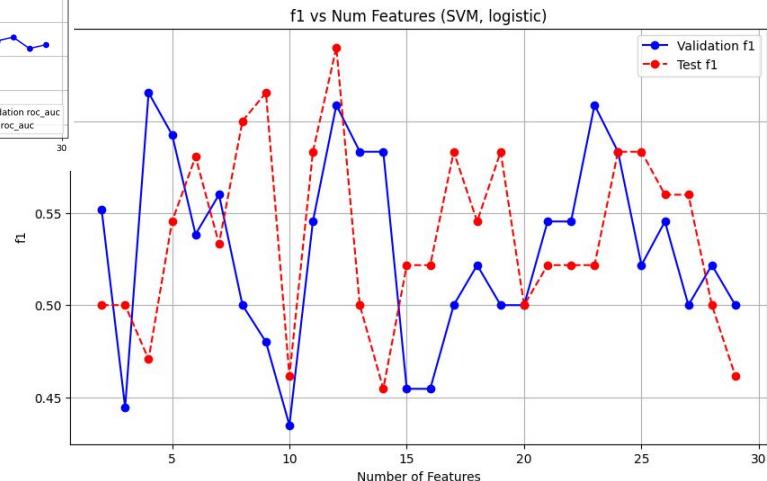
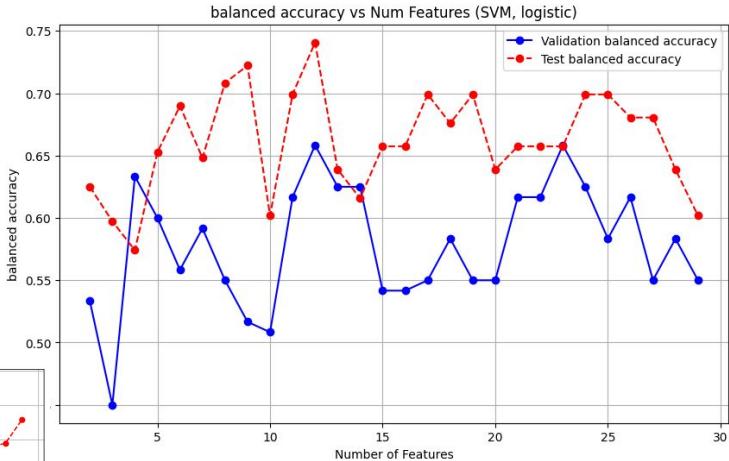
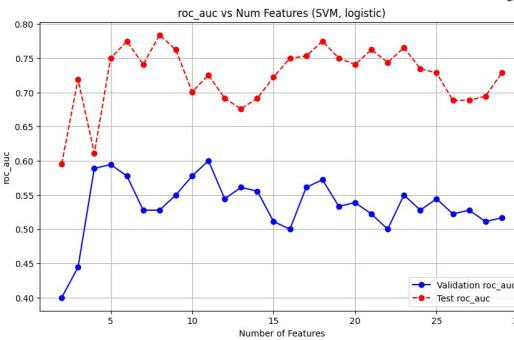
Inception

risultato migliore trovato per classificatore

```
--- Best Validation Result for SVM ---
Selector: logistic
Mode: Mean
Num Features: 12
```

```
--- Validation Set Metrics ---
Balanced Accuracy (Validation): 0.6583
ROC AUC (Validation): 0.5444
F1 Score (Validation): 0.6087
Accuracy (Validation): 0.6667
Confusion Matrix (Validation):
[[11  4]
 [ 5  7]]
```

```
--- Corresponding Test Result ---
Balanced Accuracy (Test): 0.7407
ROC AUC (Test): 0.6914
F1 Score (Test): 0.6400
Accuracy (Test): 0.7692
Confusion Matrix (Test):
[[22  5]
 [ 4  8]]
```



Resnet

(é il primo risultato migliore se tolgo p_value come selector e XgBoost e SVM)

