The little hospital

A project presentation of an AI program that can diagnose ct scans of lung diseases

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Artificial intelligence?

- AI drives down the time taken to perform a task. It enables multi-tasking and eases the workload for existing resources.
- Artificial intelligence (AI) is pushing the boundaries of machine-enabled functionalities.
- It is impacting the future of **virtually every industry** and every human being, a future which we should also be part of.
- This is why in my project, I used machine learning skills, to create a program that can detect some lung diseases and different types of cancer.

About the diseases diagnosed In the project

- Cancer is among the leading causes of death worldwide. In 2018, there were 18.1 million new cases and 9.5 million cancer-related deaths worldwide.
- By 2040, the number of new cancer cases per year is expected to rise to 29.5 million and the number of cancer-related deaths to 16.4 million.
- On the other hand, respiratory diseases are an enormous challenge to life, health and productive human activity.
- Many people are sick out there and probably some cannot afford medica bills, so artificial intelligence can come to their rescue and as well reduce pressure in hospitals.
- COVID19 on the other hand, has caused 4,96 million deaths to date (October 2021) and 244 million cases have been recorded so far. Not forgetting also how it caused a strain in the economy worldwide which will take us quite some time to recover from.

About the project

In the project, I collected data from different sites and the images are ct scans of diseases namely:

1. Pneumonia
2. Covid-19
3. Adenocarcinoma(type of lung cancer)
4. Large cell carcinoma(type of lung cancer)
5. Squamous cell carcinoma(type of lung cancer)
6. A normal person

The steps taken in realising the project are as follows :

01
Data collection

CT scans collected from different sources

02
Writing code for model

Model code written in c#

03
Deploying the model

A user interface to use the model.

“I visualise a time when we will be to robots what dogs are to humans, and im routing for machines.”

—Stephen Hawking

Materials used

1. **Visual studio (IDE)**

It supports c# (which I used for programming), all .NET languages and XAML which I used for Designing the user interface.

2. **The image dataset**

As explained in previous slides

How the model works

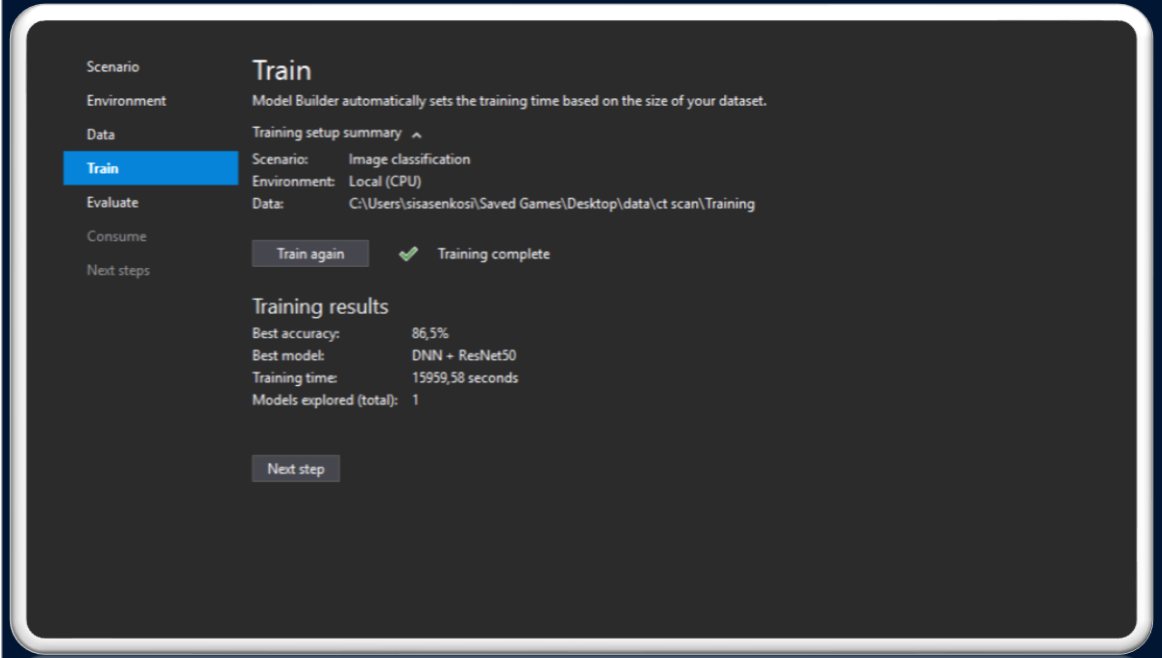
- The type of learning used was machine learning, a subset of artificial intelligence.
- I pre-processed the data and made folders each of 150 images of each disease.
- The model takes the images as input, learns patterns in the data, and as output, it gives a program that when given new images, it can predict the malady a patient has.

