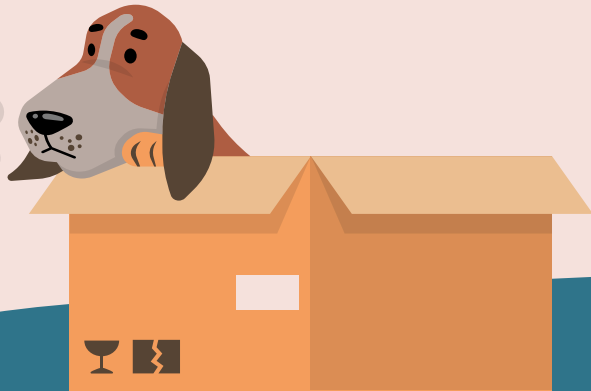


Pawpularity

Demi Soetens, Bente van Katwijk, Ilse Feenstra, Cass Maes





‘Pawpularity’ van zwerfdieren



Foto's voor asiel Maleisië

- Welke doen het het beste?



Pawpularity score: hoe vaak een pagina bekeken wordt

- Tussen 0 en 100



Doel: het creëren van een model dat de Pawpularity score van foto's voorspelt



3

A close-up photograph of a small, dark-colored puppy with light-colored markings on its chest and paws, looking directly at the camera. The puppy has large, dark eyes and floppy ears. It is being held by a person wearing a blue shirt, whose arm is visible on the right side of the frame. The background is a blurred green, suggesting an outdoor setting.

- ## Binaire (tabular) data

[illegible]

Pawpularity score: 100



Pawpularity score: 14



Preprocessing van de data



Plaatjes: 64 x 64 x 3

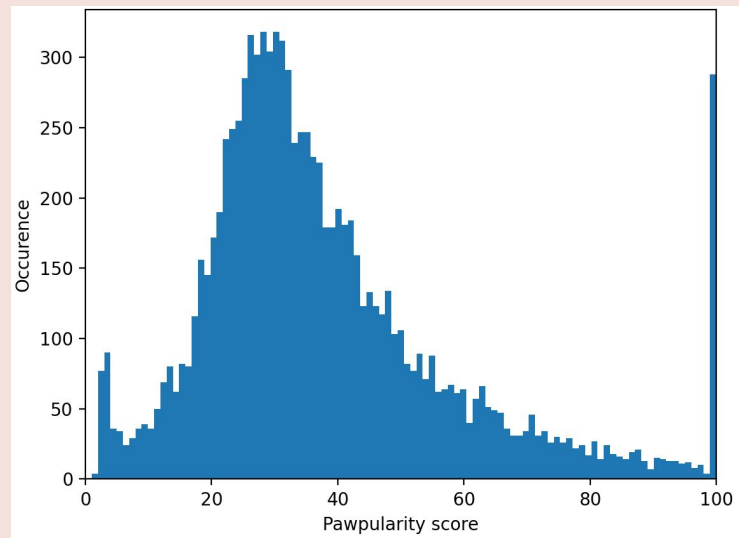


Image normalization

- Standaarddeviatie
- Mean centering

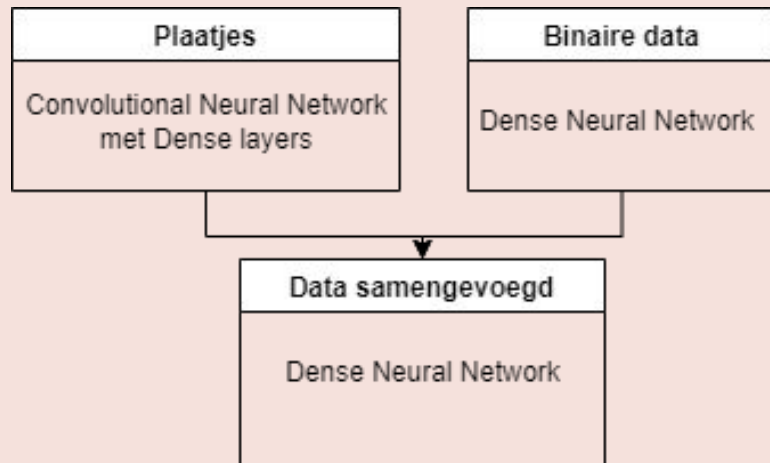


Outliers



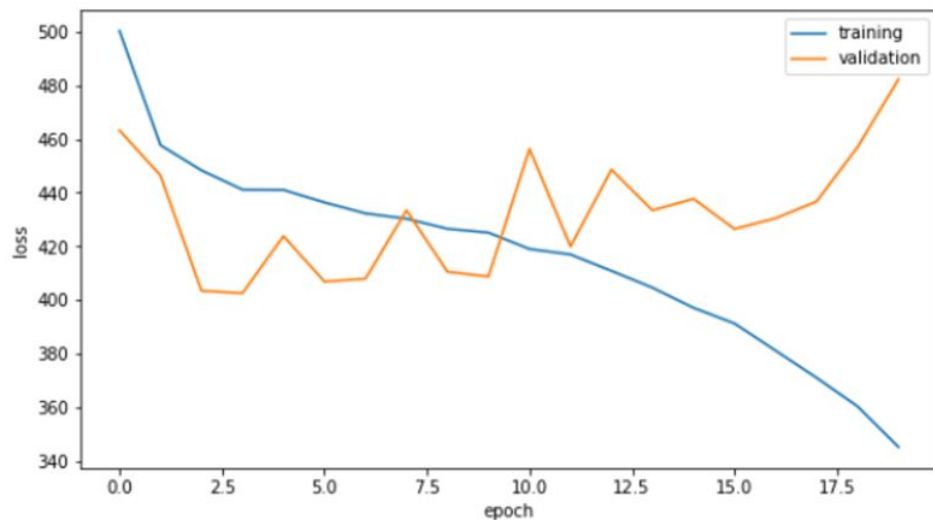
Basis model

- Plaatjes: Convolutional neural network met Dense layers
- Binaire data: Dense neural network
- Loss: mean squared error (MSE)
- Metric: root mean squared error (RMSE)

