


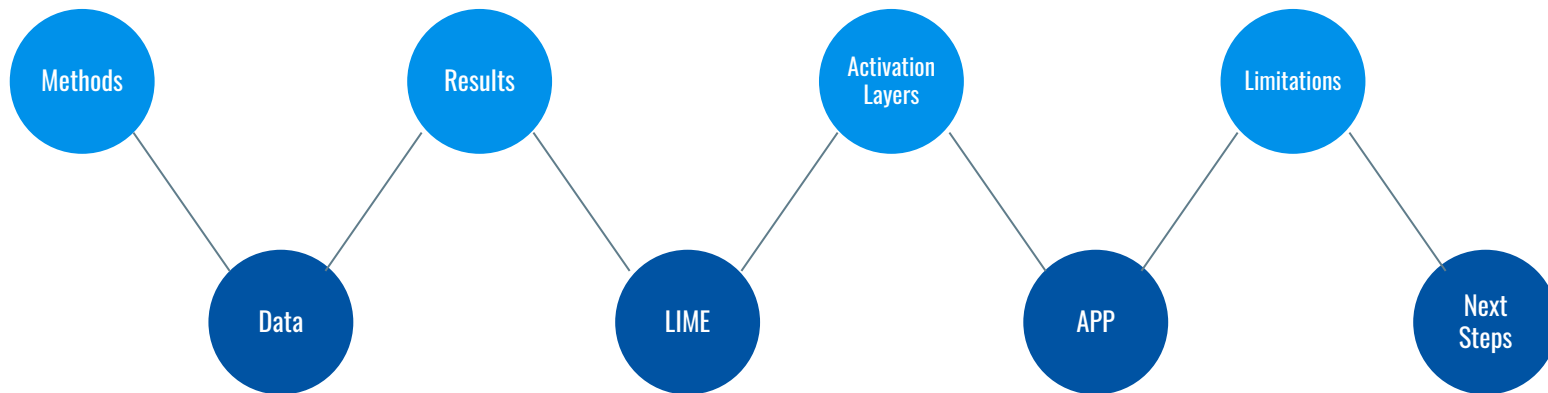


• Skin Cancer detection

- 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*
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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

