


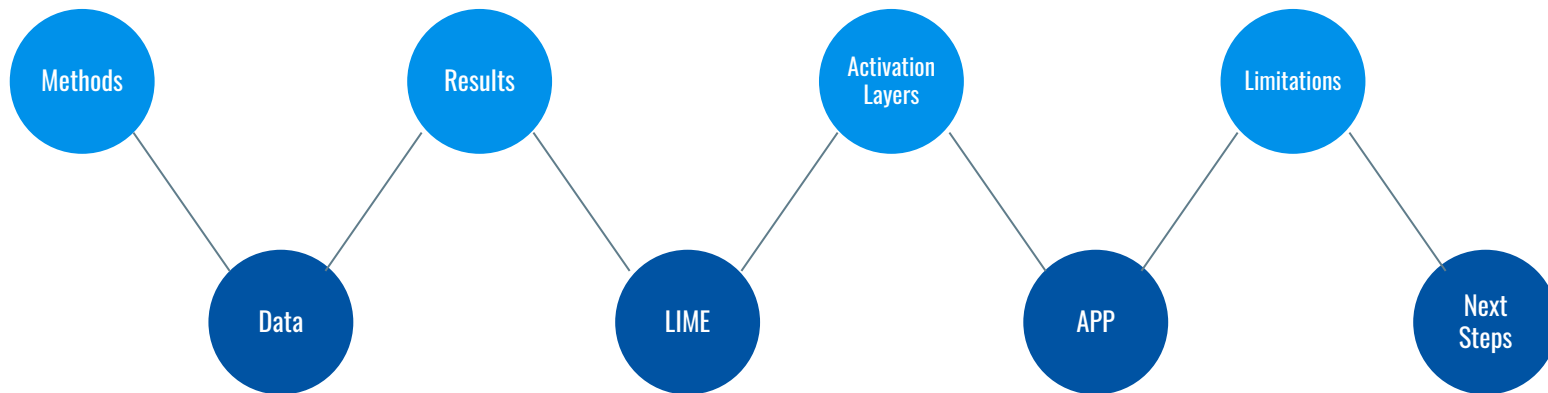


# • Skin Cancer detection

- with Convolutional Neural Networks


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- A decorative network diagram in the top-left corner, featuring a complex web of interconnected nodes and lines. The nodes are represented by circles of varying sizes, some with concentric rings, and the lines are thin and grey. The overall structure is organic and branching, resembling a molecular or biological network.
- **Skin cancer is the most common type of cancer**
  - **App to support doctors of AAD making a diagnosis**
  - **This project presents the core model for the app**

# Roadmap





# ***Methods***

- *Data Preparation*
    - *9 classes Naive Model*
  - *Grid Search and Tuning 9 class model*
    - *Division in 2 classes*
    - *2 classes Naive Model*
  - *Grid Search and Tuning 2 class model*
    - *LIME*
    - *Activation Layers*
- 

# The data

- 2357 images of skin anomalies from ISIC
- Divided into **9 classes**  
**5 benign 4 cancerous**
- Size 256x256 pixels  
total file 2 GB