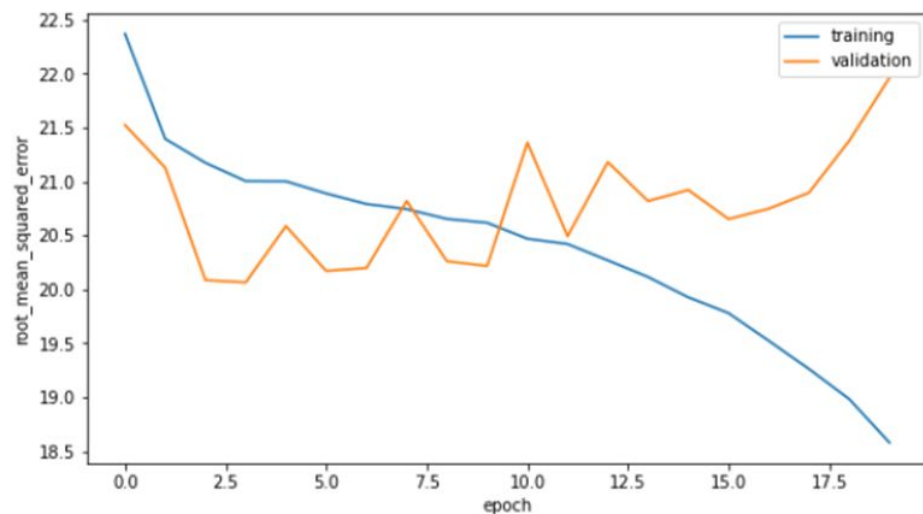


Basis model

Model loss of basic model



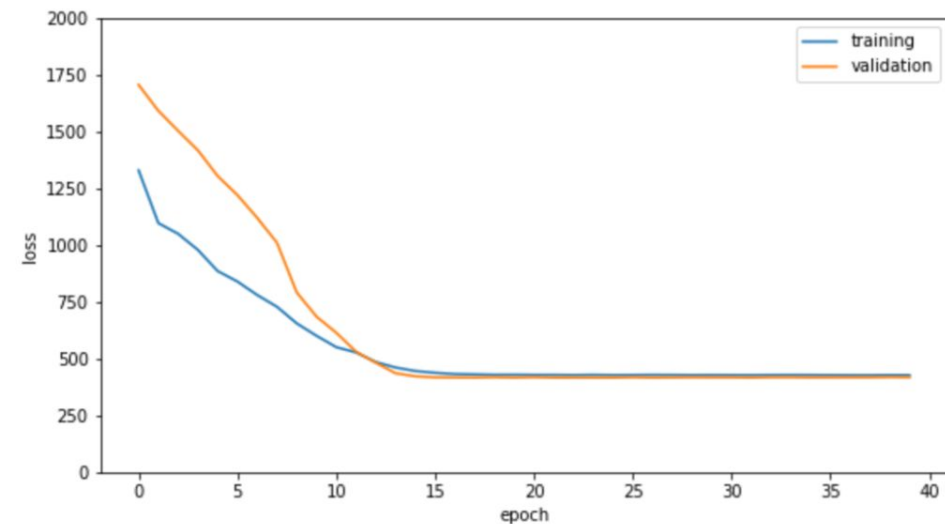
A. Mean squared error



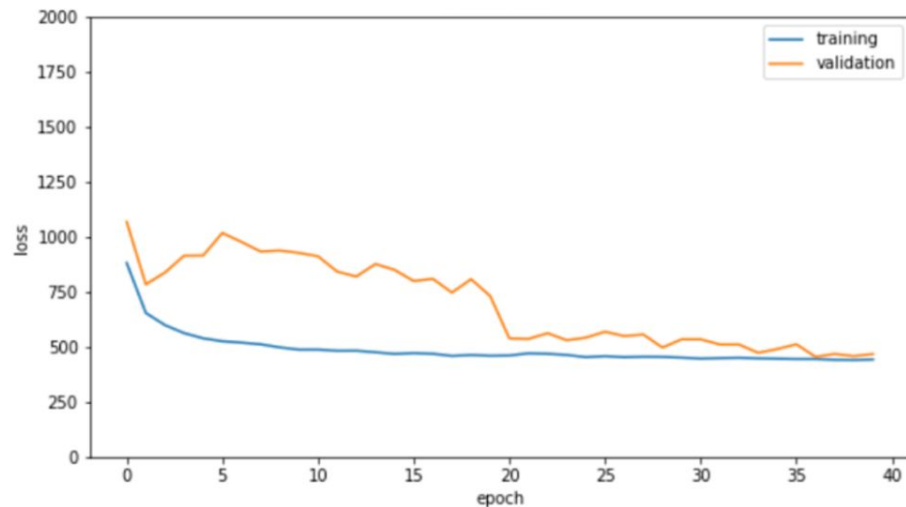
B. Root mean squared error

Dropout

Comparison of the model loss of high dropout rate vs. a reduced dropout rate



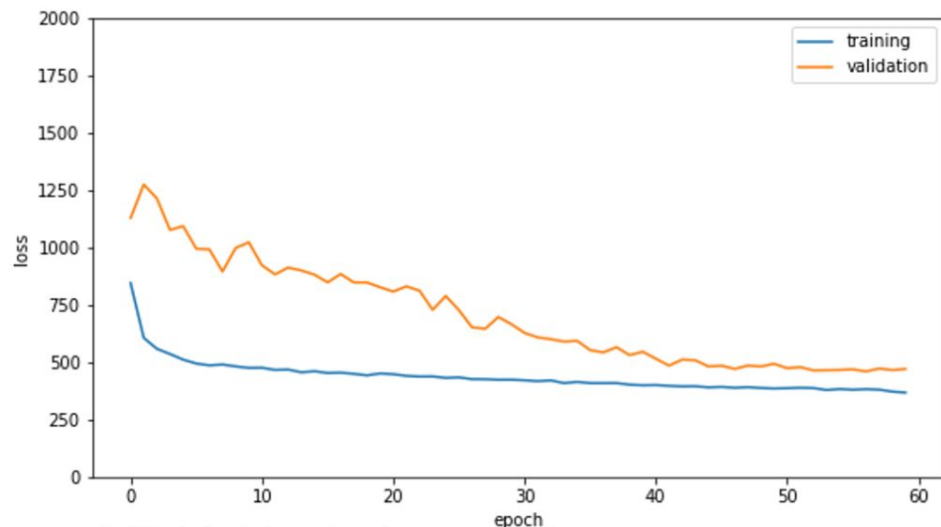
A. Model with high dropout rate



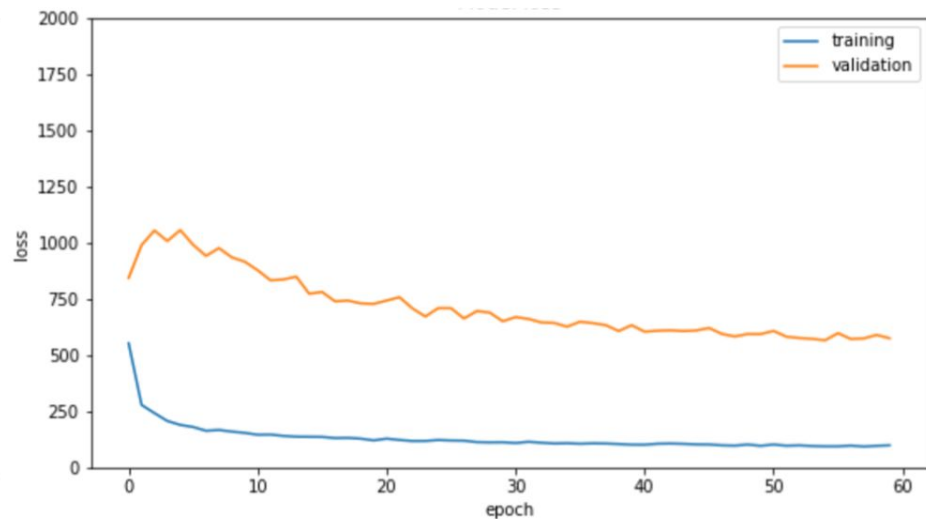
B. Model with reduced dropout rate

Batch normalization

Comparison of the model loss with vs without batch normalization