MODEL INPUT

It is a set of labelled folders of ct scan images. NOTE that labels are very important!

How the model works continued

- To train the model, I used pretraining method where an already trained model can be customised to also train these medical images.
- The pretrained model is called Resnet50 and was trained on 1.2 million images and has 50 layers.
- After training , the model accuracy was 86,5% which is fairly higher than doctors' 71,40% .
- So basically, AI can diagnose diseases better than a doctor.



MODEL OUTPUT

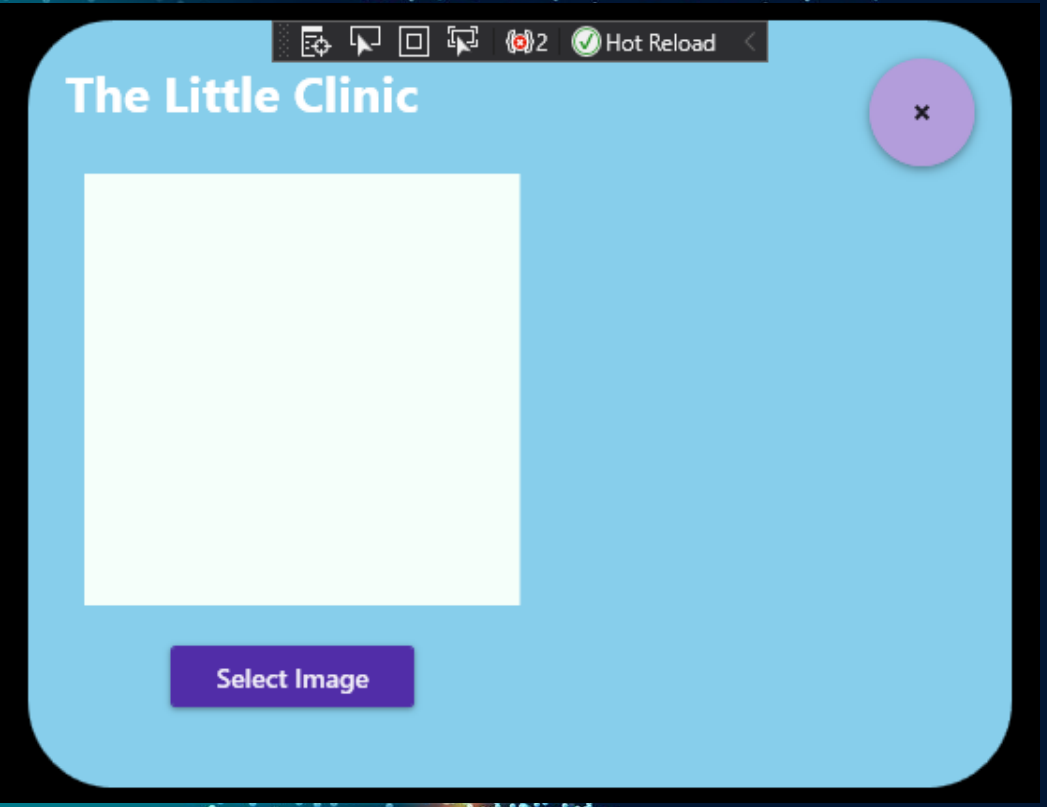
The output is a trained model ready to be deployed.

Now that the model is ready , what's left is a user interface !

Deploying the model

- To be able to use the code, I also made a user interface using Microsoft Windows Presentation Foundation (WPF).
- It uses Extensible Application Markup Language(XAML), a XML-based language.

