



# Exploring the Combination of Machine Learning and Nanotechnology in Skin Cancer Detection



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## Product mission:

Delay in cancer care results in higher costs and greater complexity of treatment. Early detection of cancer is critical for successful patient outcomes.

- Our goal: To contribute to cancer research by combining machine learning with nanotechnology to create a new model for early diagnosis of cancer.

## Methodology:

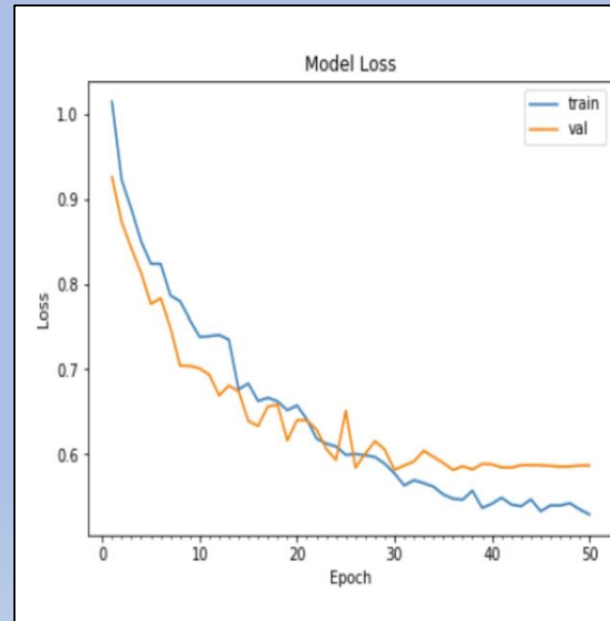
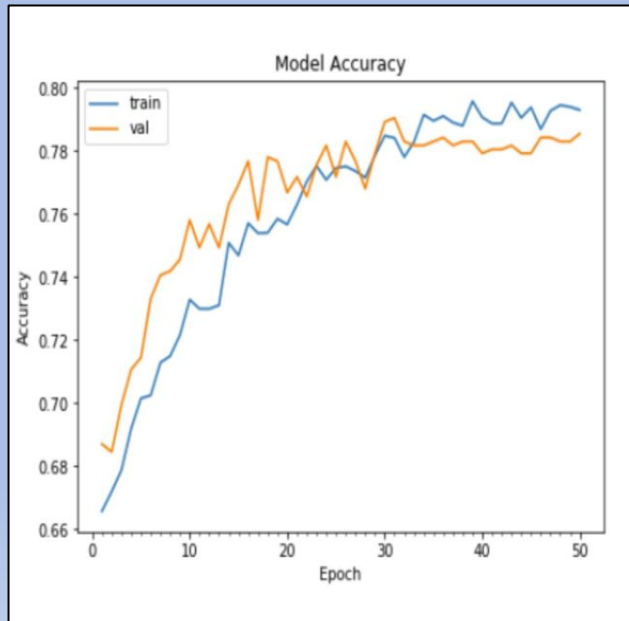
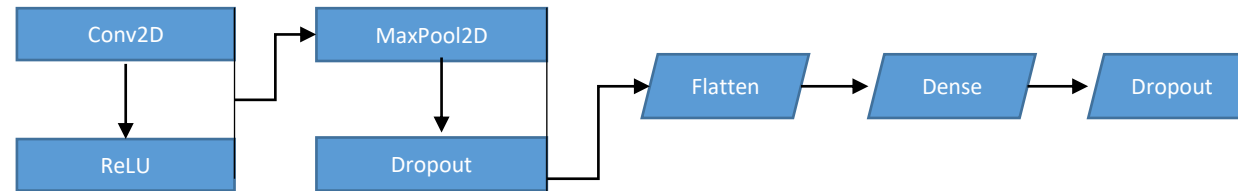
- Literature review of existing cancer detection methods.
- Analyze nanotechnology used within cancer research.
- Select type of cancer for study (skin cancer).
- Train initial machine learning model for cancer identification using existing datasets.
- Incorporate nanotechnology signals into a machine learning model.

## Nanotechnology:

- Carbon nanotubes focus.
- Literature review on skin cancer biomarkers.
- Examination of skin cancer detection using carbon nanotubes (biomarker focus).
- Generation of synthetic nanotechnology signals for model training.

## Our Model:

- Image-based classifier for skin cancer detection.
- Convolutional Neural Network (CNN) Architecture:
  - Keras Sequential API: Able to add one layer at a time.
- Optimizer: Adam



## Discussion:

- Able to produce machine learning model for skin cancer detection with approximately 78% accuracy.
- Carbon nanotubes are versatile for cancer detection due to their properties.

## Results

Able to detect skin cancer with machine learning model.

Better understanding of how nanotechnology is used within cancer detection.

Optimize machine learning model given time constraints.

## Challenges

Given time constraints, model could not be trained with generated nanotechnology signals.

Lack of relevant nanotechnology data for signal generation given the scope of the project.

## Moving Forward:

- Work on signal generation for existing model.
- Based upon our current model, expand to detect other types of cancer.
  - Model can interpret a wide variety of signals from different pieces of nanotechnology.
- Design user-friendly interface.