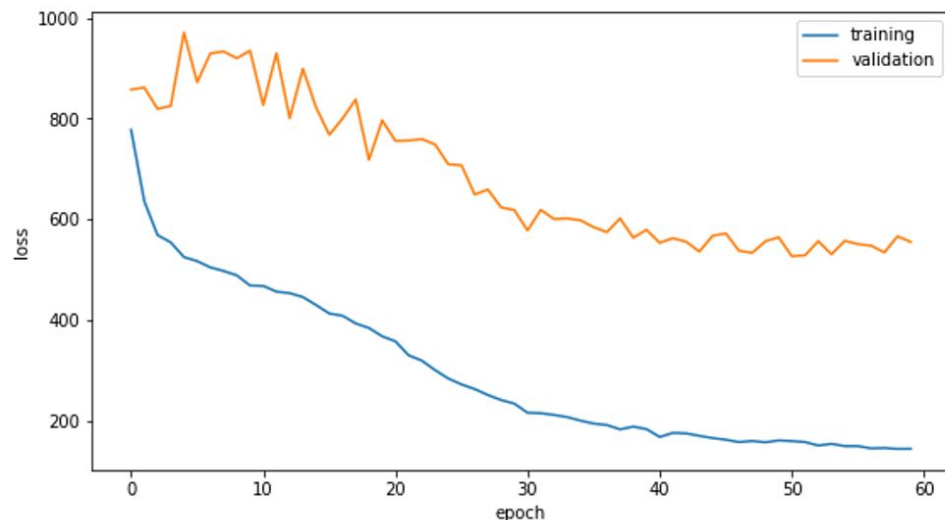
A. Model without batch normalization



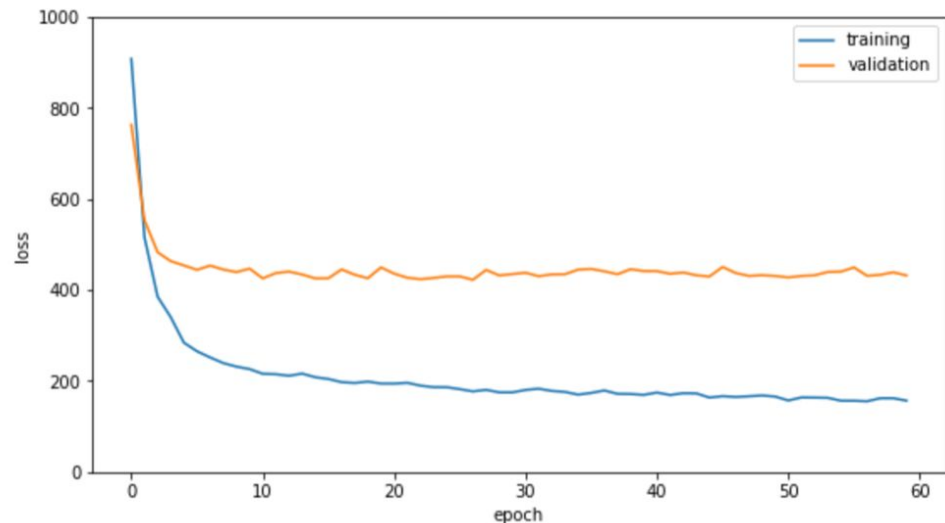
B. Model with batch normalization

Regularization term

Comparison of the model loss with vs. without regularization term



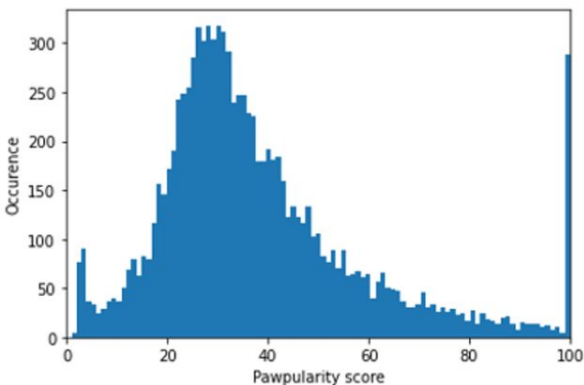
A. Model without regularization term



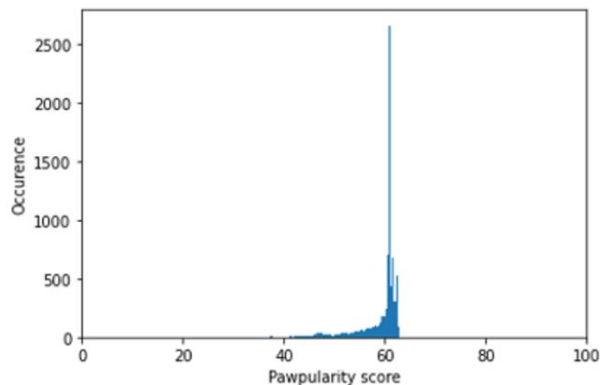
B. Model with L2 regularization term

Outliers

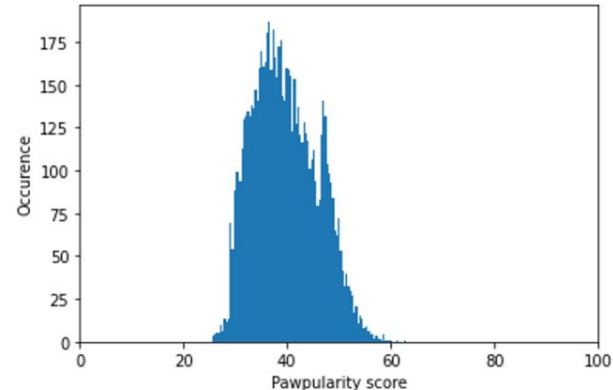
Comparison of the real vs predicted data distributions