# The 9 classes

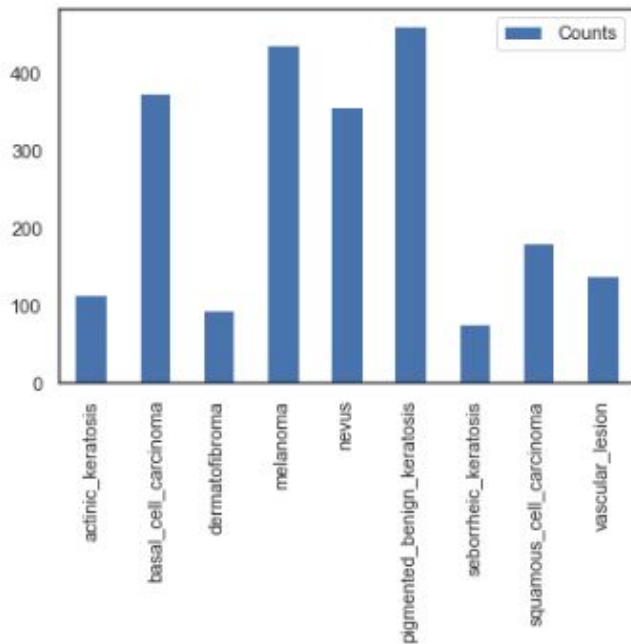
**benign**



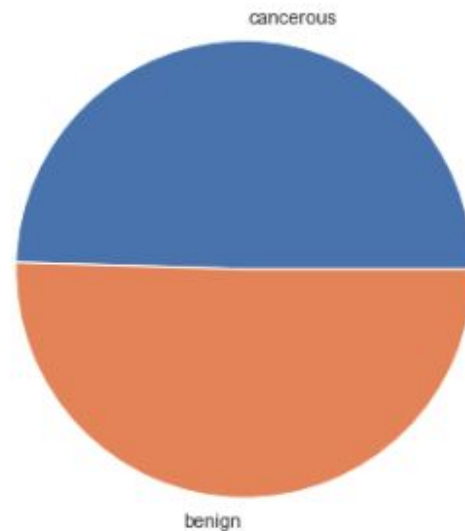
**cancerous**

# Distribution of the classes

Distribution of 9 classes in the Train set



Percentage of cancerous and benign images in the train



# Results





# 9 classes model

70% - 80%

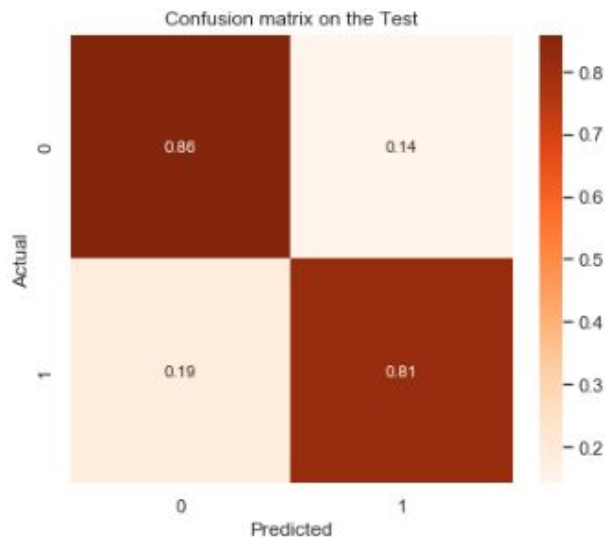
Accuracy train

15% - 20%

Accuracy test



# 2 classes model:



0 = benign 1 = cancerous

~ 80%

Recall train

~ 65%

Recall test

~ 85%

F1 train

~ 70%

F1 test

# LIME

Local Interpretable Model-Agnostic Explanations

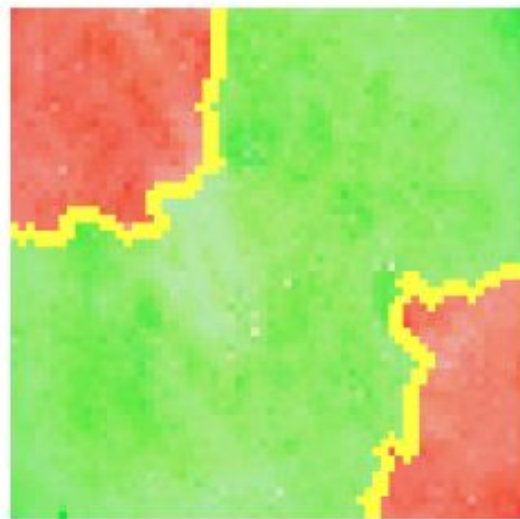
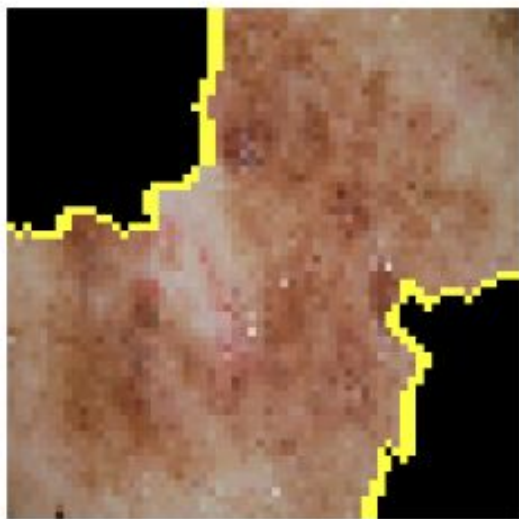


