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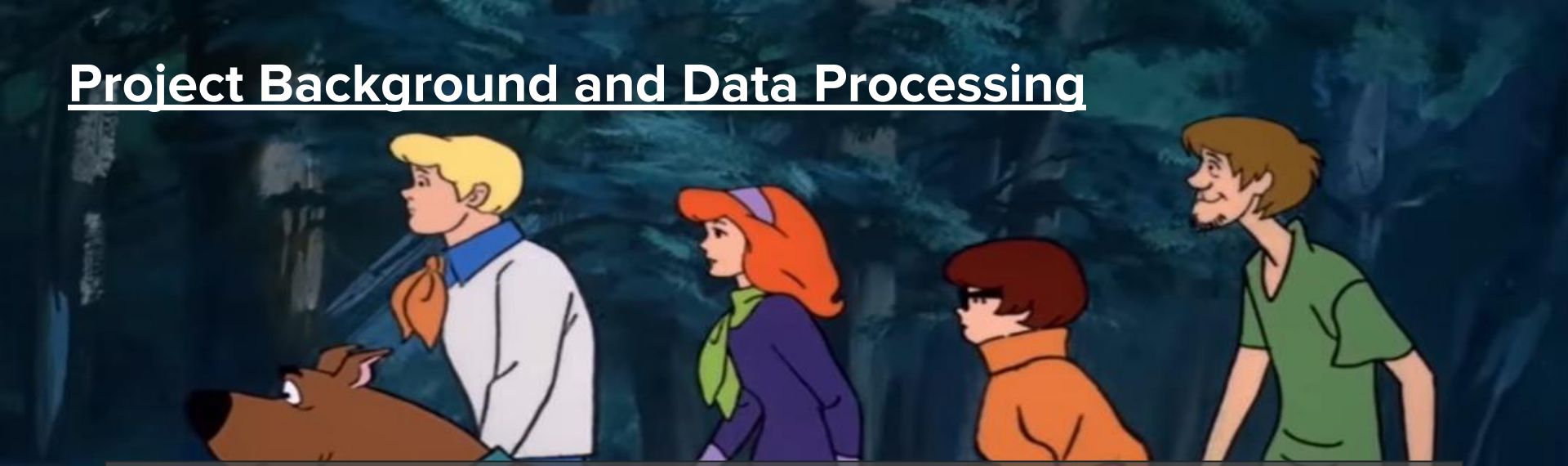
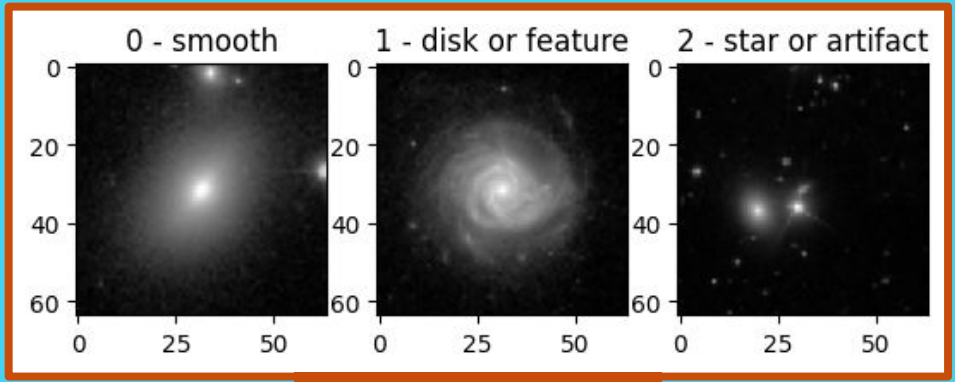
Neural Network Project Presentation
-Classification of Galaxies-