Classifier: Logistic

Selector: rf

Mode: MV

Num Features: 28

--- Validation Set Metrics ---

Balanced Accuracy (Validation): 0.7000

ROC AUC (Validation): 0.6333

F1 Score (Validation): 0.6667

Accuracy (Validation): 0.7037

Confusion Matrix (Validation):

```
[[11  4]
 [ 4  8]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7361

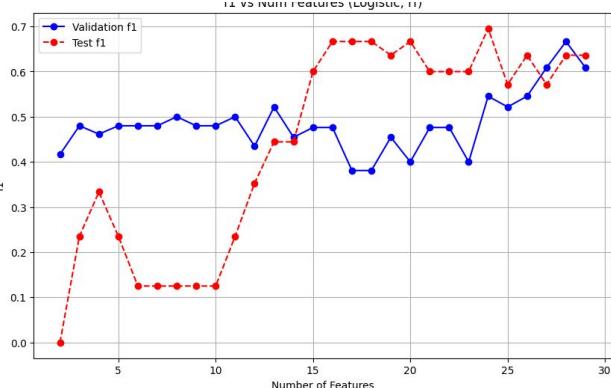
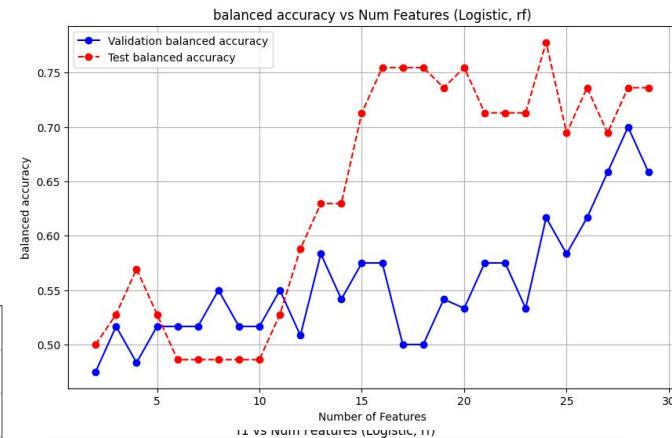
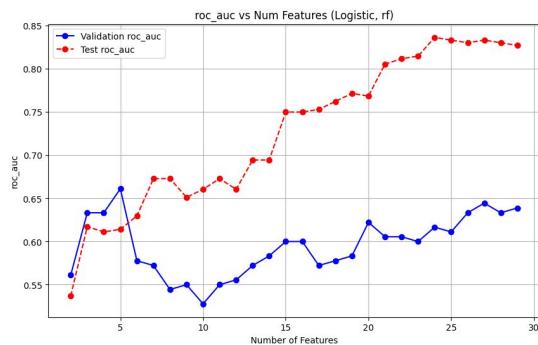
ROC AUC (Test): 0.8302

F1 Score (Test): 0.6364

Accuracy (Test): 0.7949

Confusion Matrix (Test):

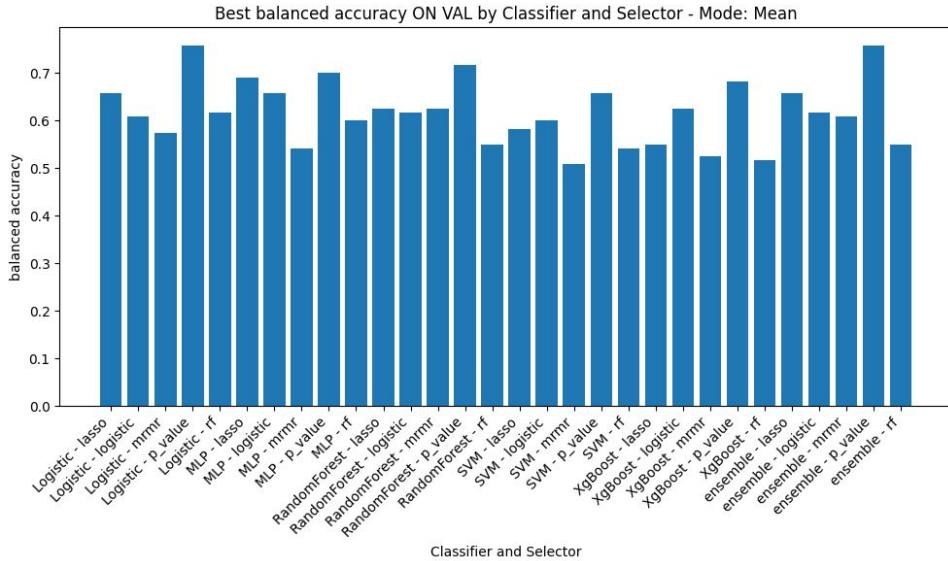
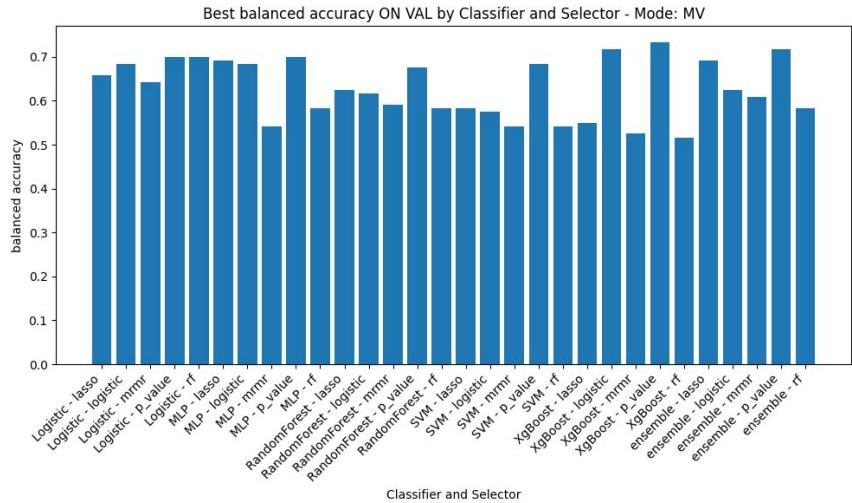
```
[[24  3]
 [ 5  7]]
```



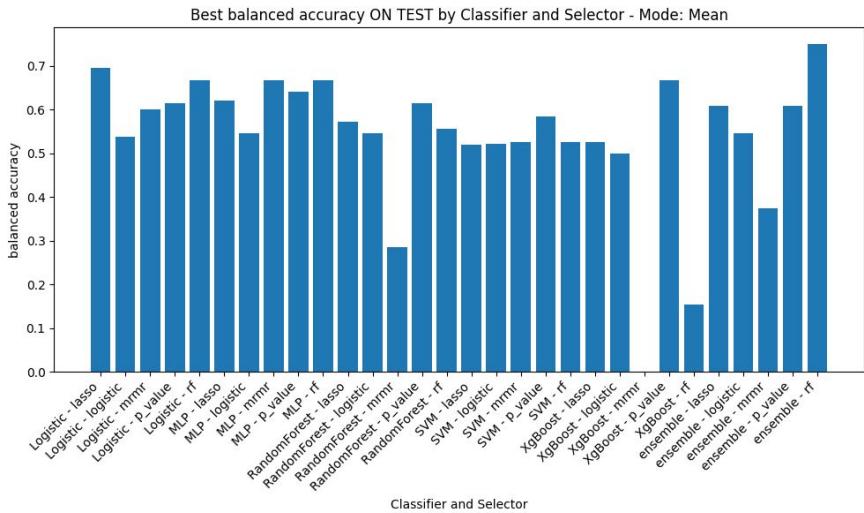
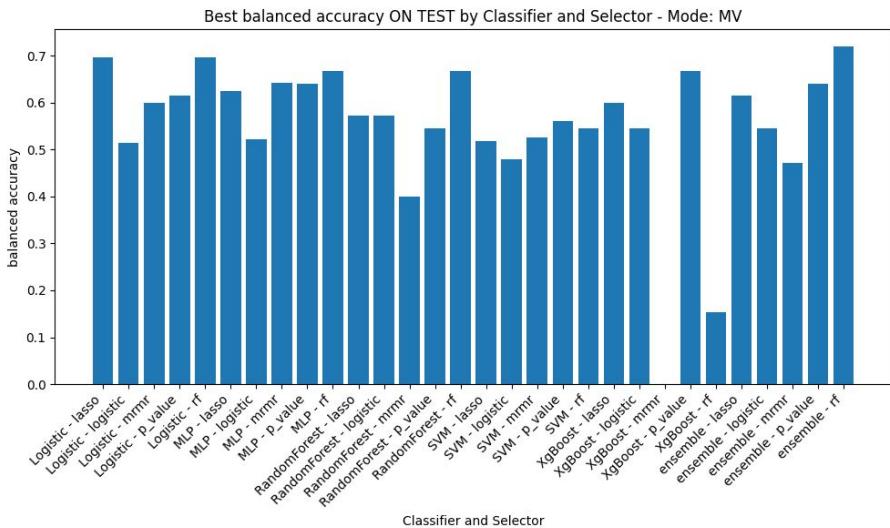
resnet test con threshold dinamica