The user interface elements are as follows



Select image button

Allows to select image from device

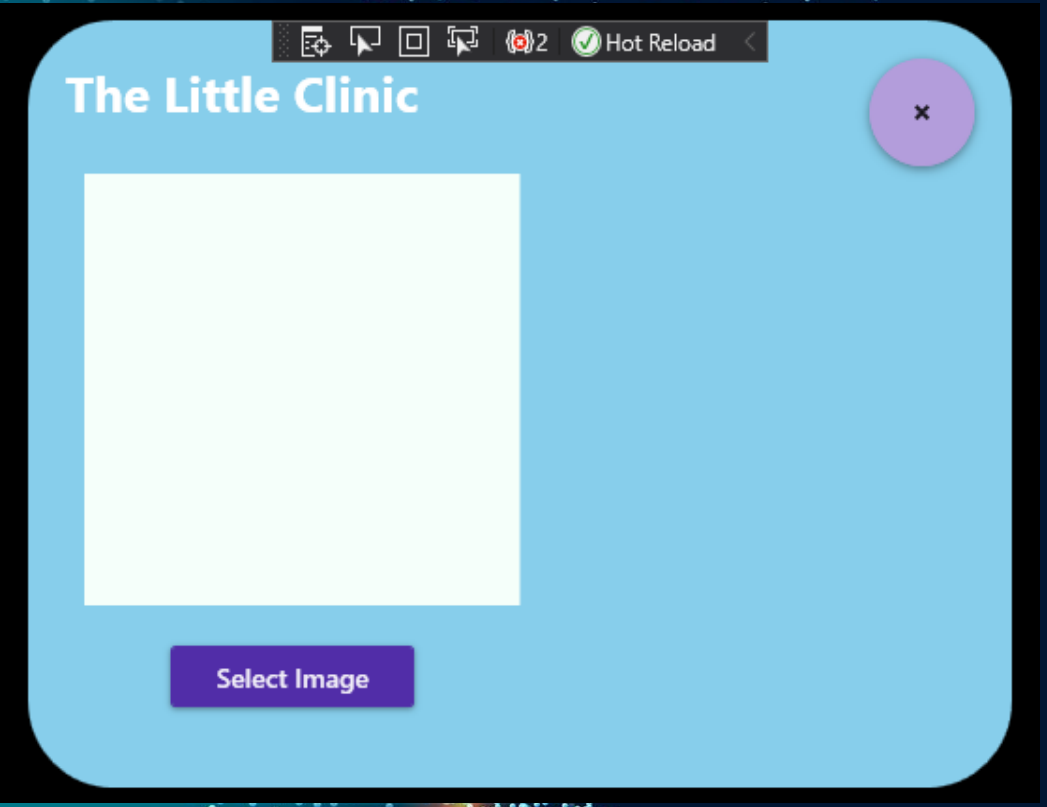
The image window

Will display selected image

The progress bar grid

Will show the percentage probabilities of disease

The user interface elements are as follows



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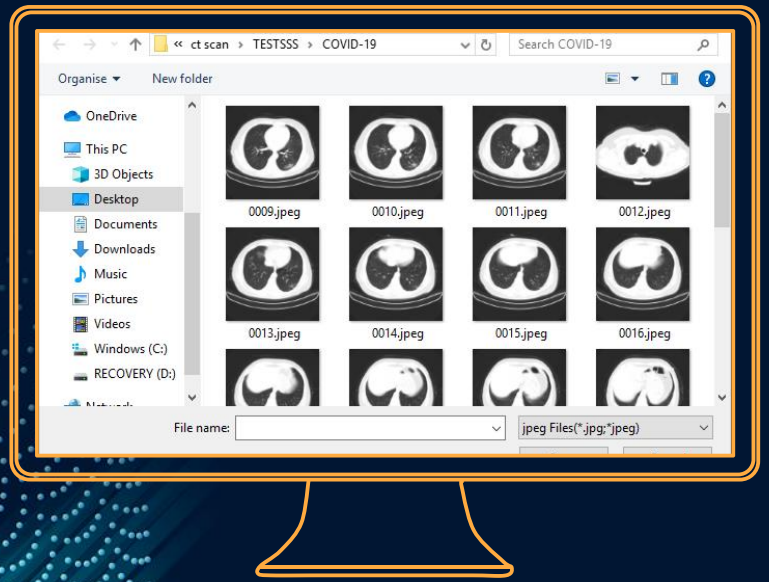
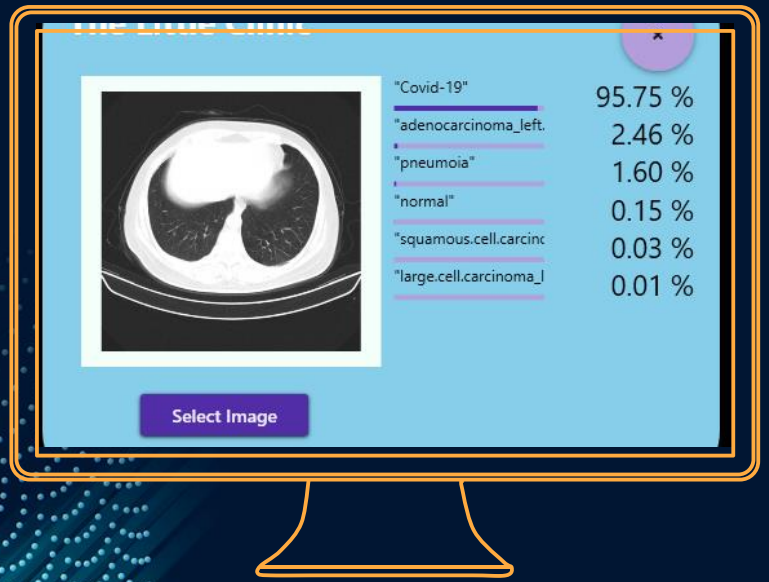
After pressing select image



From device you can select image to be analysed by clicking on it to select and press insert.