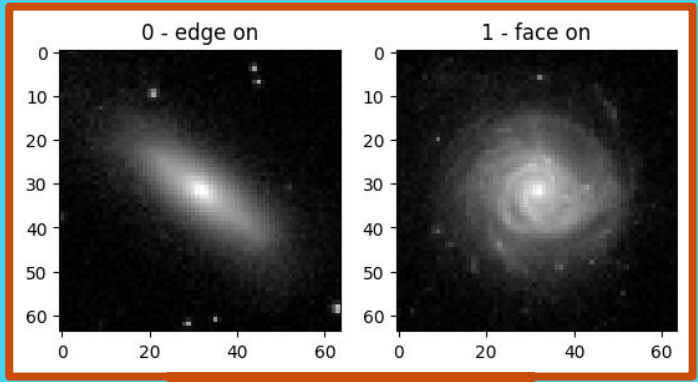
Project Background and Data Processing



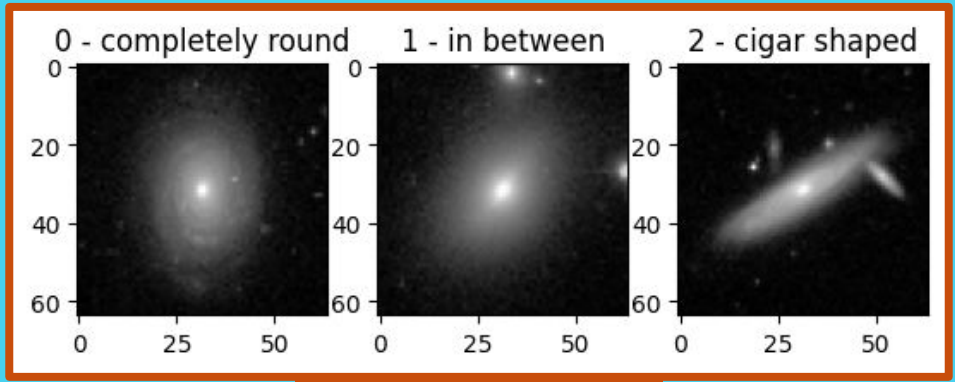
- Multiple ways to classify a galaxy: smoothness, roundness, # of arms etc
- Elimination of “missing” images
- Image transformations - center, resize and greyscale
- Databases based of questions T01, T02 and T07
- A galaxy belongs to a class ⇔ weighted factor > 0.6
- Counted number of objects in each class => Unbalanced dataset for T01


