



# CLASSIFICAZIONE DATI GENETICI

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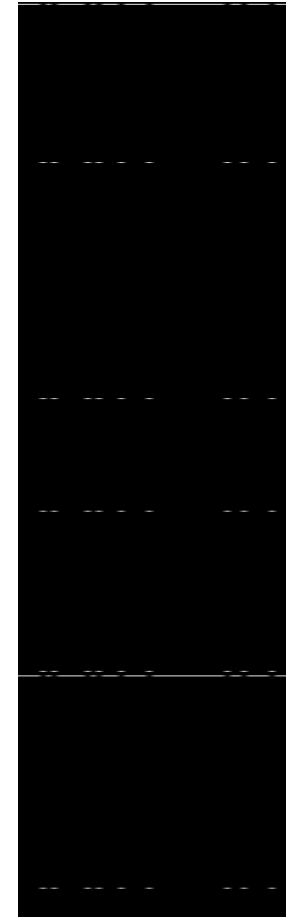
Varesco Sara

# Classificazione Immagini

- **Image Classification:**  
Due Classi: Processi Casuali (0) e Selezione Naturale (1)
- **Dataset:**
  - 2080 immagini 1000x48x3
    - 1050 Neutral
    - 1030 Selection
  - Preprocessing:  
eliminazione di un'immagine perché di dimensione diversa → 2079 immagini effettive