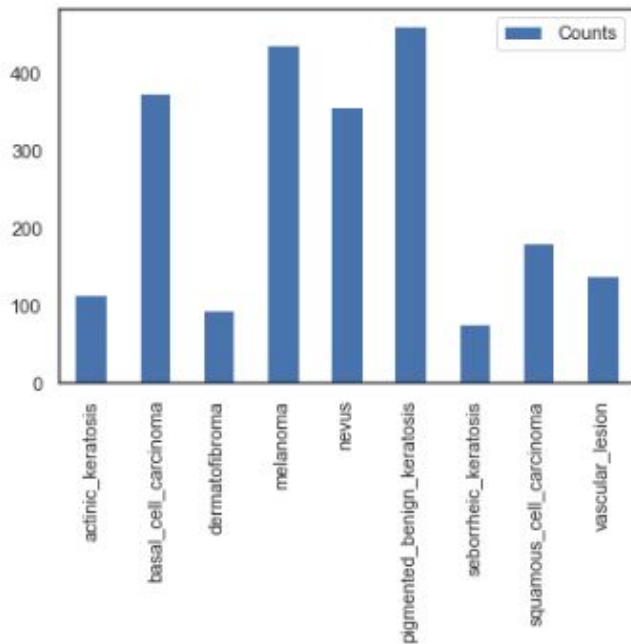
benign



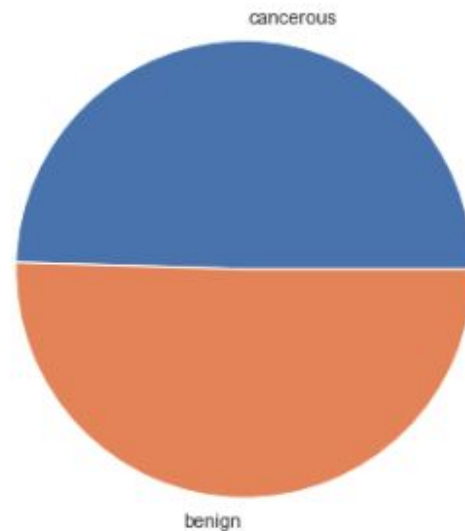
cancerous

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%

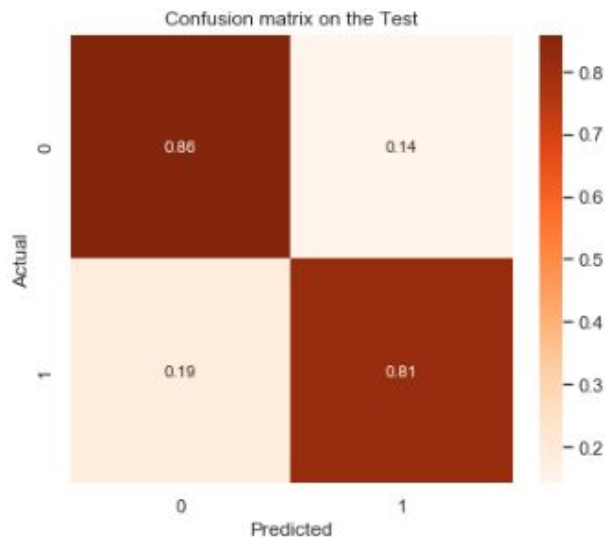
Accuracy train

15% - 20%

Accuracy test



2 classes model:



~ 80%

Recall train

~ 65%

Recall test

~ 85%

F1 train

~ 70%

F1 test

LIME

Local Interpretable Model-Agnostic Explanations

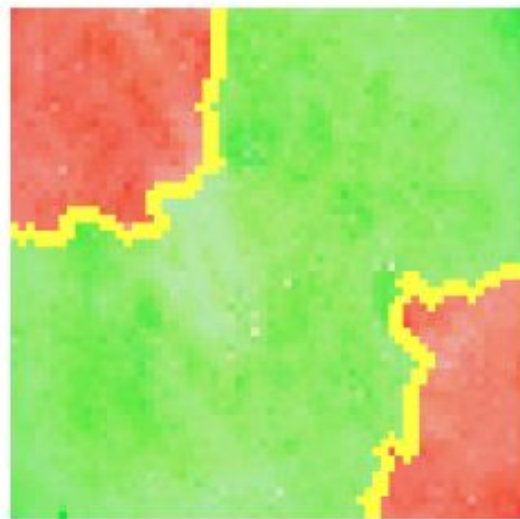
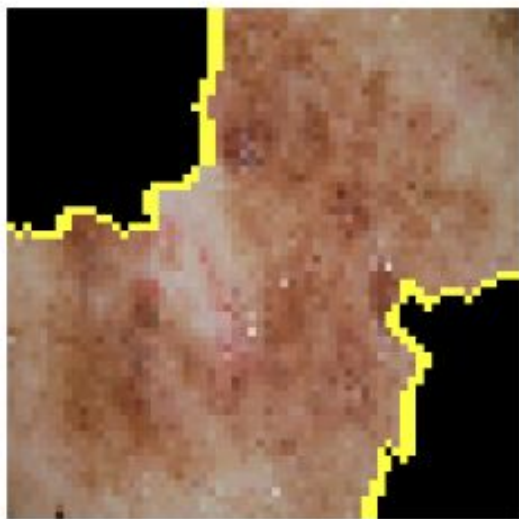