0 - smooth
1 - disk or feature
2 - star or artifact

T01

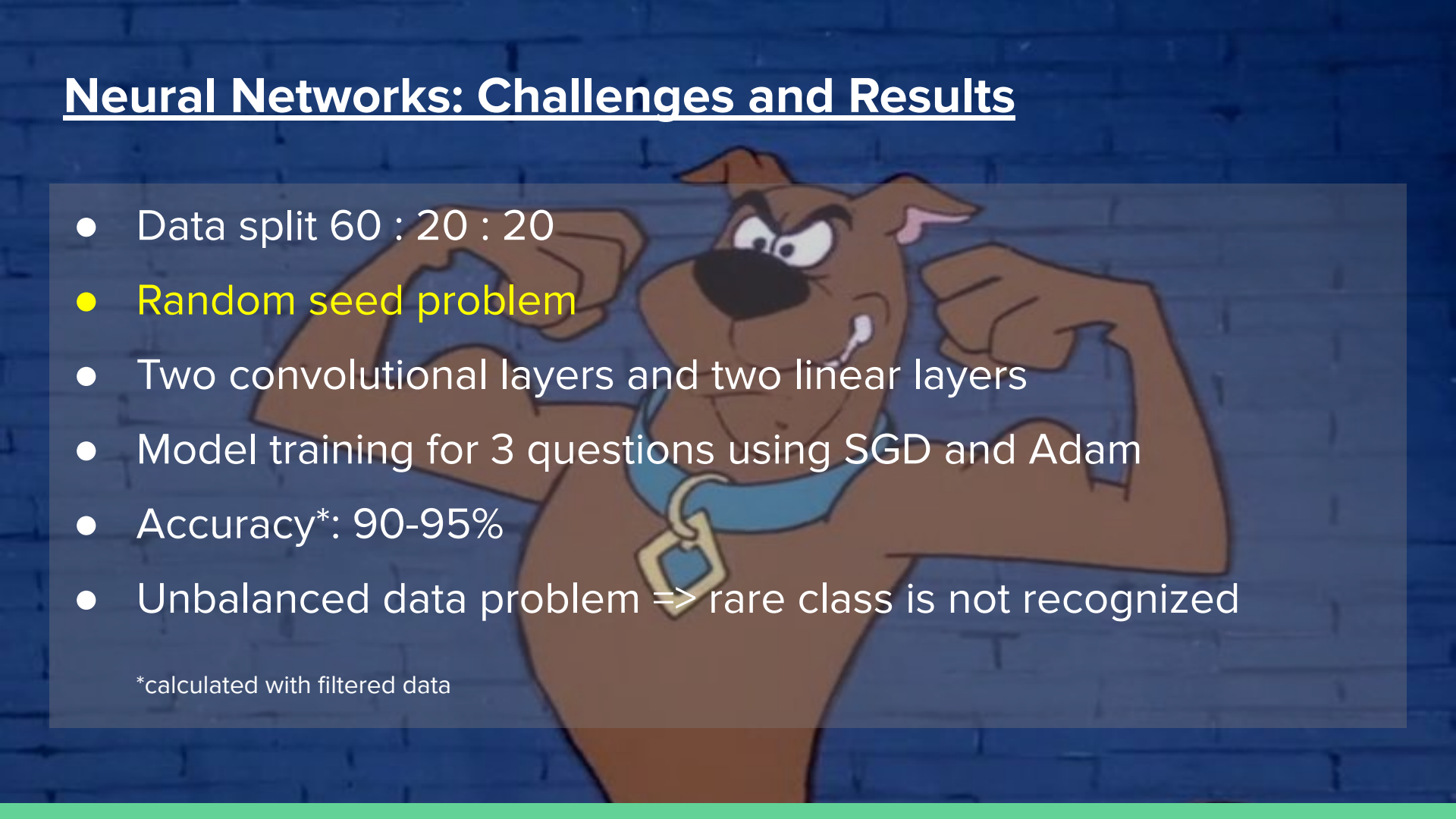

0 - edge on
1 - face on

T02


0 - completely round
1 - in between
2 - cigar shaped

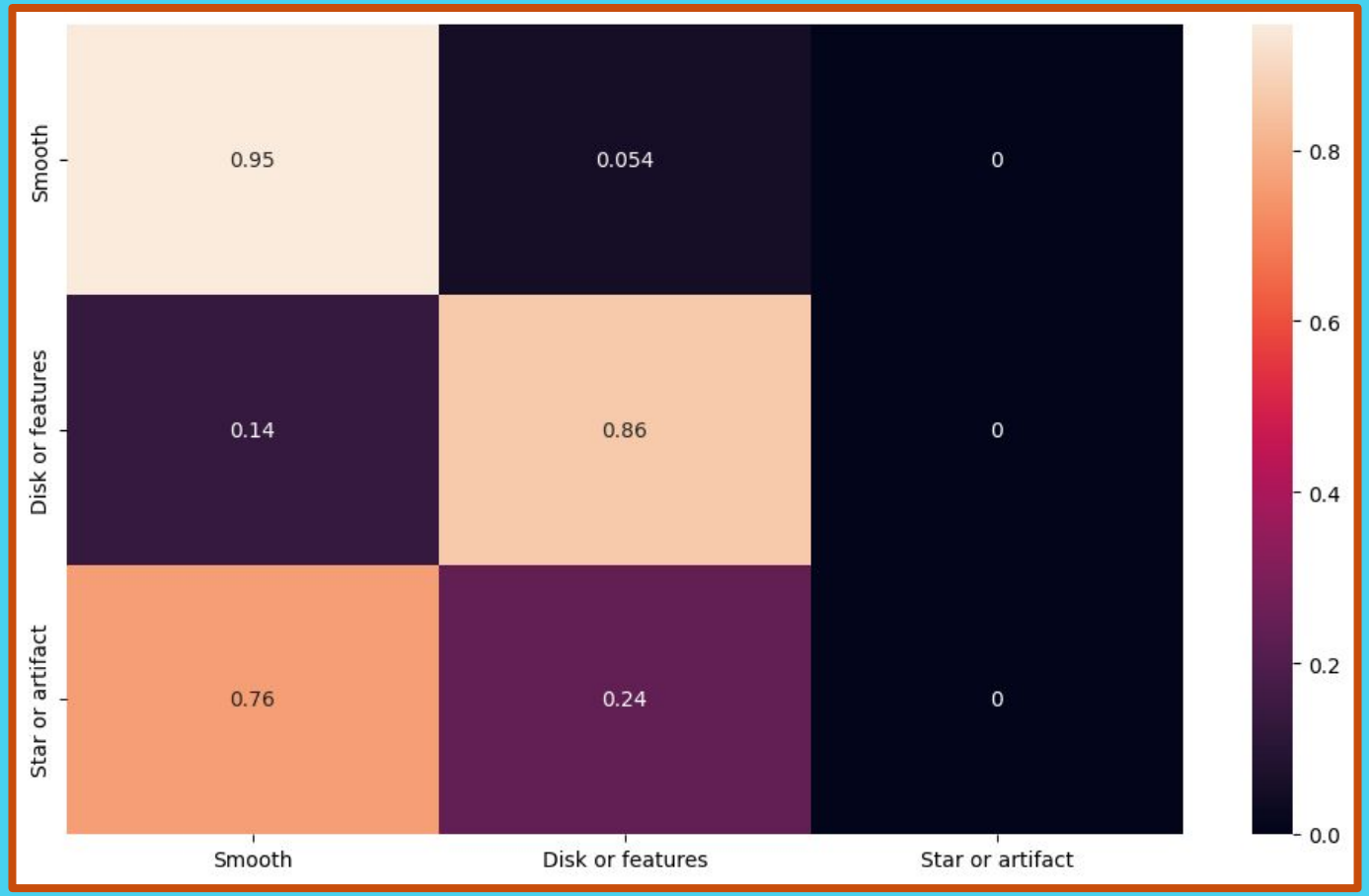
T07

Neural Networks: Challenges and Results



- Data split 60 : 20 : 20
- Random seed problem
- Two convolutional layers and two linear layers
- Model training for 3 questions using SGD and Adam
- Accuracy*: 90-95%
- Unbalanced data problem => rare class is not recognized