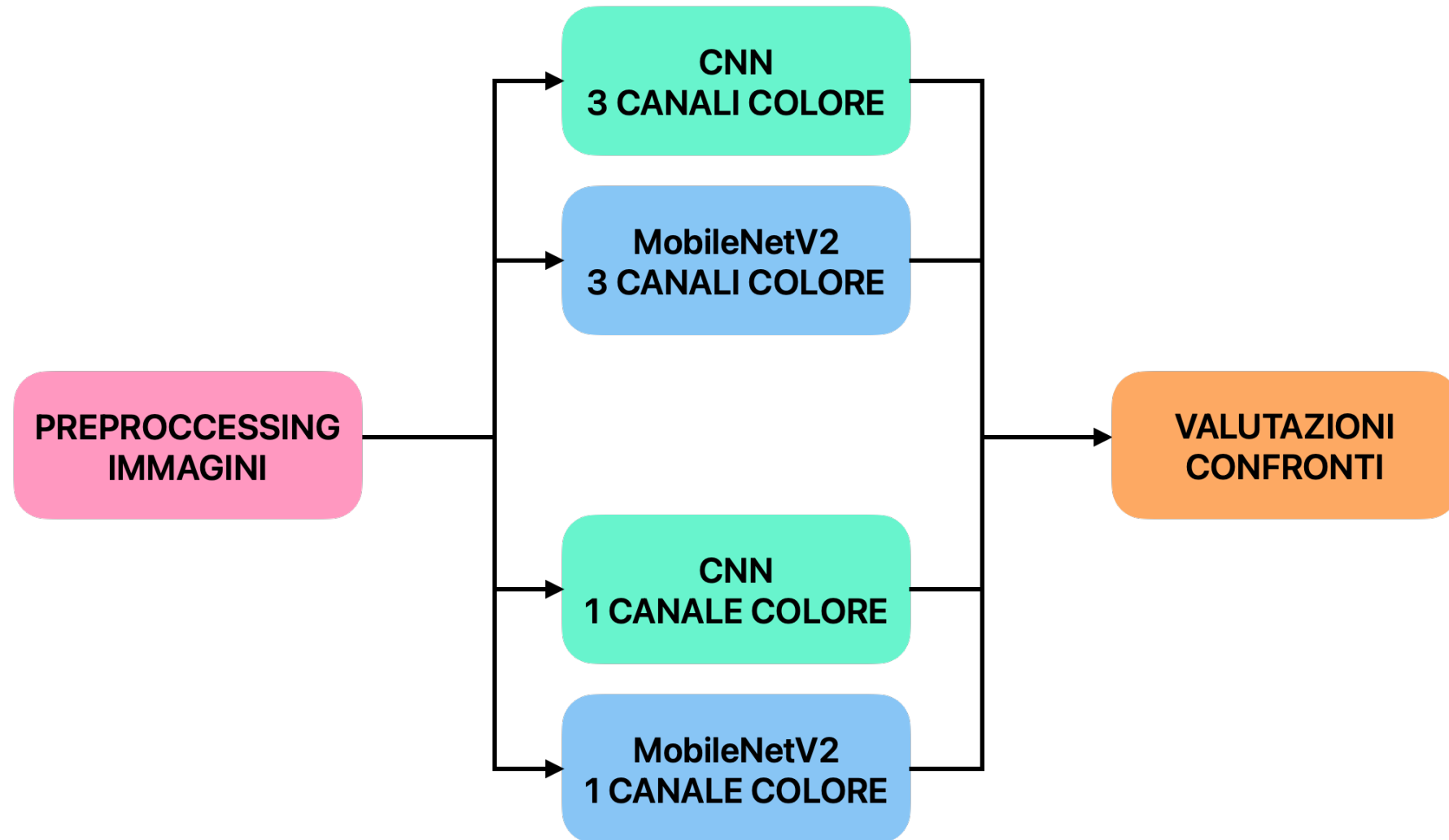


Mutazione da Processi  
Causali



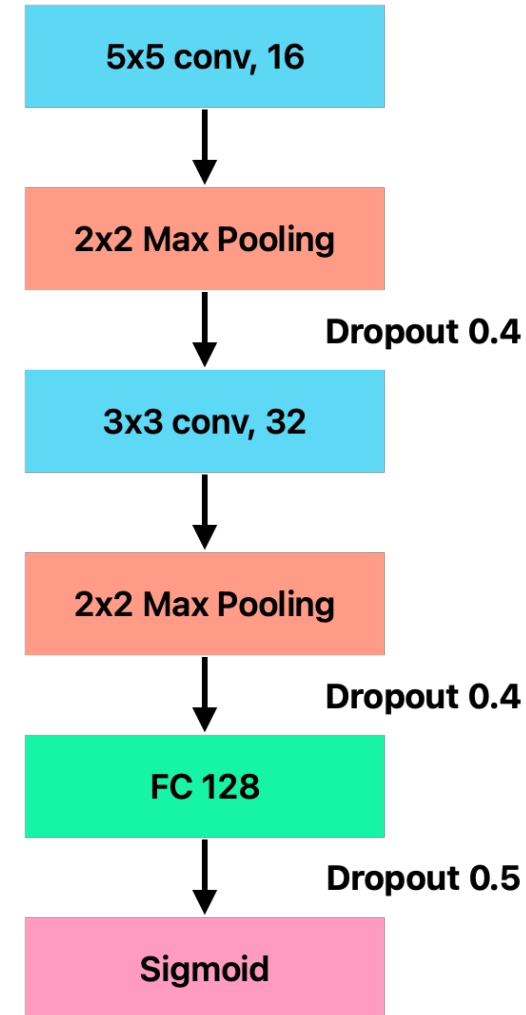
Mutazione da Selezione  
Naturale

# Workflow

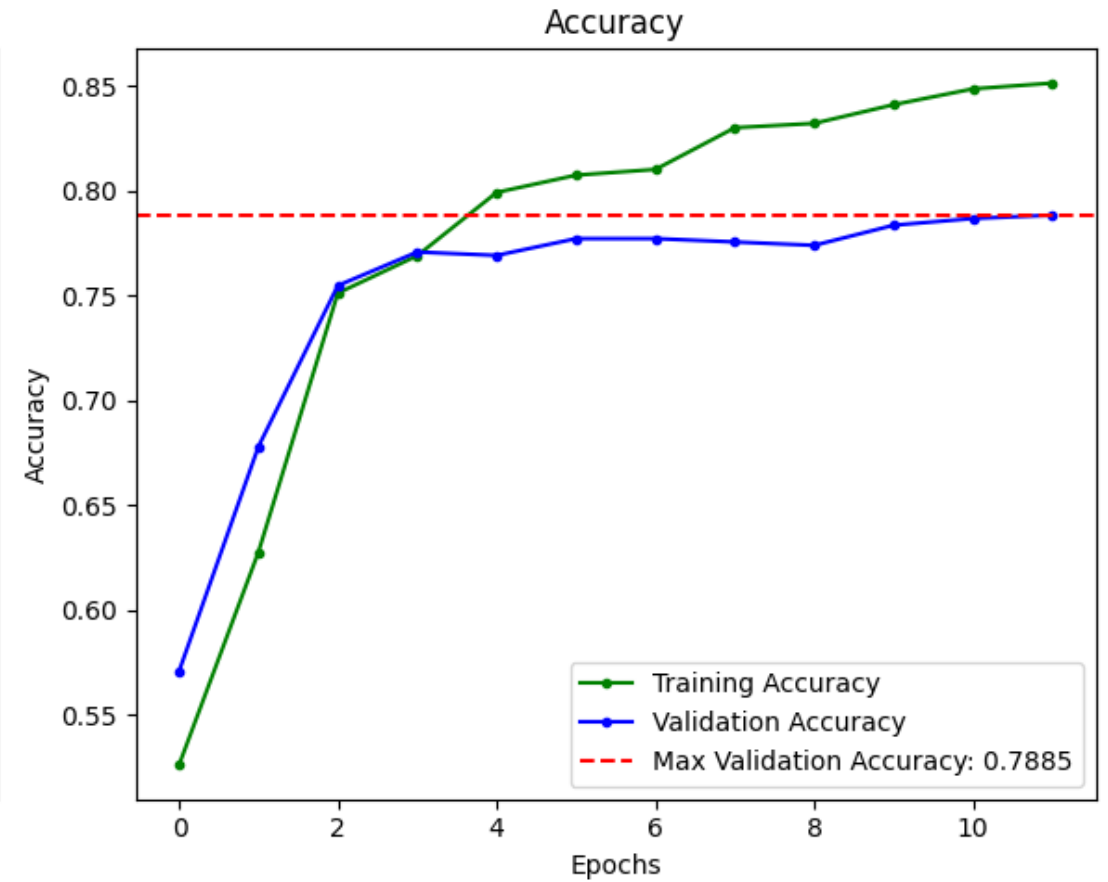
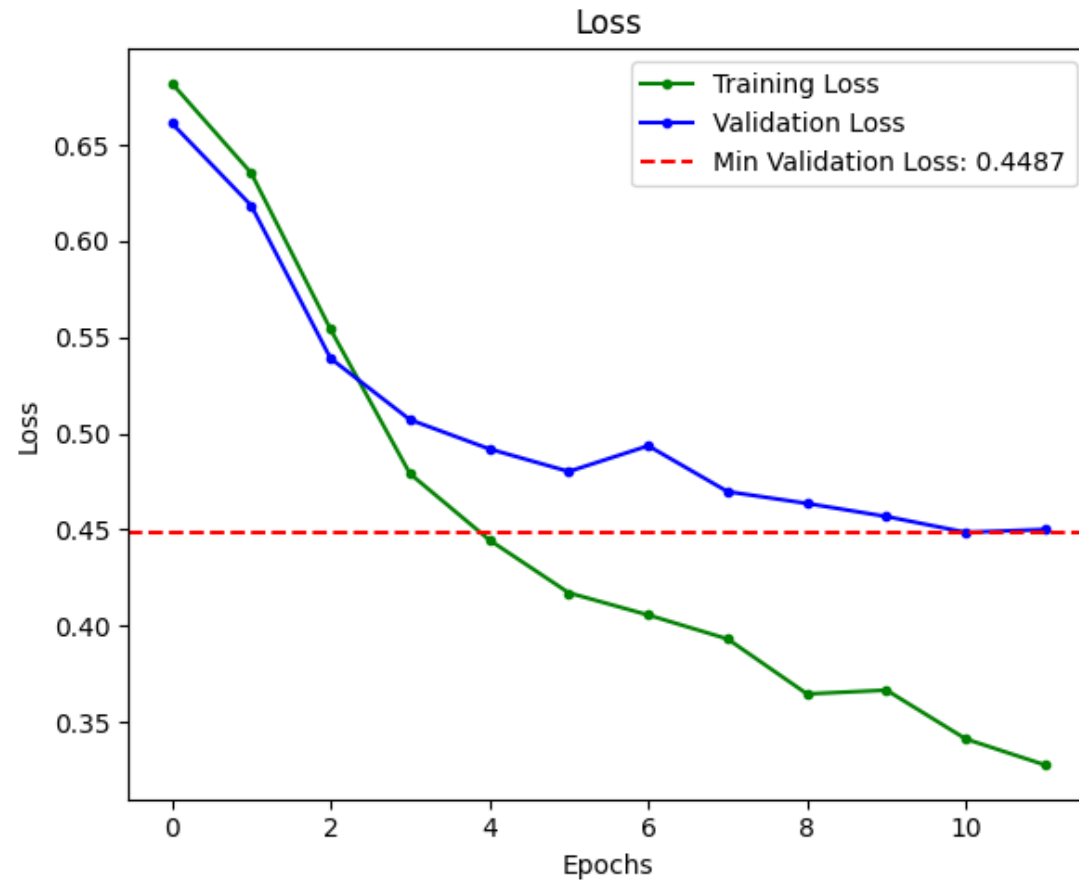