Image classified correctly by the model

LIME

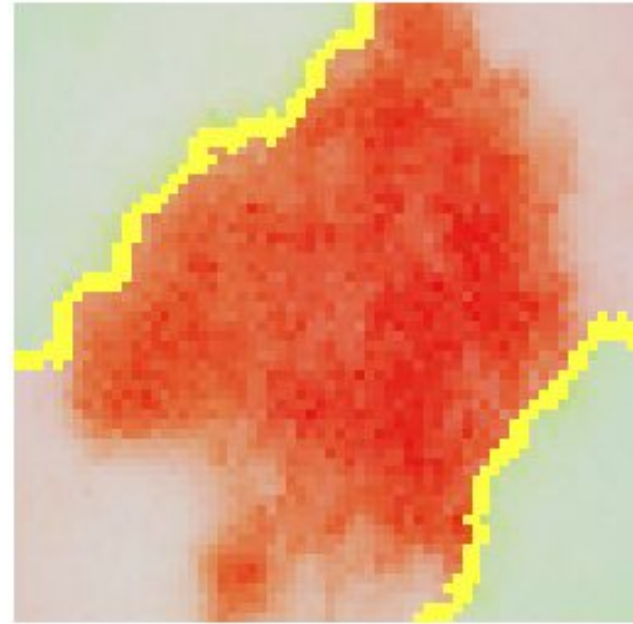
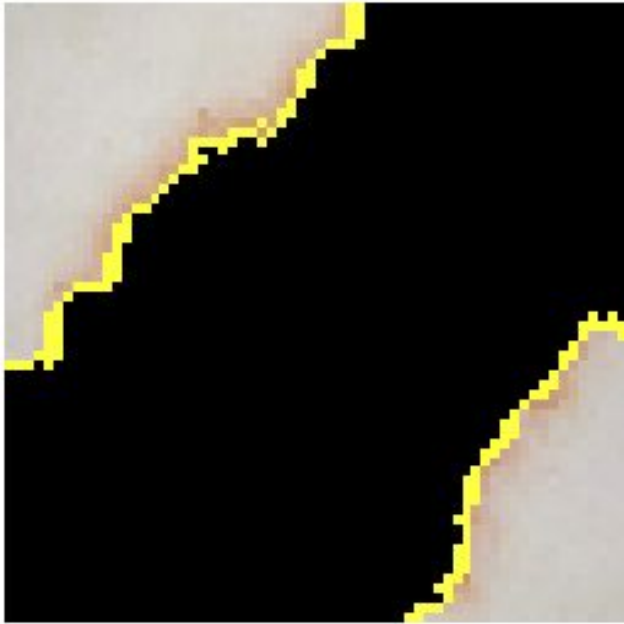