A. Distribution of Pawpularity score



B. Distribution of predicted Pawpularity score

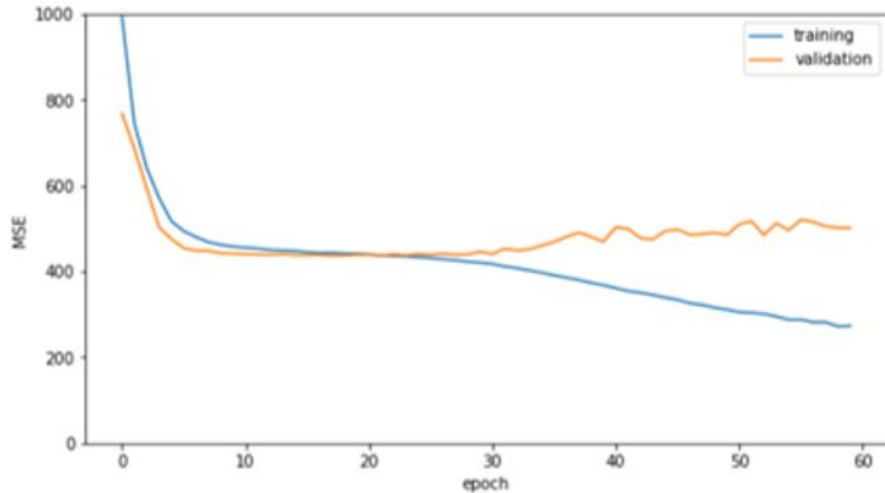


C. Distribution of predicted Pawpularity score after removal outliers

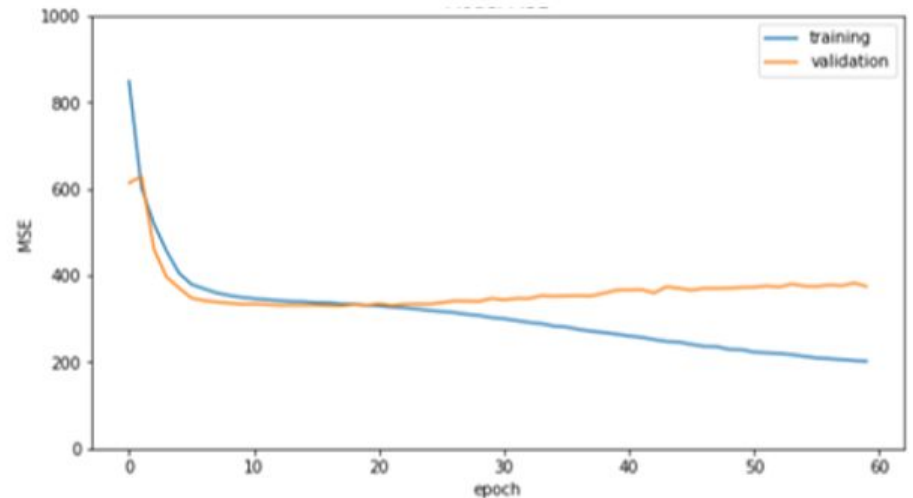
Outliers verwijderen

🐾 Outliers bij Pawpularity score 100

Comparison of model with and without outliers



A. Model with outliers



B. Model without outliers

Data augmentation

🐾 Horizontal flip, rotation range 90° en shear range 20%



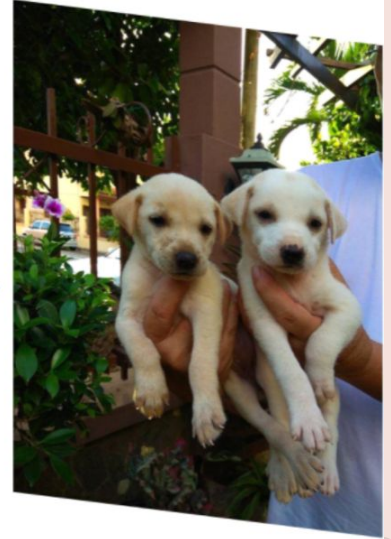
A.