Image classified correctly by the model

# LIME

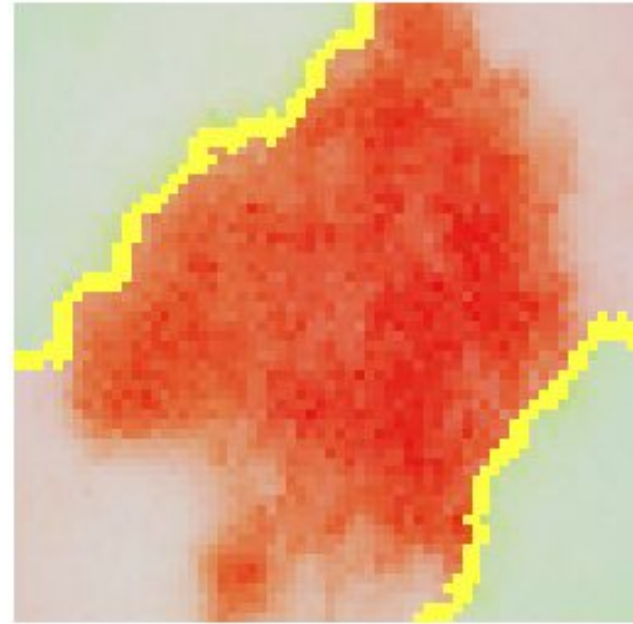
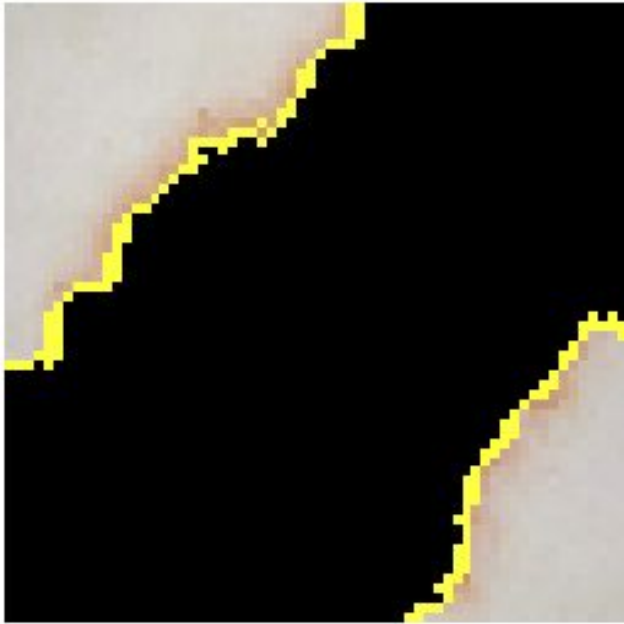