```
Best F1 Score: 0.6667
Balanced Accuracy: 0.7593
Test Accuracy: 0.7949
PR AUC: 0.7190
ROC AUC: 0.8302
Best Threshold: 0.4400
Number of Features: 28
Selected Features: [333    2     9 170 598
5     0 100    4   94 112   25   22     8 230   23
93 133
17 418 261 383 114 140 172   54 505   86]
Confusion Matrix:
[[23   4]
 [ 4   8]]
```

analisi resnet sul val



analisi resnet sul test



osservazioni

-Xgboost funziona male per entrambi, SVM anche

-

tabella risultati classificazione 2.5D

type of features	Classifier	Selector	features	Mode	roc auc val	bal accuracy val	f1 val	roc auc test	bal accuracy test	f1 test	confusion matrix test
RADIOMICA	ensemble	logistic	2	Mean	0.7889	0.7583	0.7	0.6944	0.6806	0.56	[[21 6] [5 7]]
RADIOMICA wavelet	Logistic	mrmr	23	Mean	0.85	0.8	0.7619	0.7747	0.7456	0.6429	[[20 7] [3 9]]
VGG19	Random Forest	logistic	23	MV	0.5556	0.6333	0.6154	0.6235	0.6019	0.4615	[[19 8] [6 6]]
Resnet50	Logistic	rf	28	MV	0.6333	0.7	0.6667	0.8302	0.7361	0.6364	[[24 3] [5 7]]
InceptionV3	SVM	logistic	12	mean	0.5444	0.6583	0.6087	0.6914	0.7407	0.64	[[22 5] [4 8]]

Radiomic + Inception

Classifier: MLP

Selector: rf

Mode: MV

Num Features: 22

--- Validation Set Metrics ---

Balanced Accuracy (Validation): 0.7667

ROC AUC (Validation): 0.6722

F1 Score (Validation): 0.7273

Accuracy (Validation): 0.7778

Confusion Matrix (Validation):

`[[13 2]`

`[4 8]]`

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7222

ROC AUC (Test): 0.7469

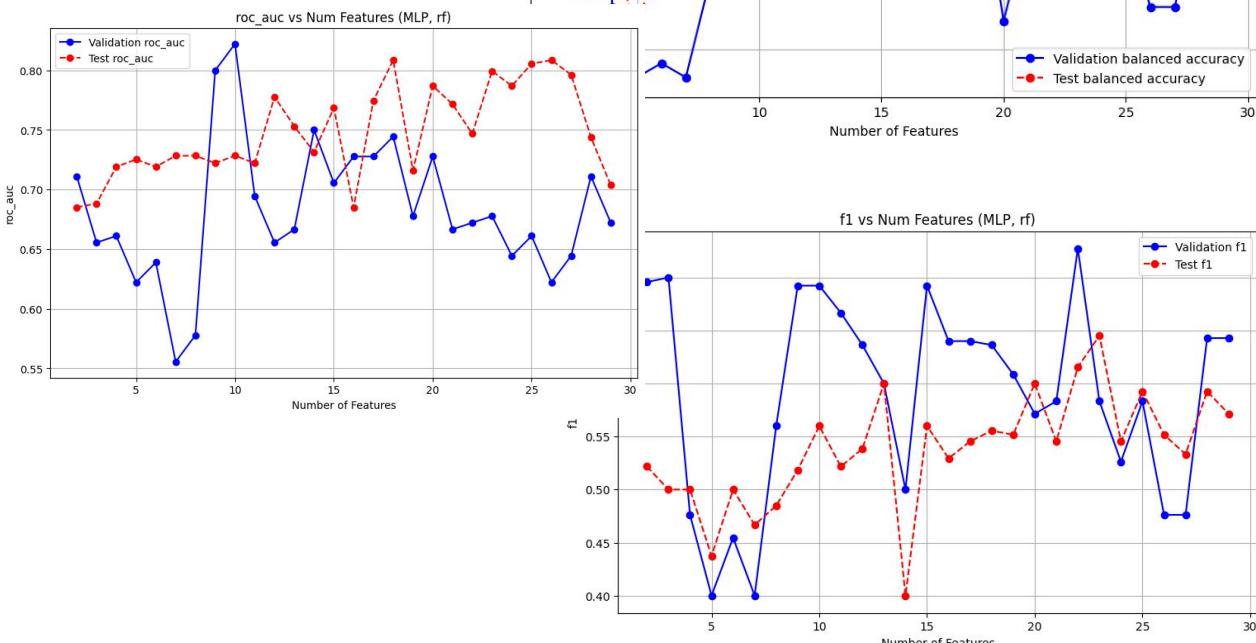
F1 Score (Test): 0.6154

Accuracy (Test): 0.7436

Confusion Matrix (Test):

`[[21 6]`

`[4 8]]`



Radiomic + Resnet

Classifier: RandomForest

Selector: mrmr

Mode: Mean

Num Features: 5

--- Validation Set Metrics ---

Balanced Accuracy (Validation):

0.7583

ROC AUC (Validation): 0.7722

F1 Score (Validation): 0.7000

Accuracy (Validation): 0.7778

Confusion Matrix (Validation):