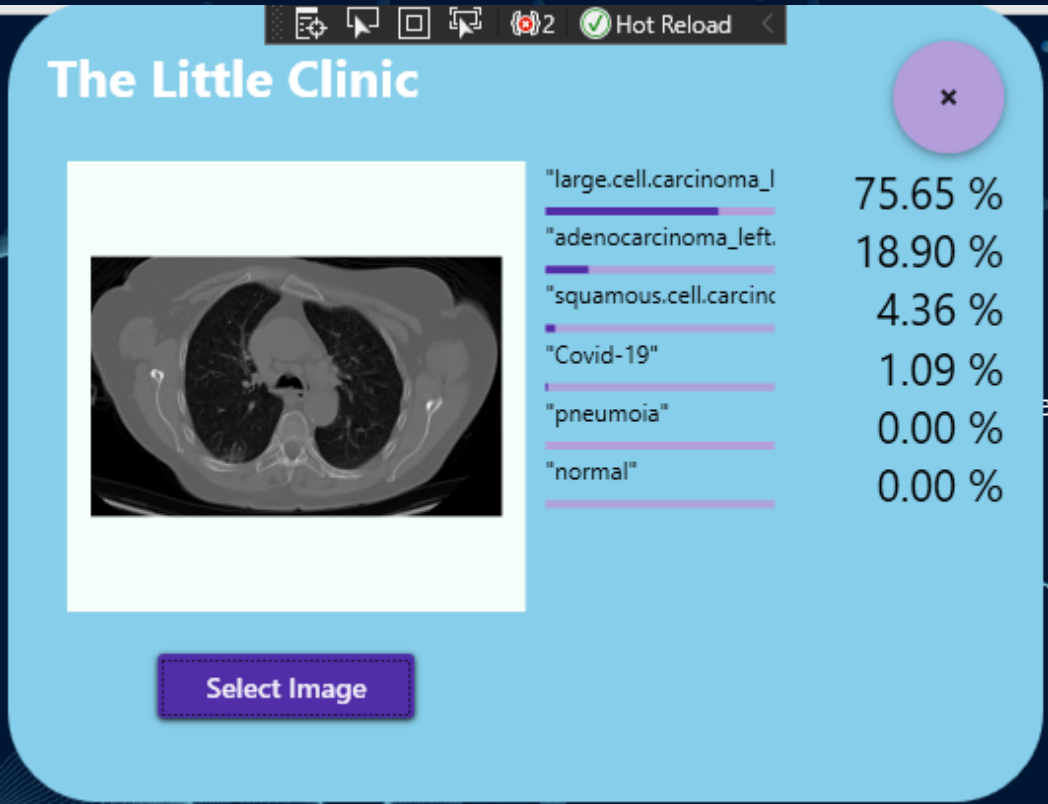
After pressing select image



It will then automatically give you a progress bar grid from the most likely disease to the least.

Who can use this model and where can it be implemented?

- It can be used by the general public as long as one posseses a computer.
- It can be implemented by medical facilities and laboratory analysts.



Problems encountered throughout project

- Data acquision , It is difficult to find authentic data since patient’s medical records are confidential.
- For this reason, image data labels might be incorrect, resulting in distortion of model output results

FUTURE IMPROVEMENTS

- Increase in number of diseases analysed.
- Expansion of model to cater for mobile phone users, tablets and other different operating systems.
- Getting more authentic hospital data to improve model accuracy.
- Expanding the model to even give prescriptions and advise to patients.

CONCLUSION

Many people are sick and can be saved, with the help of artificial intelligence.
We can be part of the generation that saves the world,
With just a snap and a click to analyse, you can determine your sickness with my software :
”THE LITTLE CLINIC “

References

- The data was acquired from:

- https://www.kaggle.com/awsaf49/cbis-ddsm-breast-cancer-image-dataset
- https://www.kaggle.com/mohamedhanyyy/chest-ctscan-images
- https://www.kaggle.com/arindammajee/sarscov covid

THANK YOU!

For all questions kindly send an email to:

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