*calculated with filtered data

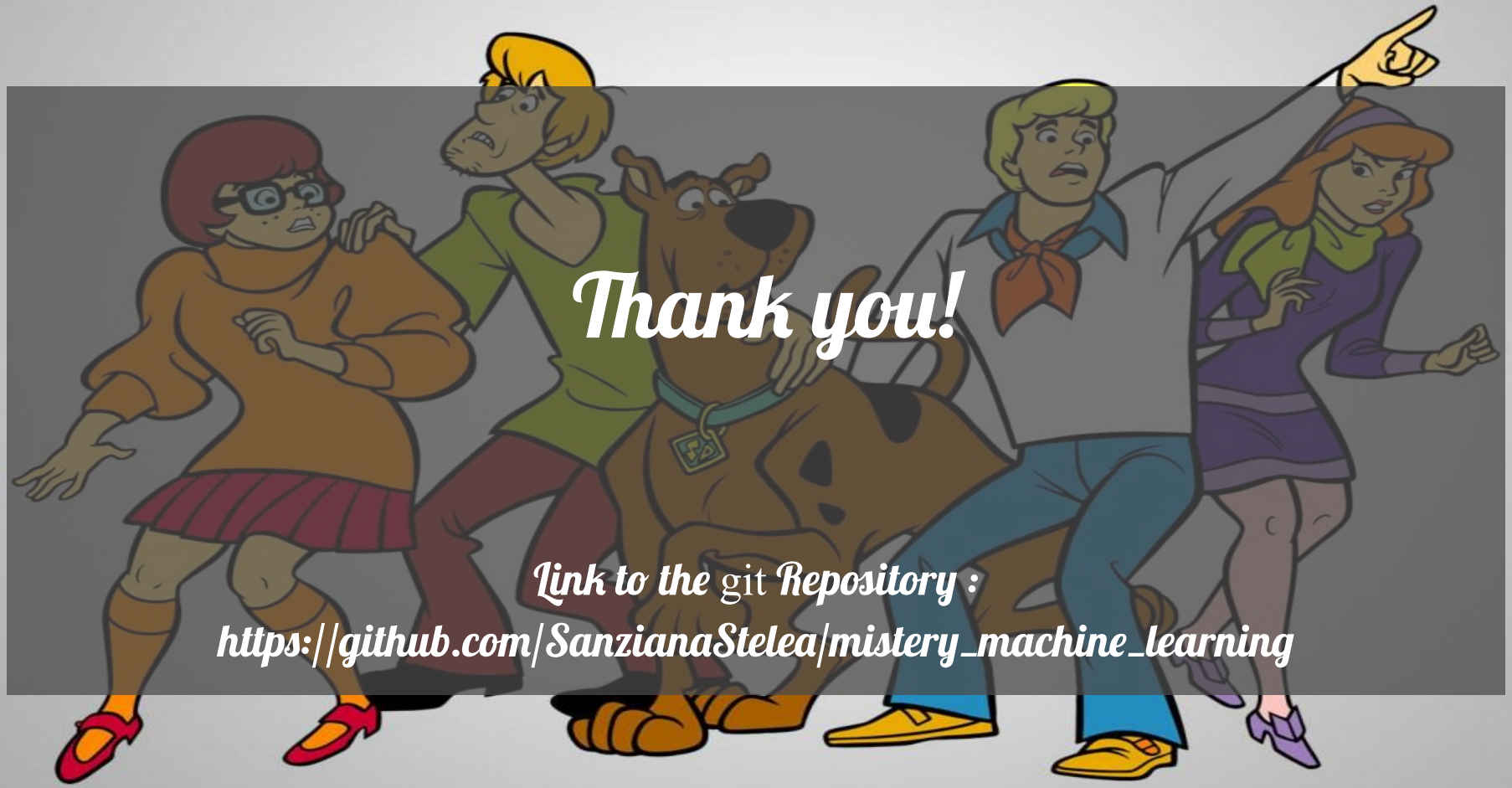


Confusion Matrix for TOI Classification

Improvement and future plans

- Pytorch Lightning and TensorBoard
- Elimination of redundant code
- DocStrings and Documentation

- Custom loss function / Oversampling
- Expand network for complete classification
- Create a GUI or website that can provide the characteristics of an uploaded galaxy picture



Thank you!

Link to the git Repository :

https://github.com/SanzianaStelea/mistery_machine_learning