```
[[14  1]
 [ 5  7]]
```

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.7361

ROC AUC (Test): 0.7130

F1 Score (Test): 0.6364

Accuracy (Test): 0.7949

Confusion Matrix (Test):

```
[[24  3]
 [ 5  7]]
```

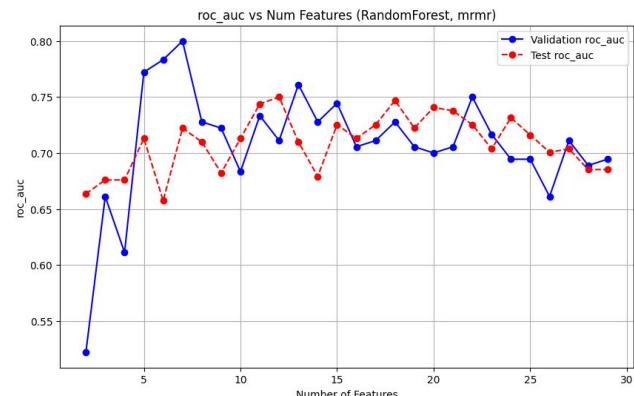
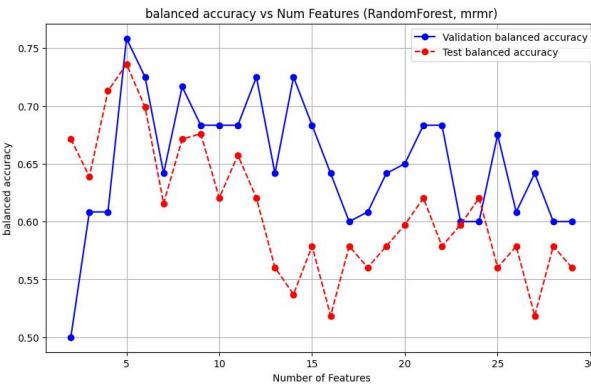
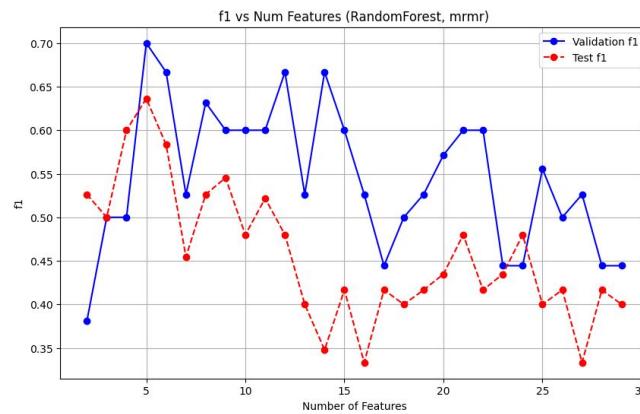


Tabella risultati classificazione 2.5D

Encoder + Radiomic Wavelet

type of features	Classifier	Selector	features	mode	roc auc val	bal accuracy val	f1 val	roc auc test	bal accuracy test	f1 test	confusion matrix test
Wavelet + Inception	MLP	rf	22	MV	0.6722	0.7667	0.7273	0.6722	0.7222	0.6154	[[21 6] [4 8]]
Wavelet + Resnet	Random Forest	mrmr	5	Mean	0.772	0.7583	0.7	0.713	0.7361	0.6364	[[24 3] [5 7]]