Image classified incorrectly by the model

LIME

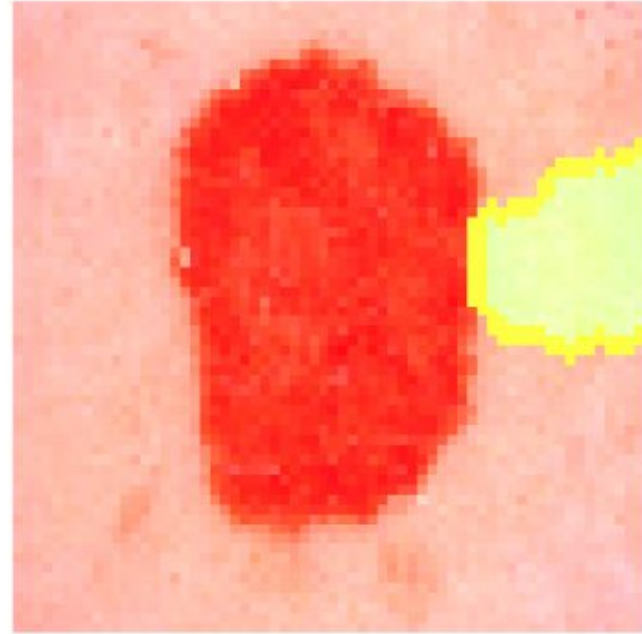
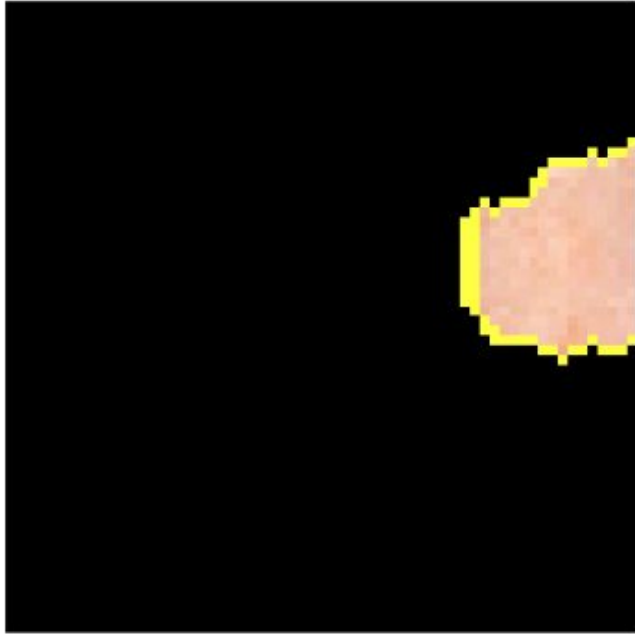
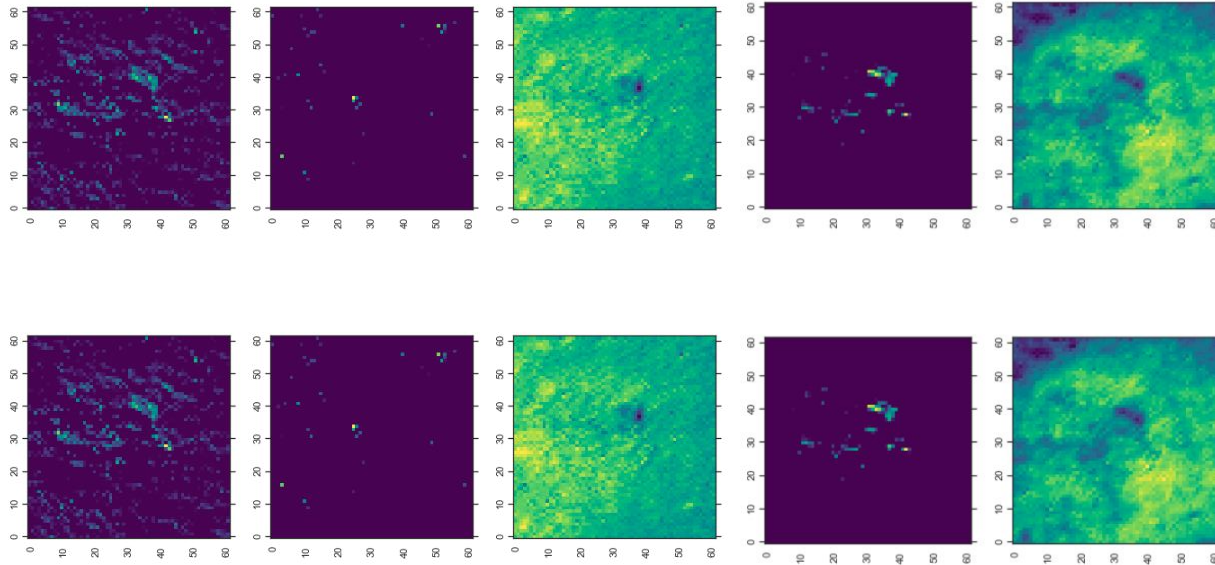


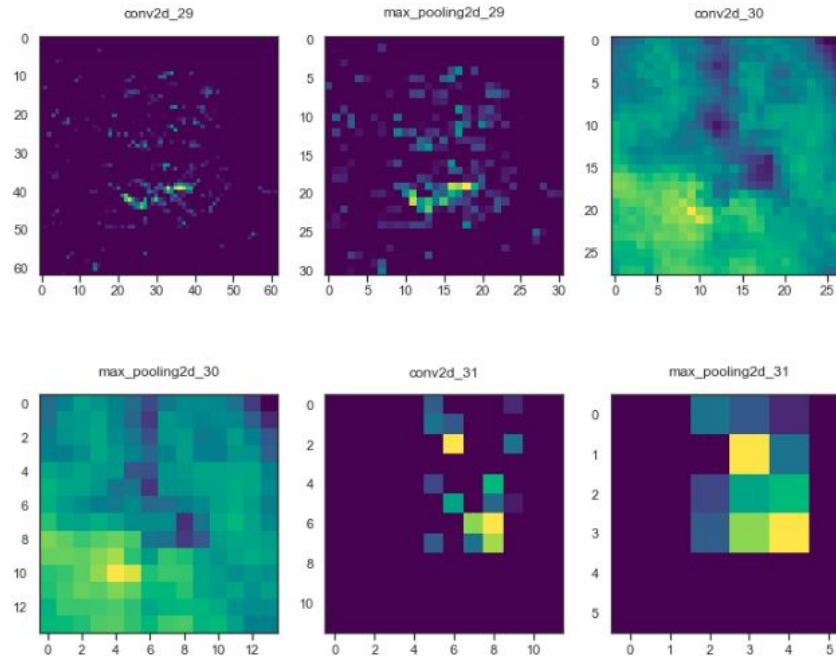
Image classified incorrectly by the model