Image classified incorrectly by the model

# LIME

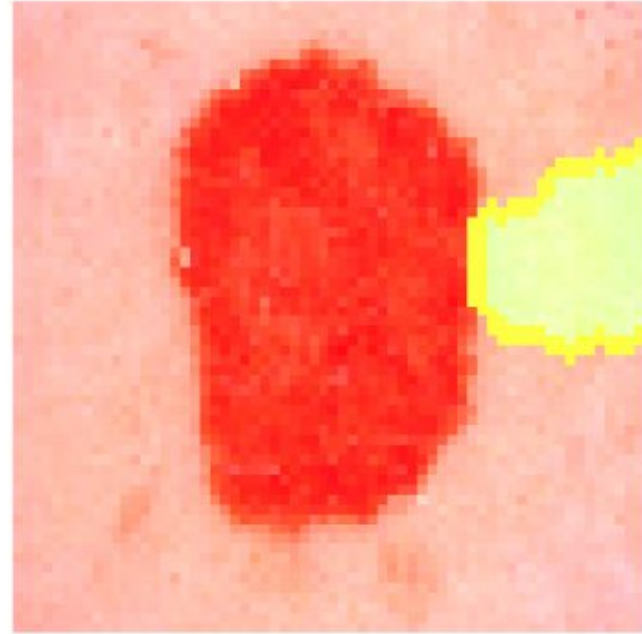
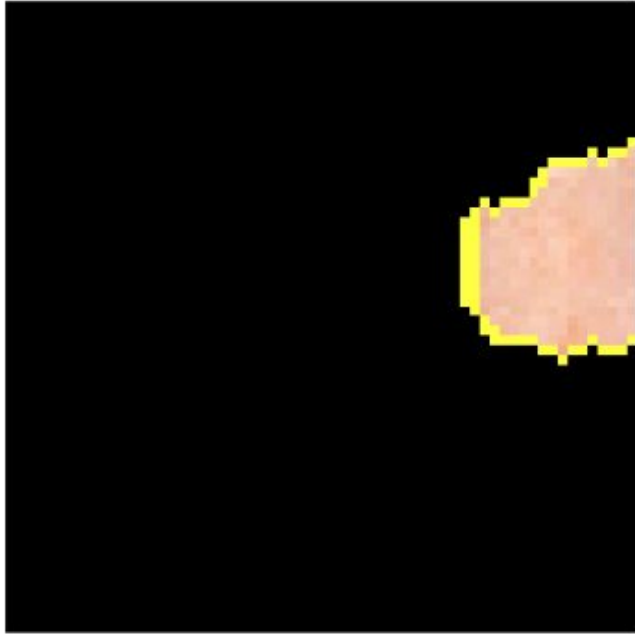
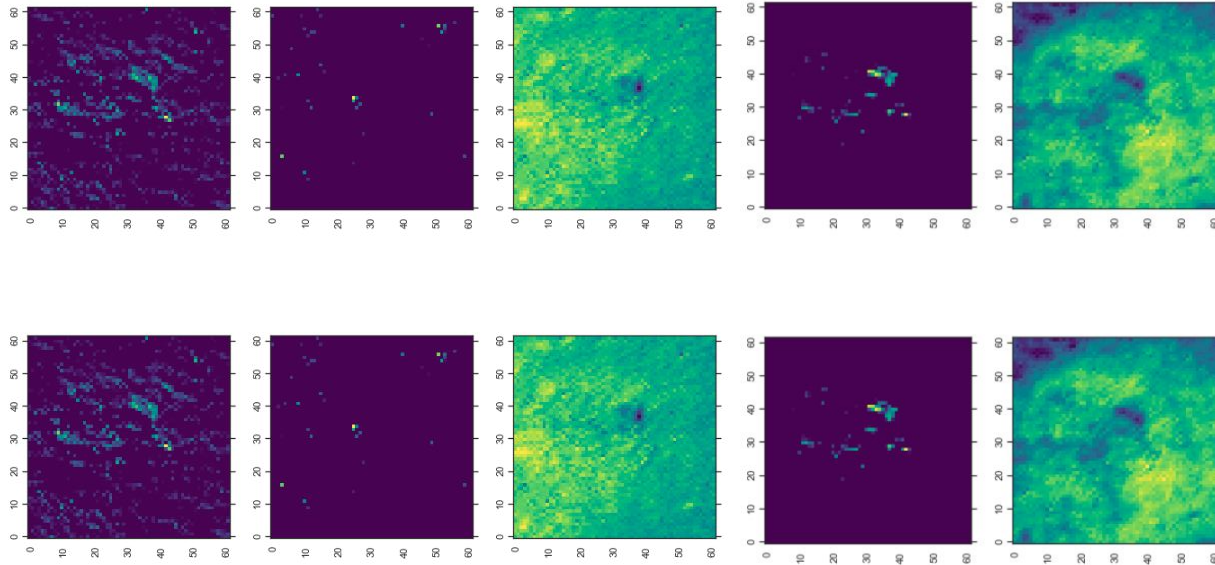


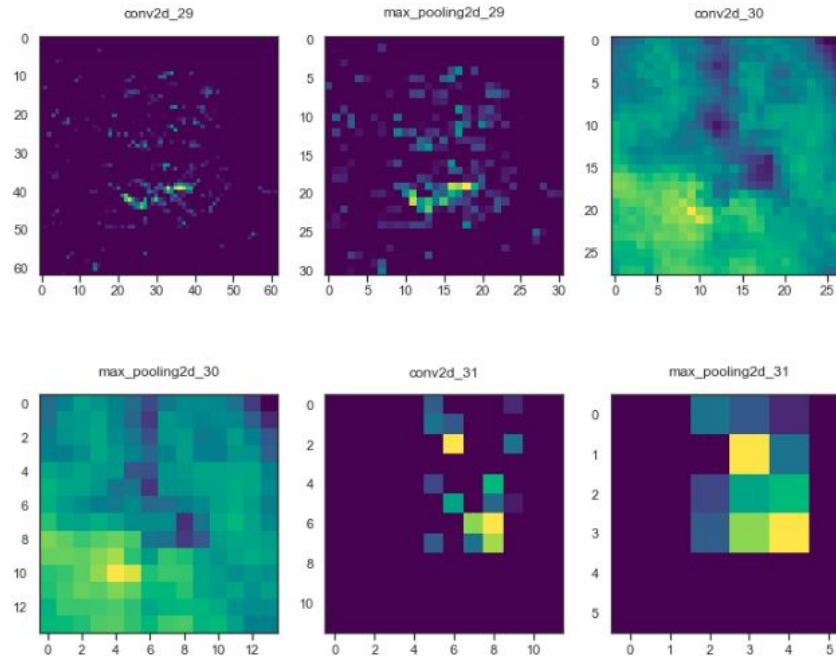
Image classified incorrectly by the model