B.



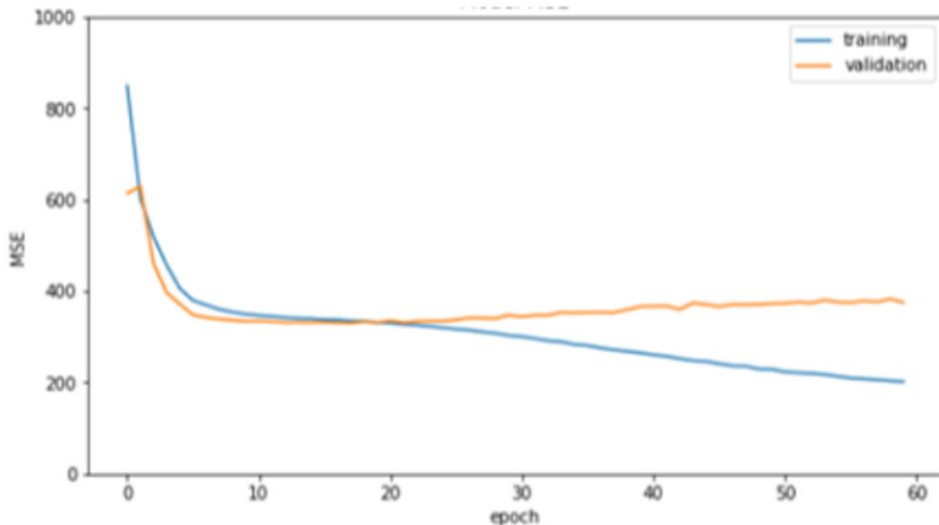
C.



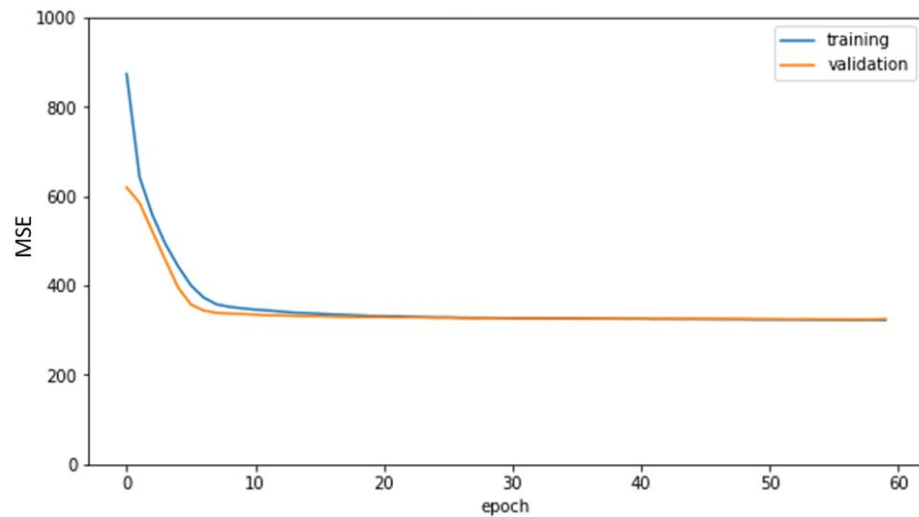
D.

Data augmentation

Comparison of the model loss with vs without data augmentation after removal of outliers