# CNN – 3 canali colori

- In ogni strato convoluzionale:
  - Relu
  - Stride 2x2
  - Padding: same
- Batch Size: 32
- Ottimizzatore: Adam
- Learning rate: 0.0005
- Weight Decay: 1e-6
- Addestramento: 7 epoche
- Loss: Binary Cross Entropy
- Numero totale parametri: 767 969

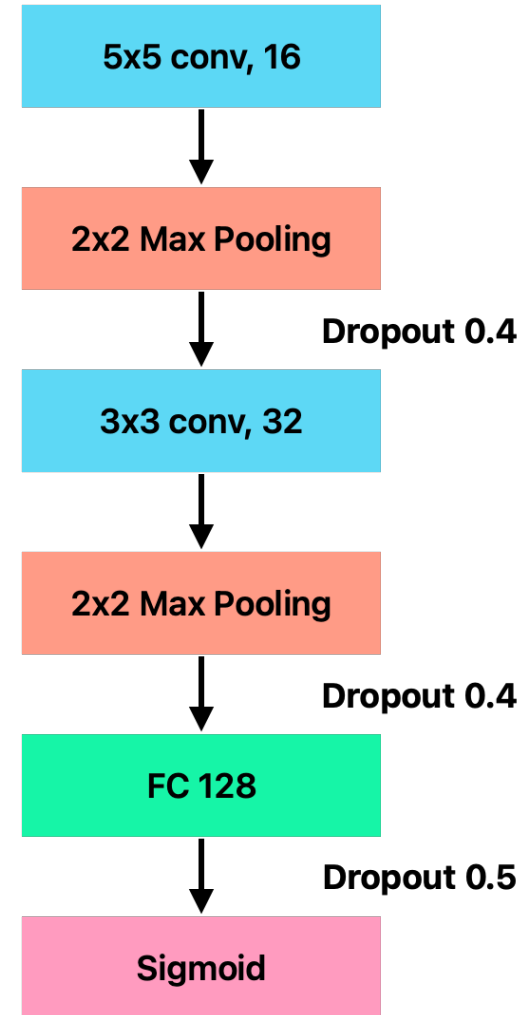


# CNN – 3 canali colori

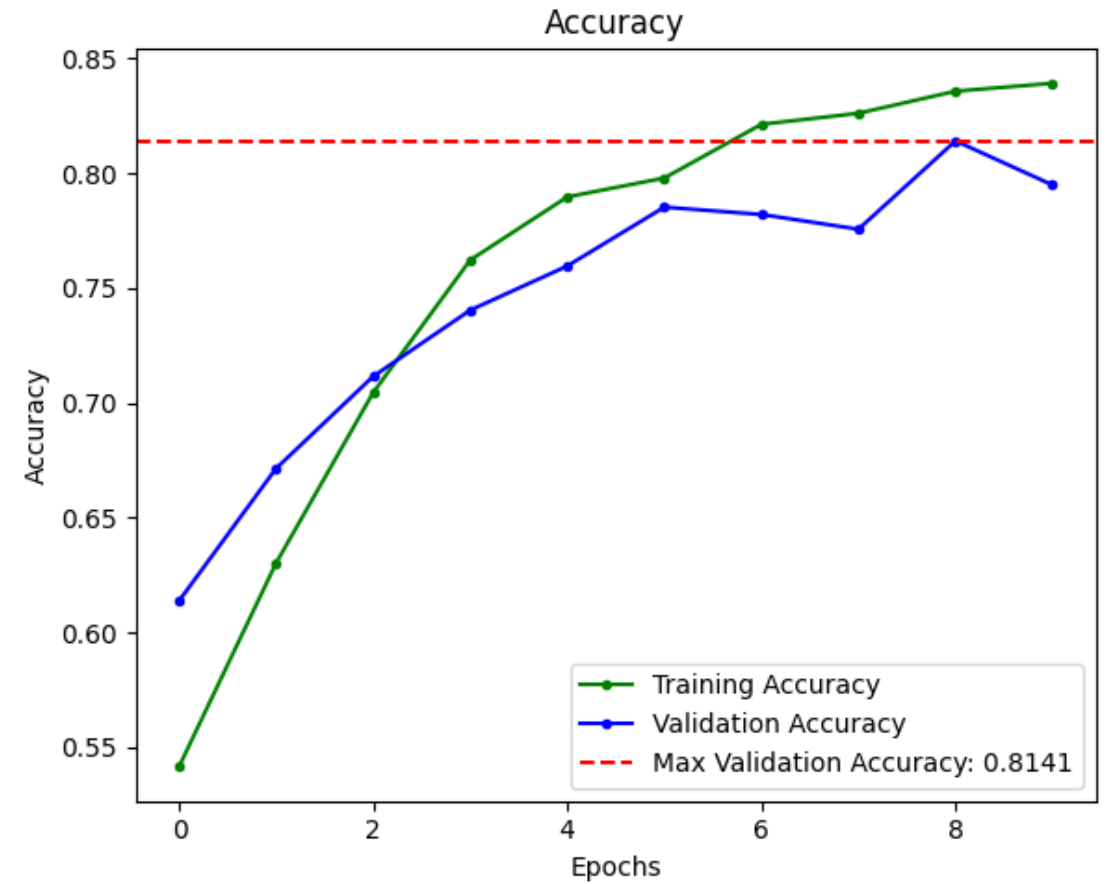
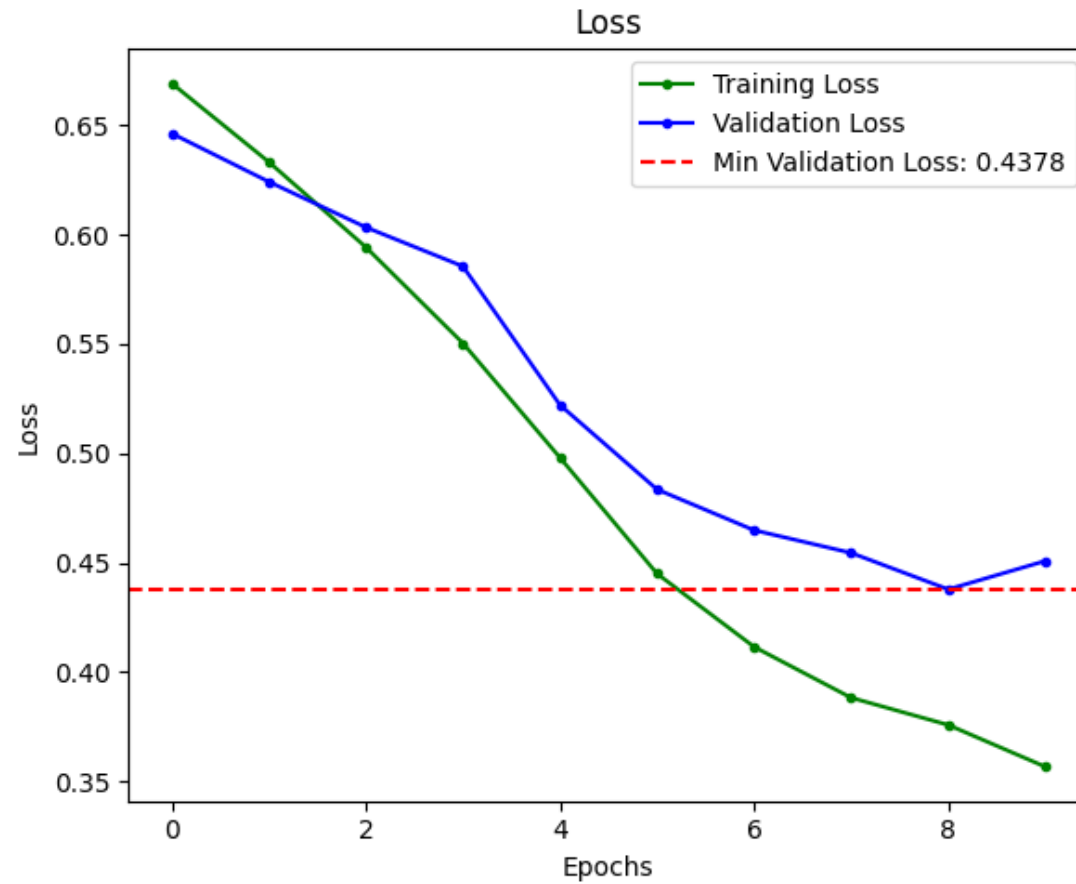


