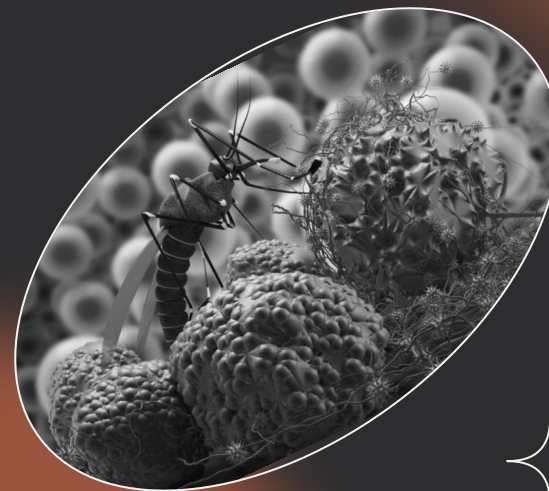


Malaria detection in blood

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ML 2022-24



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<https://github.com/Menego23>

Meneghetti Gianluca

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Risultati

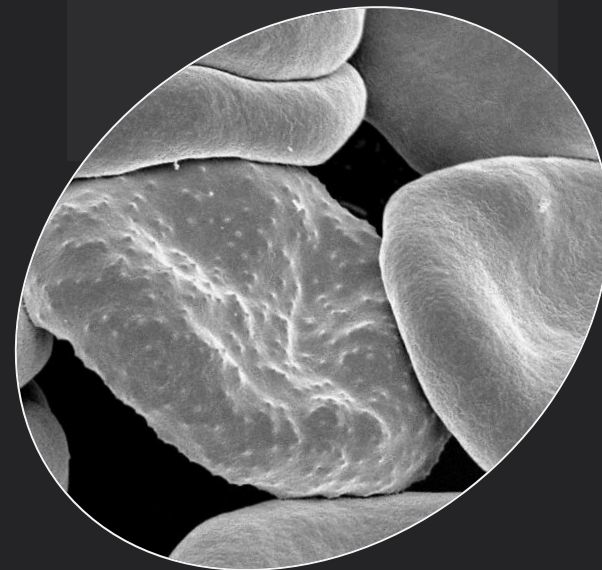
Tabelle e grafici dei risultati

04

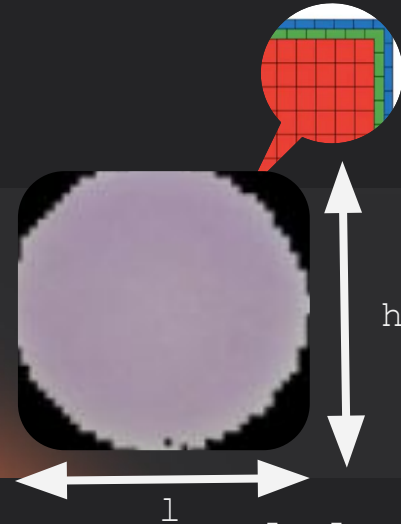
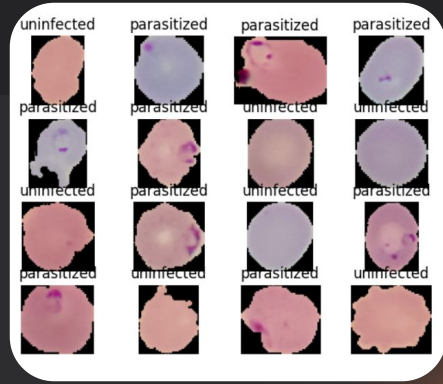


Conclusioni

Deduzioni

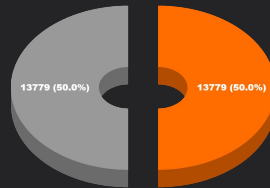


Dataset



Composizione

- 27_558 Immagini
- 2 Classi
- Istanze uguali



Immagini

- Shape diversa

(103, 103, 3)
(151, 115, 3)
(121, 115, 3)
(157, 136, 3)
(151, 148, 3)

Approcci

Step 1

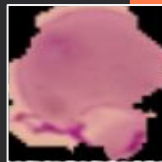
- Reshaping → `(shape=(224, 224, 3),`

Step 2

- Data augmentation →



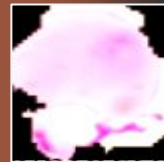
Flip left right



Flip up down



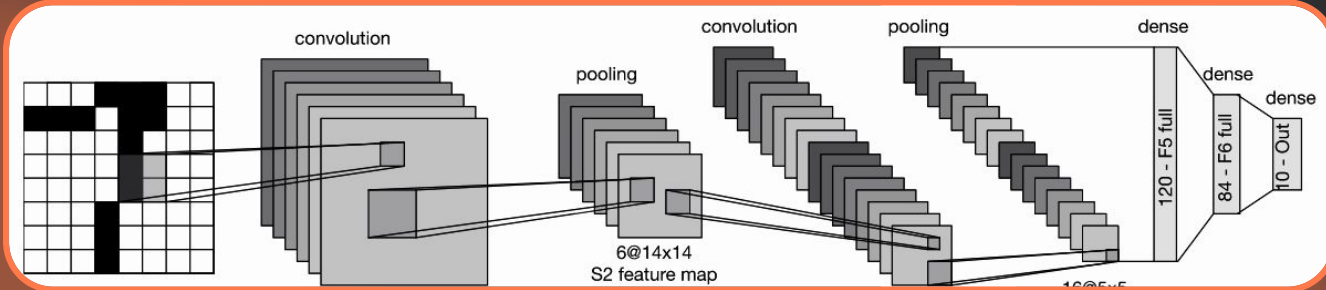
Brightness
(delta = 0.2)