2d rad + resnet

--- Positive Case 7 ---

Classifier: RandomForest

Selector: rf

Num Features: 9

--- Validation Set Metrics

Balanced Accuracy (Validation):

0.8250

ROC AUC (Validation): 0.7500

F1 Score (Validation): 0.8148

Accuracy (Validation): 0.8148

Confusion Matrix (Validation):

[[11 4]

[1 11]]

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.6111

ROC AUC (Test): 0.6343

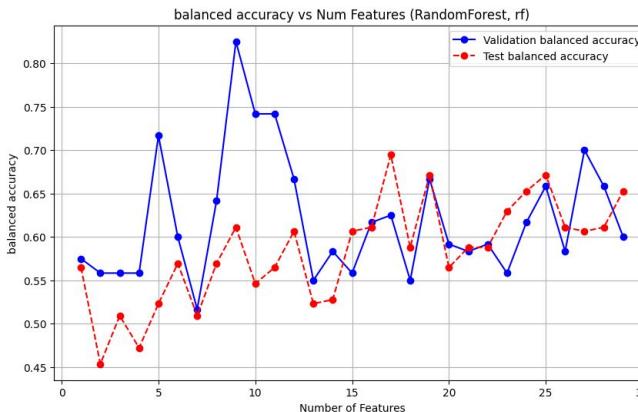
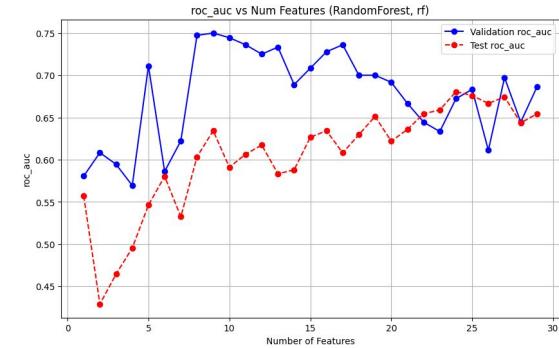
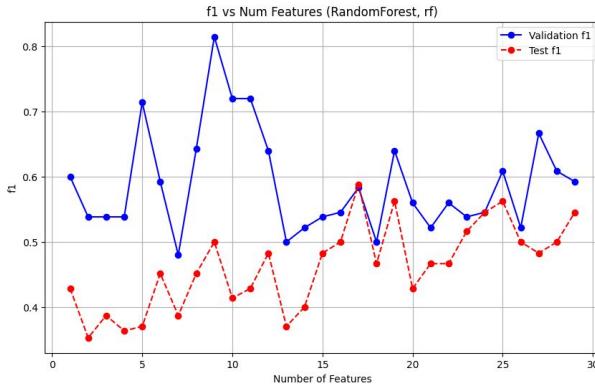
F1 Score (Test): 0.5000

Accuracy (Test): 0.5897

Confusion Matrix (Test):

[[15 12]

[4 8]]



2d Rad + Inc

Classifier: SVM

Selector: rf

Num Features: 4

--- Validation Set Metrics

Balanced Accuracy (Validation):

0.7333