# CNN – 1 canale colore

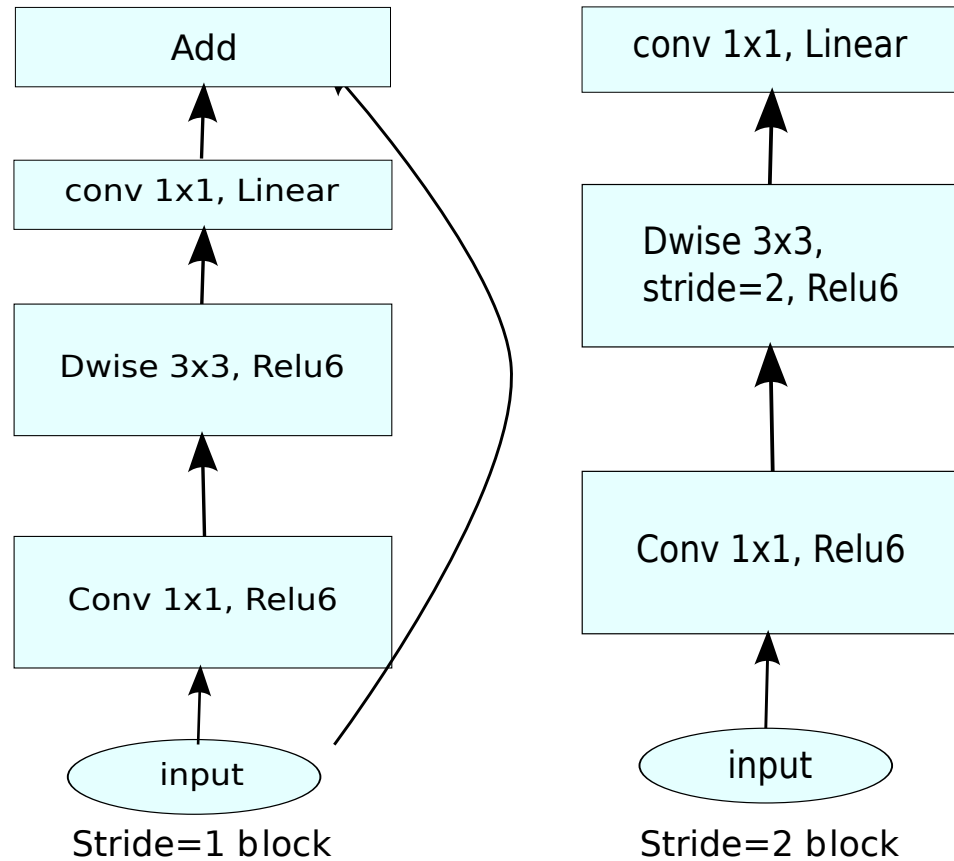
- In ogni strato convoluzionale:
  - Relu
  - Stride: 2x2
  - Padding: same
- Batch Size: 32
- Ottimizzatore: RMSProp
- Learning rate: 0.0005
- Weight Decay: 1e-6
- Addestramento: 10 epoche
- Loss: Binary Cross Entropy
- Numero totale parametri: 767 169