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

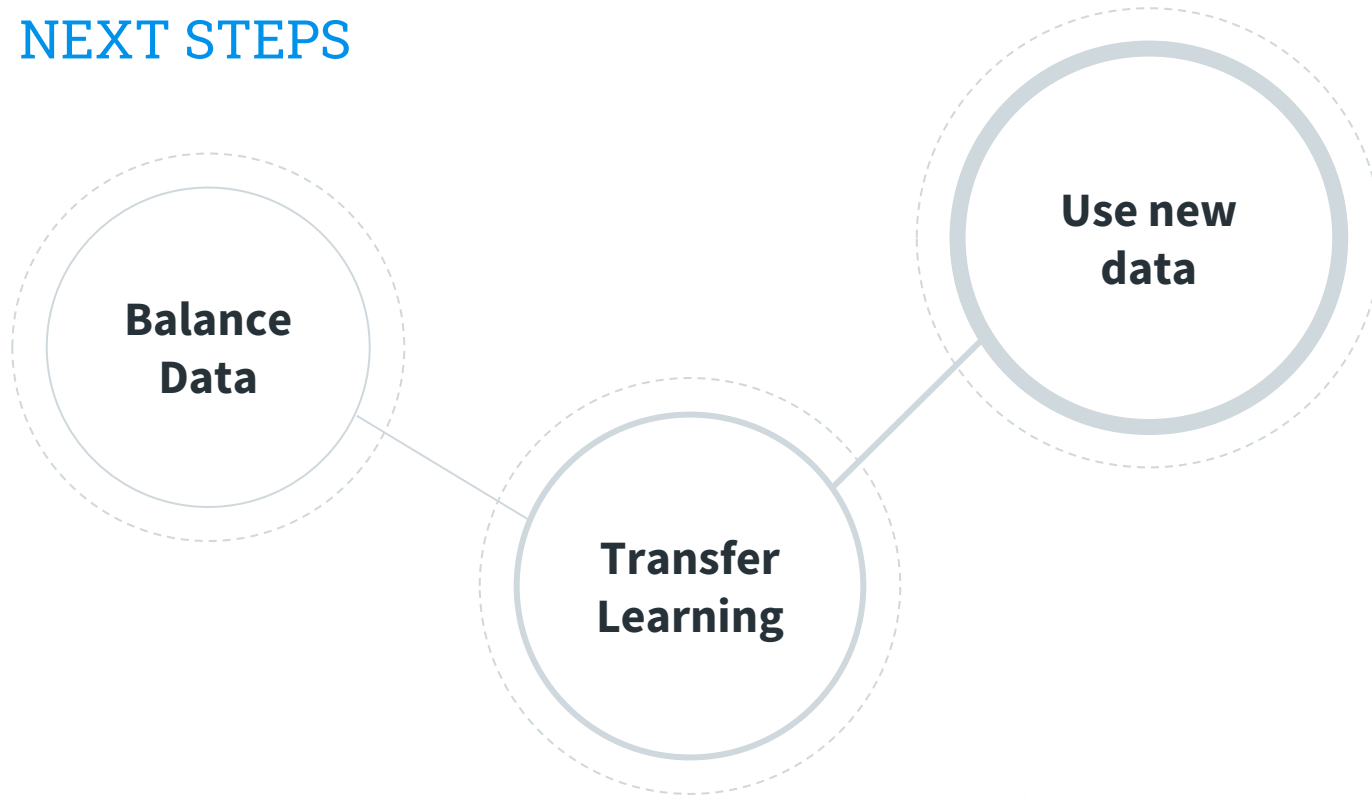
Patient Privacy

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 of which are solid gray and others are hollow, connected by thin, light gray lines. These lines form a complex web of interconnected nodes and edges, creating a sense of a global or digital network.

Thank you

Any questions?

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