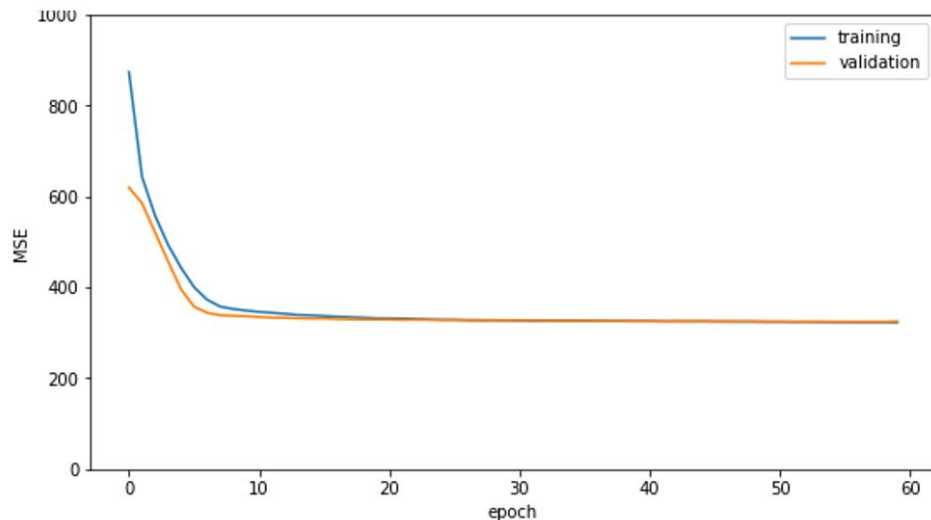
A. Without data augmentation



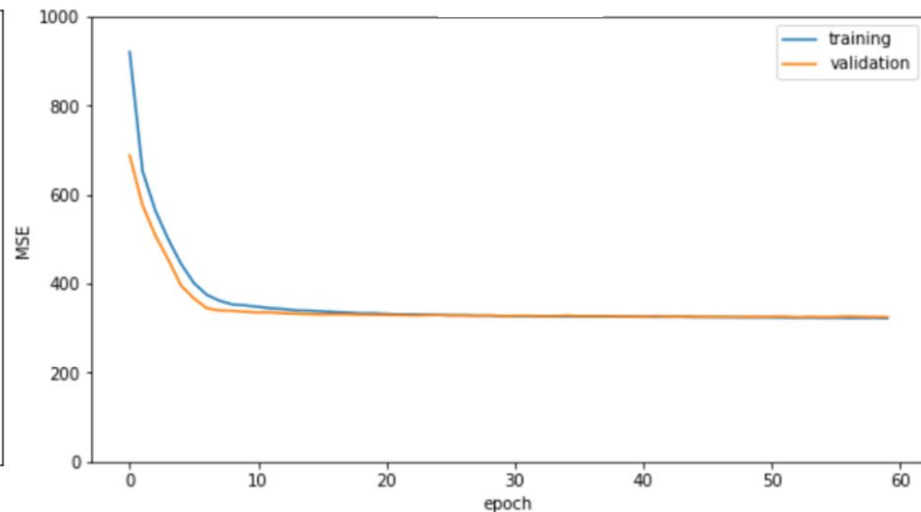
B. With data augmentation

Extra convolutional lagen

Comparison of model loss with and without one extra layer per convolutional layer