# CNN – 1 canale colore



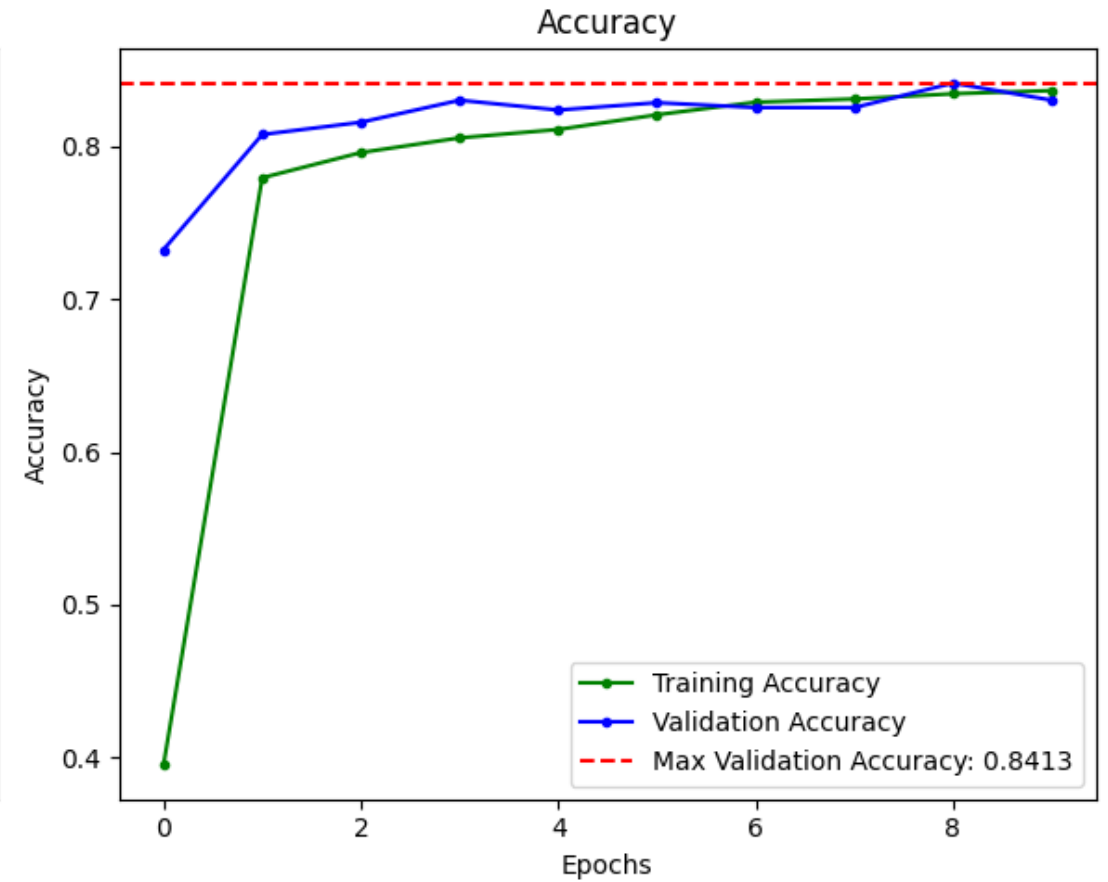
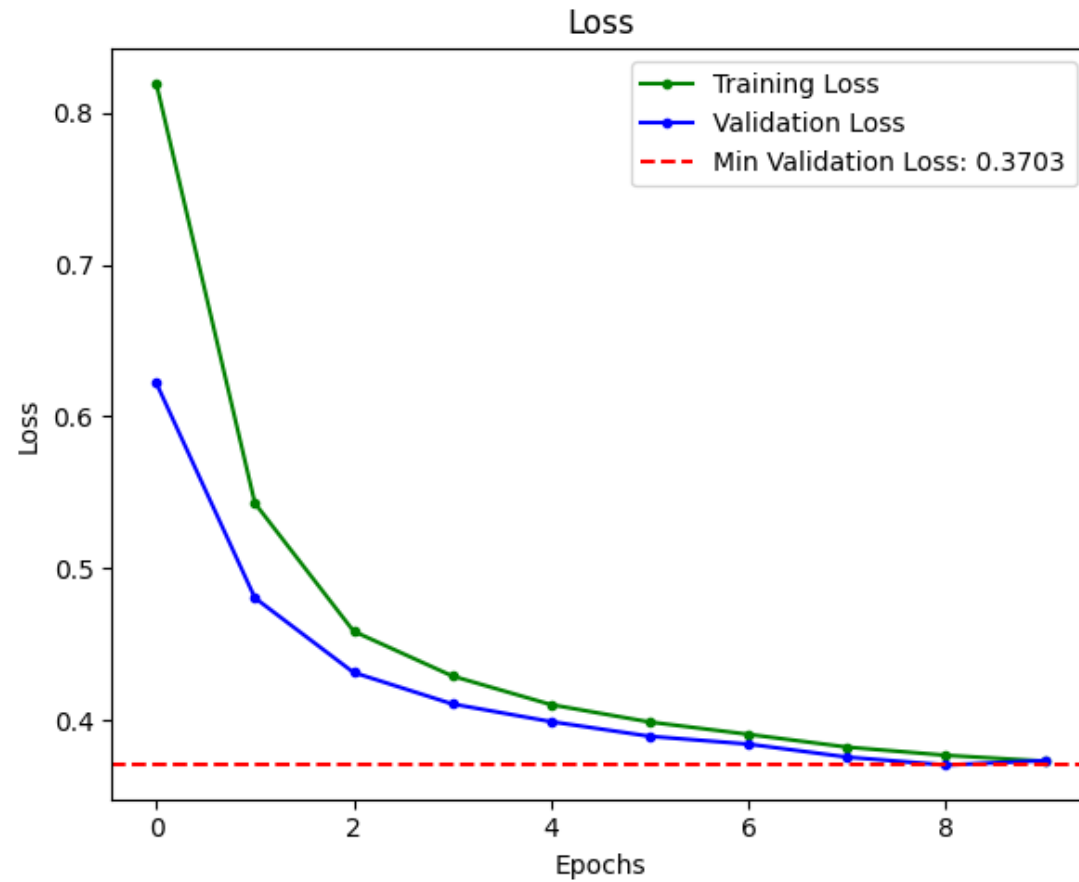
# MobileNetV2 – 3 canali colore