# Visualizing activation layers



Visualizing the 10 different channels of the first layer

# Visualizing activation layers



Visualizing the six layers of the sixth channel

## APP Features

Dr receives result  
with % of certainty  
and explanatory  
visualizations

Dr can set the  
threshold for  
cancerous or  
“at risk” cases

Dr can upload  
pictures to  
database to make  
model always more  
precise



# Limitations

## Limited Data

With more data and balancing the 9 classes the model will be able to perform even better

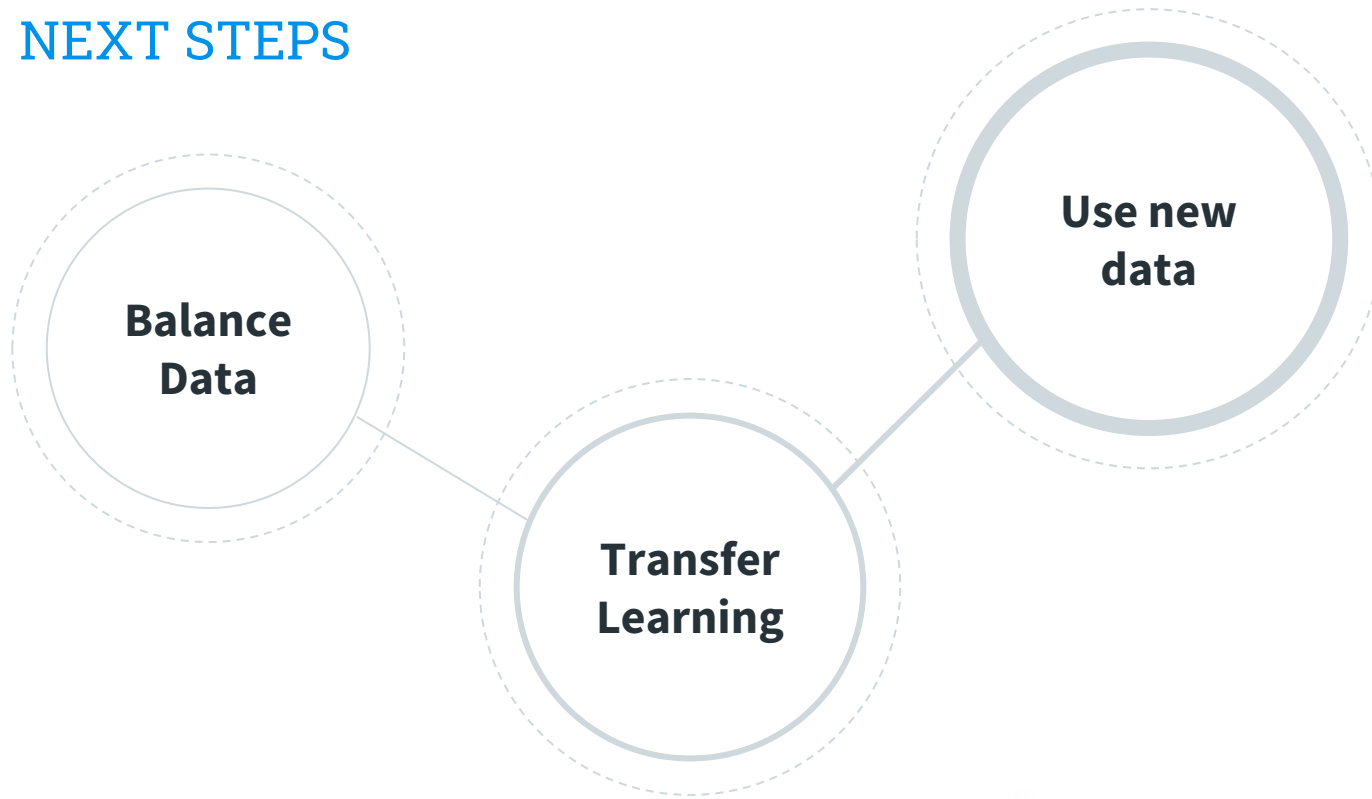
## Patient Privacy

To upload pictures to database the patient has to agree and sign a HIPAA form

## Computational Power

Limited computational power and running time - Cloud system could solve this

## NEXT STEPS



The background of the slide features a light gray network pattern. It consists of numerous small circles, some solid and some hollow, connected by thin, light gray lines, creating a web-like structure across the entire slide.

# Thank you

Any questions?

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