A. Without extra convolutional layers



B. With one extra convolutional layers

Overzicht uiteindelijke model



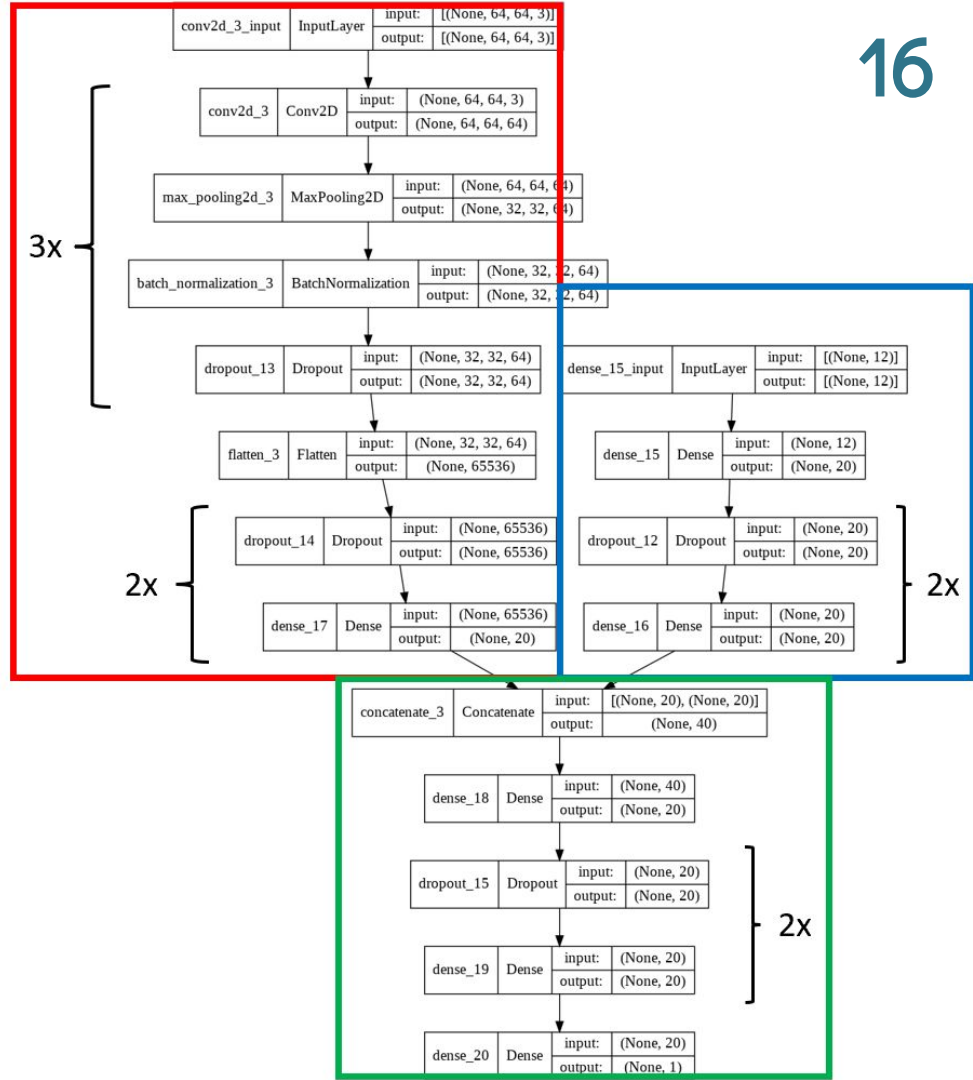
Tabular network



Convolutional network



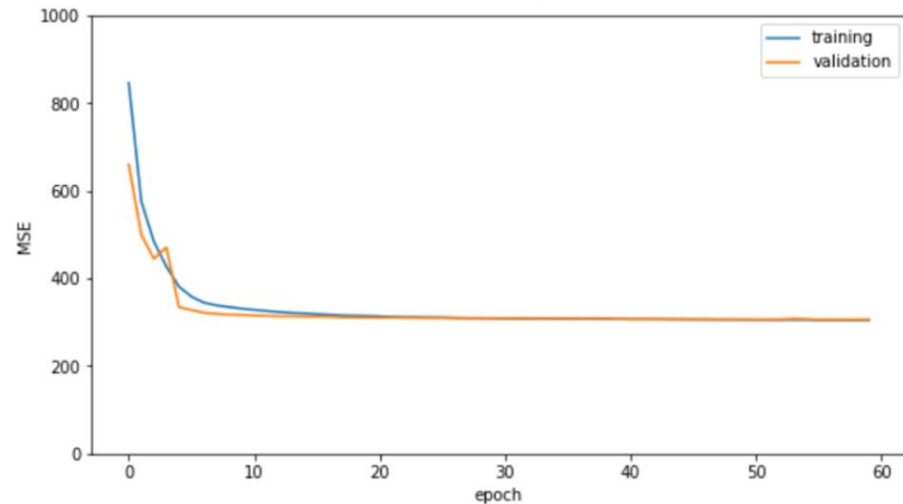
Concatenated network



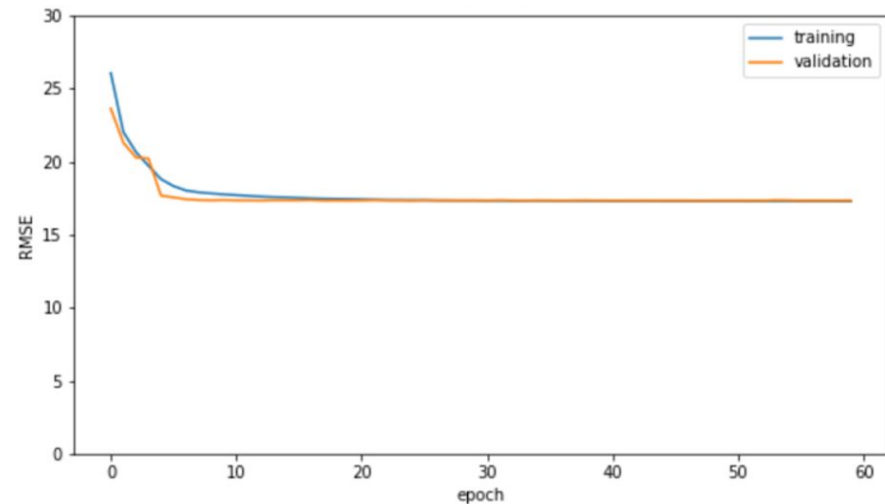
Prestatie uiteindelijke model

- Validation MSE 302 vs 482
- Validation RMSE 17 vs 22

Model loss of final model









A. MSE







B. RMSE

Hoe krijg je het beste model?

Do's

-  Verwijderen outliers
-  Data augmentation
-  Dropout
-  Regularization terms
-  Batch normalization
-  Lineaire output 0 - 100

Don'ts

-  Verwijderen lagen in tabular netwerk
-  Extra convolutional lagen toevoegen
-  Meer hidden nodes toevoegen
-  Andere activatie functies



Hoe nu verder?

- Transfer network
- Ensemble of models
- Hyperparameters random kiezen



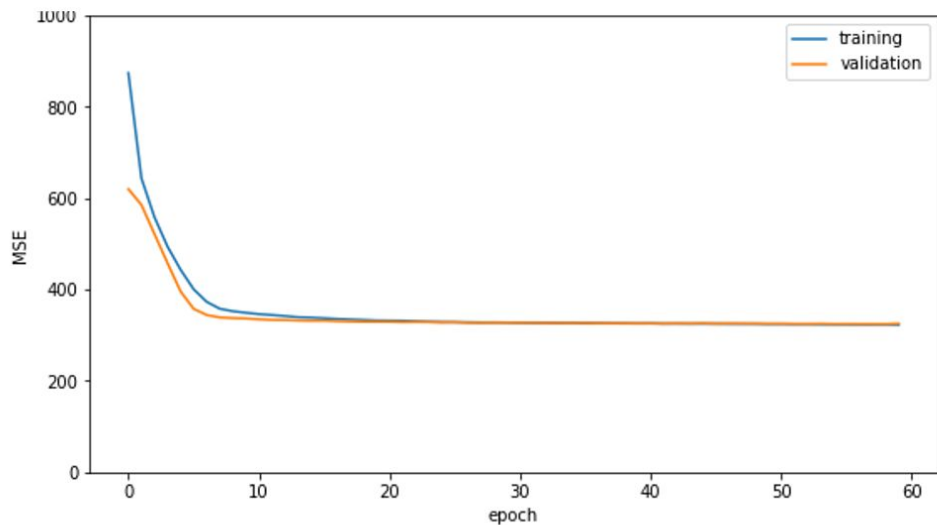
Bedankt voor jullie aandacht!

Vragen?