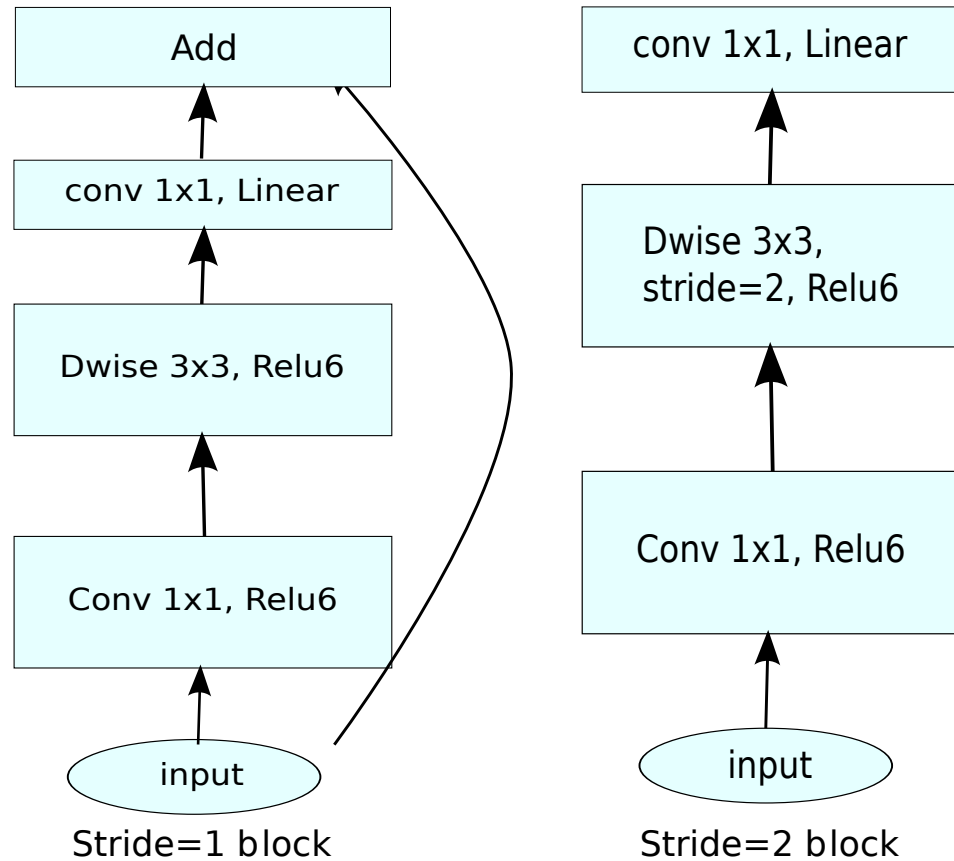
- Pesi pre-addestrati su Image-Net (non addestrabili).
- Aggiunti:
  - Strato di Average Pooling
  - Strato di output sigmoidale (da addestrare)
- Batch Size: 64
- Ottimizzatore: Adam
- Learning Rate: 0.0005
- Addestramento: 10 epoche
- Loss: Binary Cross Entropy
- Numero totale parametri: 2 261 829
- Numero totale parametri addestrabili: 1281



# MobileNetV2 – 3 canali colore

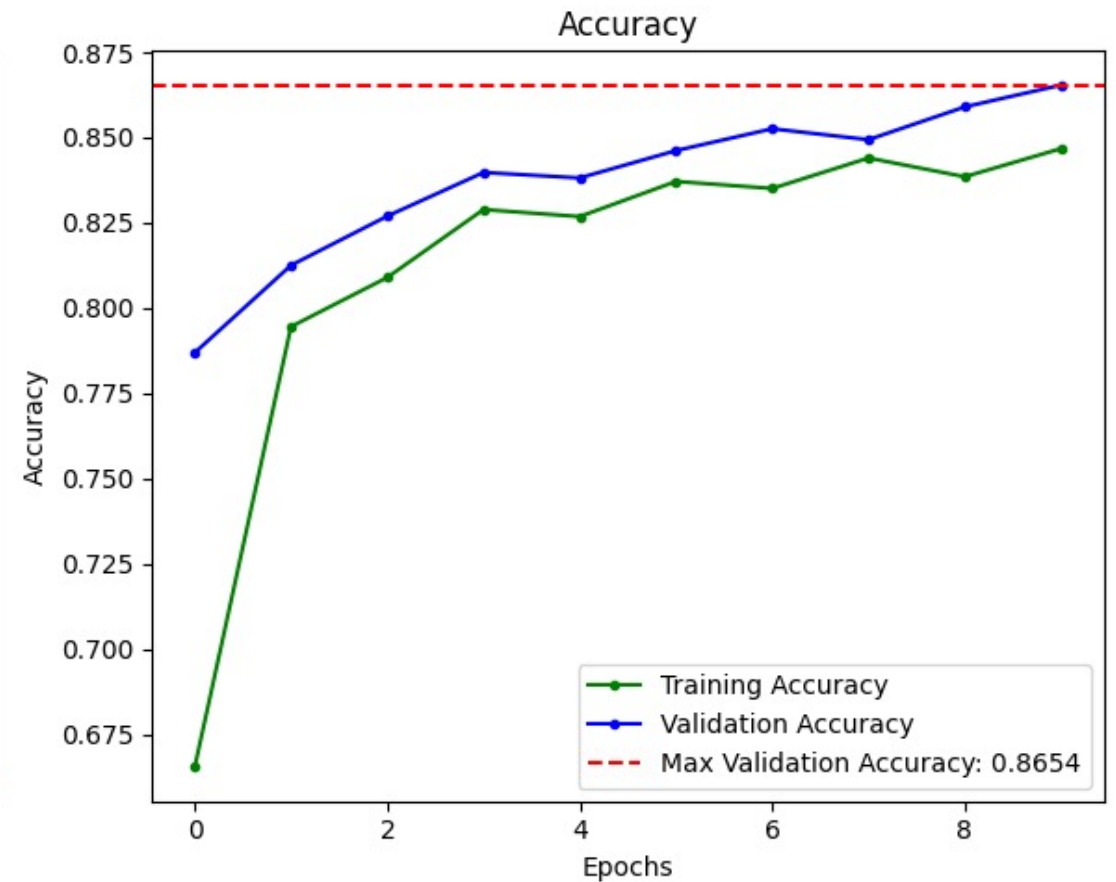
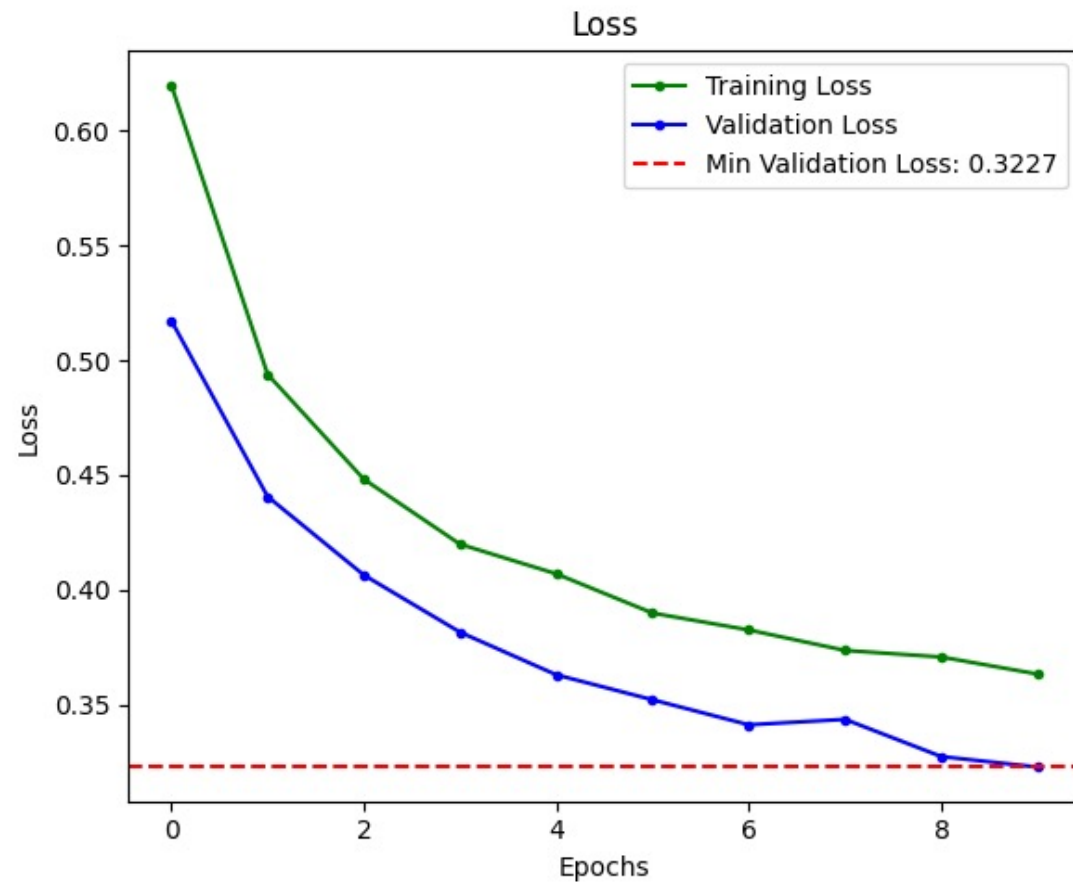