Random contrast
(0.5 ->1.5)



Lenet model

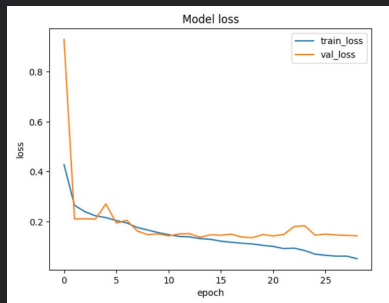


My Model:

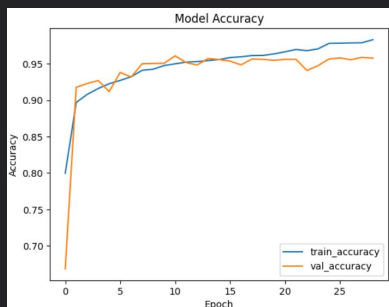
- Conv2D(f = 8, k = 3, s = 1, valid, relu)
- Batch Norm
- MaxPooling (p = 2, s = 2)
- Conv2D(f = 16, k = 3, s = 1, valid, relu)
- Batch Norm
- MaxPooling (p = 2, s = 2)
- Flatten()
- Dense(100, Relu)
- BatchN
- Dense(10, relu)
- BatchN
- Dense(1, Sigmoid)

Risultati

✦ **Loss** val_loss: 0.1494



✦ **Accuracy** val_accuracy: 0.9579



✦ **Precision** val_precision: 0.9498

$$\text{Precision} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Positive}}$$

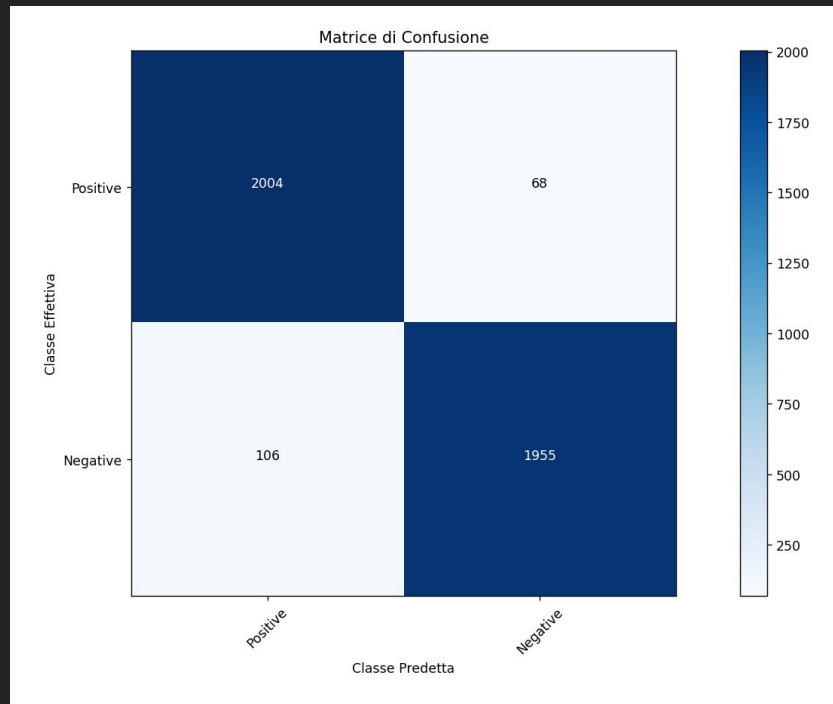
✦ **F1 score** val_f1_score: 0.9557

$$\text{F1 Score} = \frac{2 \times \text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$$

✦ **Recall** val_recall: 0.9672

$$\text{Recall} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Negative}}$$

Confusion Matrix



✦ Conclusioni

Deduzioni:

- Elevata accuratezza.
- Buona precisione e richiamo.
- Elevato AUC-ROC, indicando una forte capacità di separazione tra le classi.
- Bassi falsi positivi e falsi negativi.
- Il modello dimostra una sensibilità notevole nella diagnosi della malattia.

La specificità del modello è elevata, il che suggerisce una buona capacità di identificare correttamente campioni negativi.

Migliorie possibili:

- L'ottimizzazione degli iperparametri.
- L'uso di tecniche di regolarizzazione come la dropout o la L2 regularization può aiutare a prevenire l'overfitting del modello.