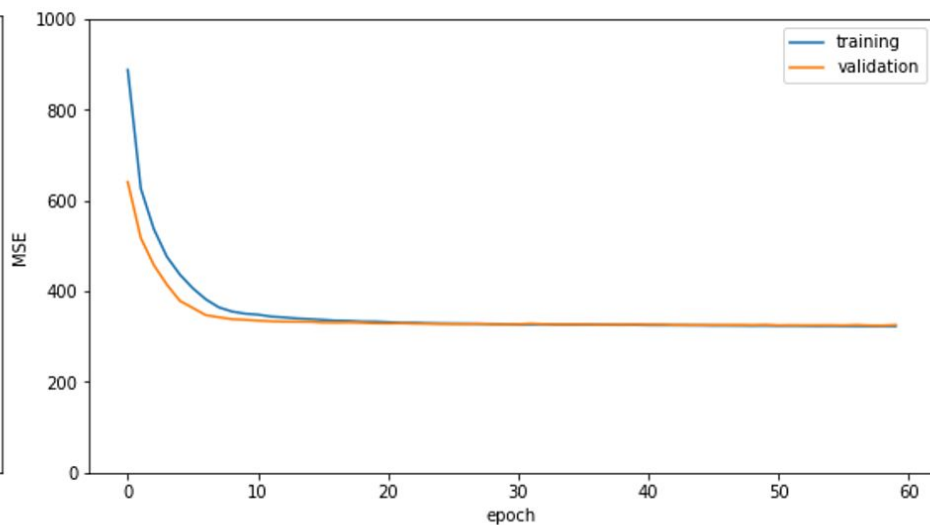


Verwijderen lagen

Comparison of model loss with full tabular network vs simple tabular network



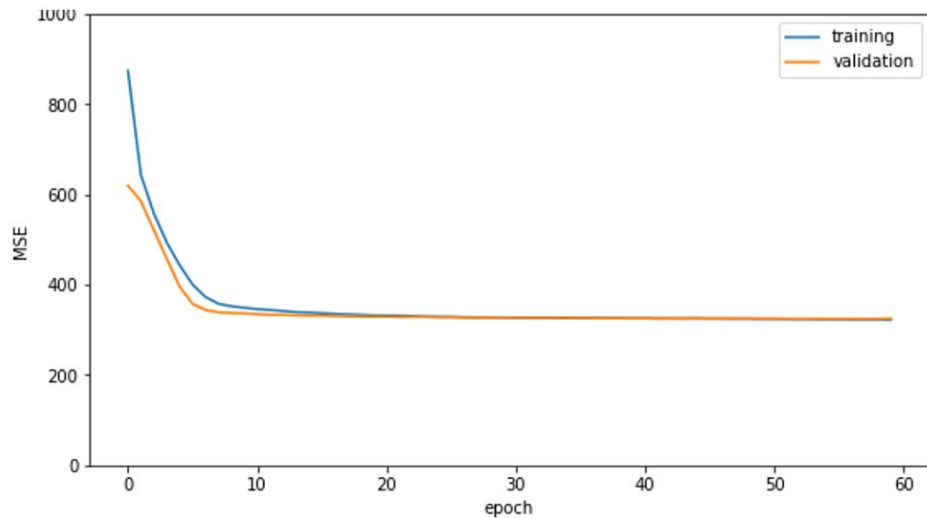
A. With full tabular network



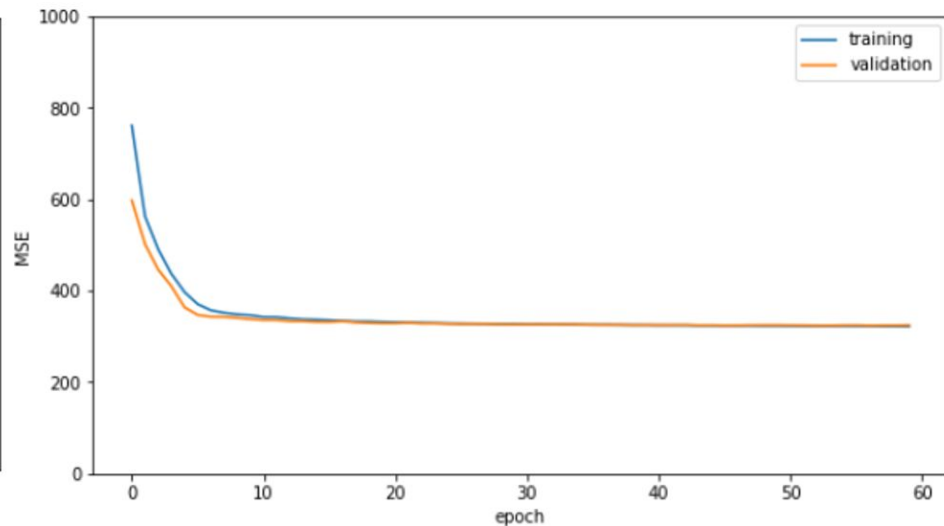
B. With one tabular layer

Extra hidden nodes

Comparison of model loss with and without extra hidden nodes



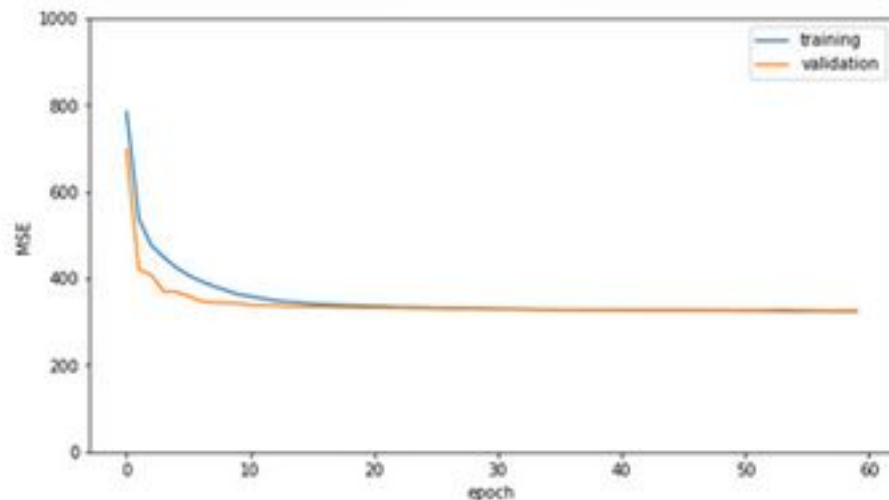
A. Without extra hidden nodes



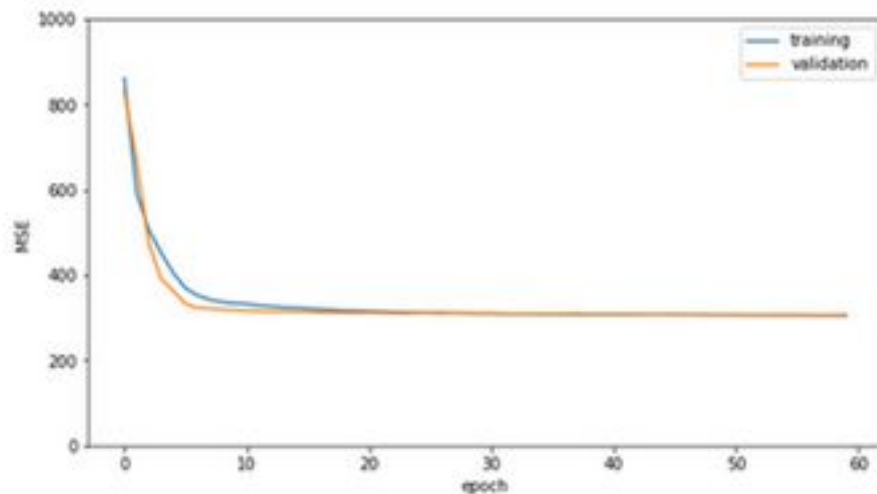
B. With extra hidden nodes

Removal lower outliers

Comparison of the model performance with and without lower outliers removed



A. Model without lower outliers removed



B. Model with lower outliers removed