# MobileNetV2 – 1 canale colore

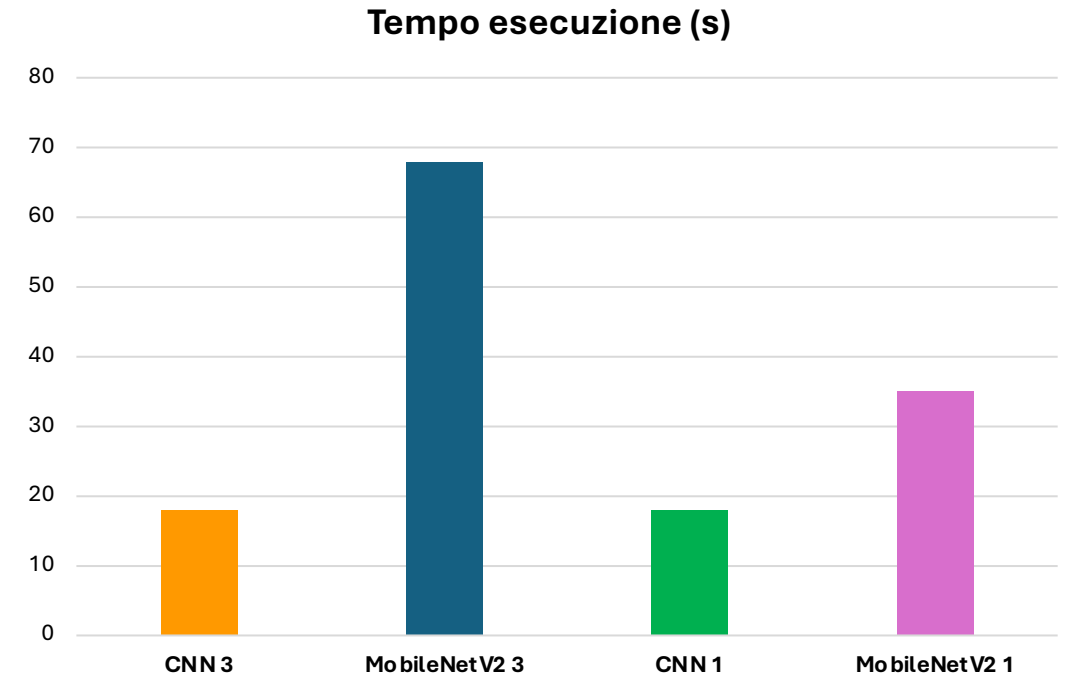
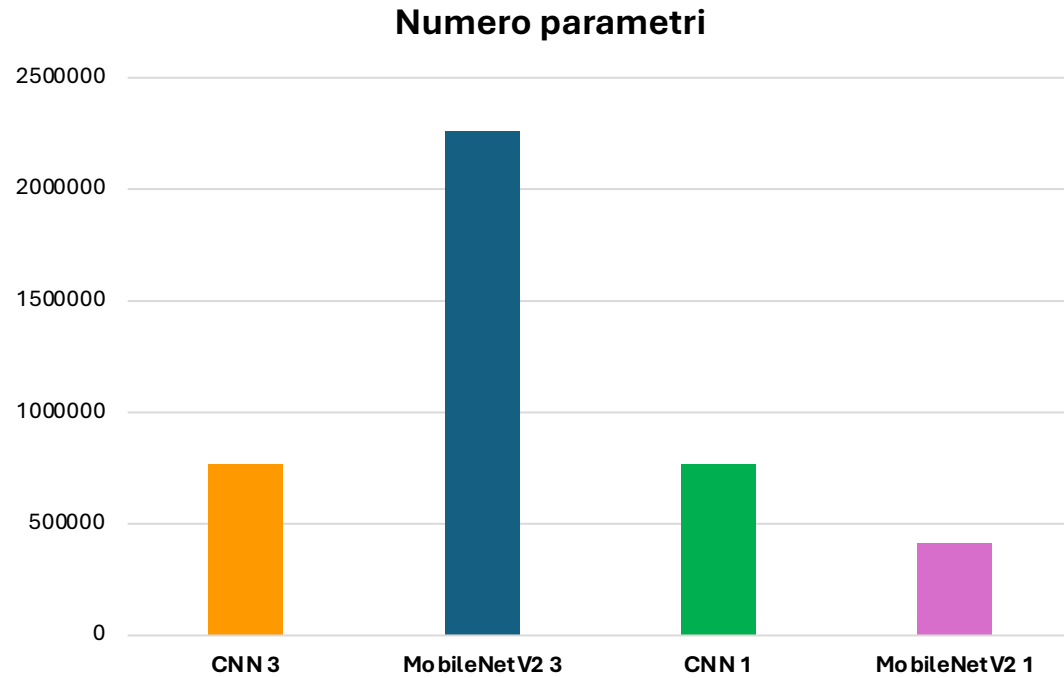