ROC AUC (Validation): 0.7000

F1 Score (Validation): 0.6957

Accuracy (Validation): 0.7407

Confusion Matrix (Validation):

[[12 3]

[4 8]]

--- Test Set Metrics ---

Balanced Accuracy (Test): 0.6343

ROC AUC (Test): 0.8025

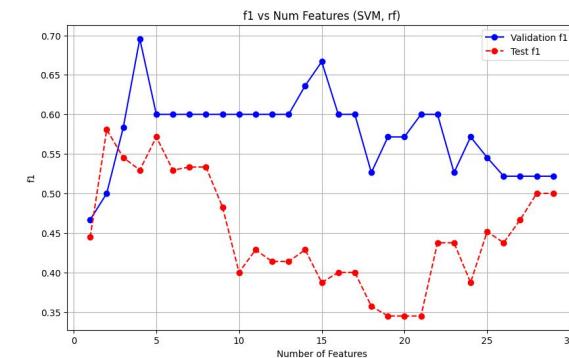
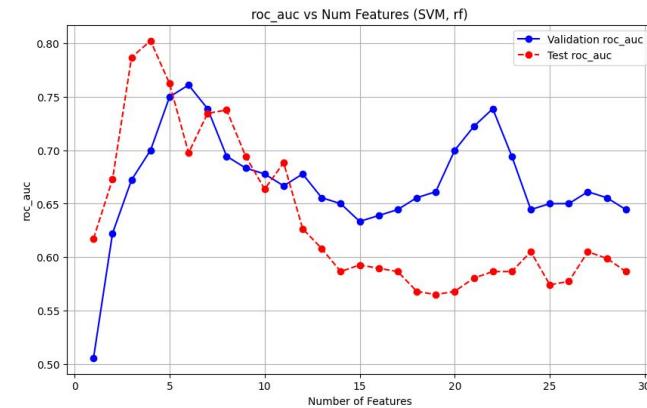
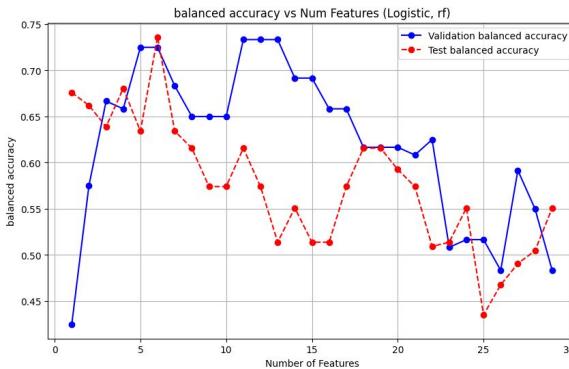
F1 Score (Test): 0.5294

Accuracy (Test): 0.5897

Confusion Matrix (Test):

[[14 13]

[3 9]]



2D Rad + VGG

Classifier: ensemble
Selector: rf
Num Features: 3

--- Validation Set Metrics

Balanced Accuracy (Validation):

0.8000

ROC AUC (Validation): 0.8444

F1 Score (Validation): 0.7619

Accuracy (Validation): 0.8148

Confusion Matrix (Validation):

$\begin{bmatrix} 14 & 1 \\ 4 & 8 \end{bmatrix}$