- Pesi presi da GitHub, addestrati su immagini 96x96 di ImageNet in scala di grigi (non addestrabili).
- Aggiunti:
  - Strato di Average Pooling
  - Strato di output sigmoidale (da addestrare)
- Batch Size: 32
- Ottimizzatore: Adam
- Learning Rate: 0.0005
- Addestramento: 10 epoche
- Loss: Binary Cross Entropy
- Numero totale parametri: 413 765
- Numero totale parametri addestrabili: 1281

# MobileNetV2 – 1 canale colore

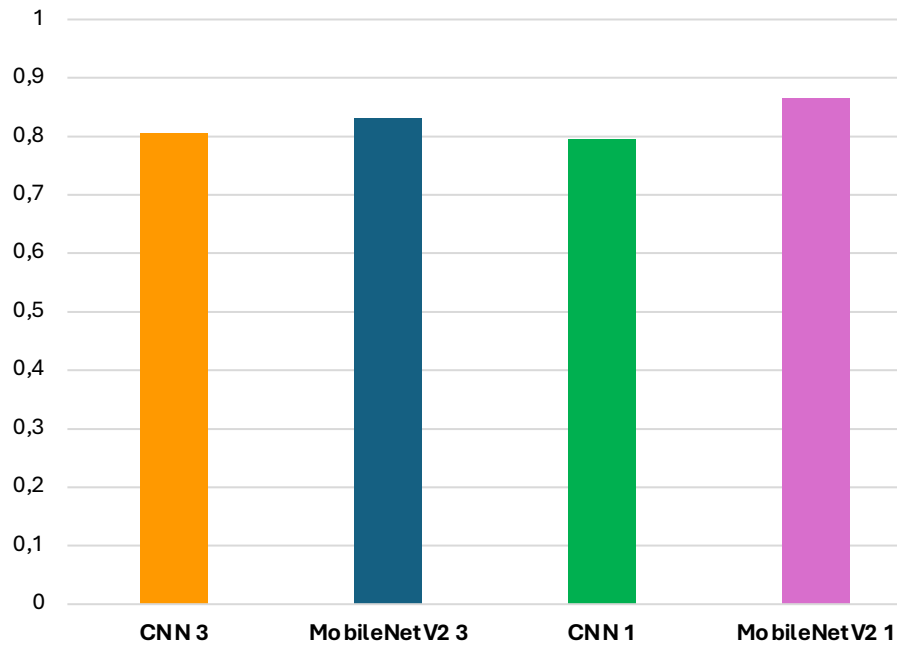


# Risultati complessivi (1)

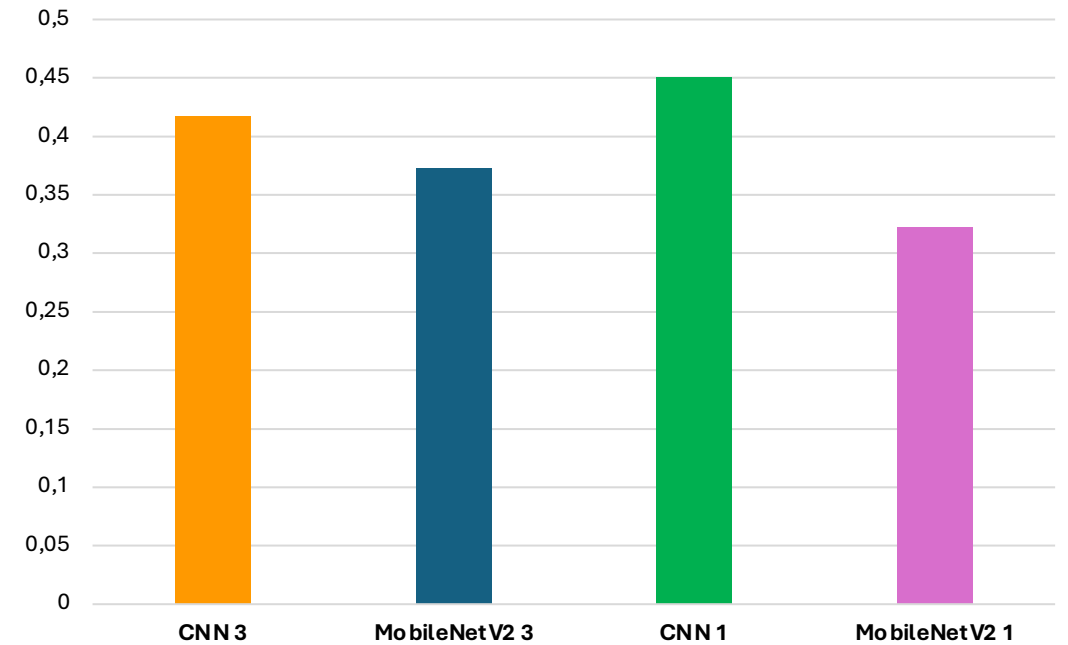


# Risultati complessivi (2)

**Validation Accuracy**



**Validation Loss**





GRAZIE PER  
L'ATTENZIONE