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User Guide for
proHealth360 final project



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Introduction :

proHealth360 is a web app that is based on the Flask app framework, it's free and everyone can use it anytime.

No need to download anything, it's Wi-Fi less and it's available to everyone.

All you need is just a computer.



ProHealth360 offers accurate disease detection such as COVID-19, Breast Cancer, Alzheimer's, and more. By providing real-time predictive analysis, our platform accelerates the diagnostic process and ensures equitable access to essential healthcare services for individuals in remote or underserved communities. So here a user guideline to make sure that our users will have the best experience of visiting our web app.

every page is explained well and full of detailed guides as possible.

so let's zoom in on the instructions.



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- **Home page:** The home page represents the initial landing page displayed when accessing the website for the first time.

Section 1

ProHealth360 - an all in one medical solution
Medical problem?
Here's the solution
This portal can help you with medical solutions and for FREE!!
ProHealth360 is an all-in-one medical solution app designed to empower users with tools and resources for managing their health and well-being. It provides features for the detection and management of 5 specific diseases: Covid Detection, Brain Tumor Detection, Breast Cancer Detection, Alzheimer Detection, and Diabetes Detection. These features include educational content, self-assessment tools, and access to crucial information about each disease. ProHealth360 emphasizes early detection, prevention, and informed decision-making, aiming to support users in their healthcare journey and promote better health.
[Check It Out](#)

Section 2

Brain Tumor
[Click Here](#)

Diabetes
[Click Here](#)

Alzheimer
[Click Here](#)

Covid
[Click Here](#)

Breast Cancer
[Click Here](#)

Section 3

Artificial Intelligence in
PROHEALTH360
Where Health Meets Innovation

The artificial intelligence (AI) technologies becoming ever present in modern business and everyday life are also steadily being applied in healthcare. The use of artificial intelligence in healthcare has thus potential to aid healthcare providers in many aspects of patient care and administrative processes. Most AI and healthcare technologies have strong relevance to the healthcare field, but the tactics they support can vary significantly. And while some articles on artificial intelligence in healthcare suggest that the use of artificial intelligence in healthcare can perform just as well or better than humans at certain procedures, such as diagnosing disease, it will be a significant number of years before AI in healthcare replaces humans for a broad range of medical tasks.

Section 4

Machine Learning in
PROHEALTH360
Where Health Meets Innovation

Machine learning is one of the most common forms of artificial intelligence in healthcare. It is a broad technique at the core of many approaches to AI and healthcare technology and there are many versions of it. Using artificial intelligence in healthcare, the most widespread utilization of traditional machine learning is precision medicine. Being able to predict what treatment procedure is most likely to benefit a given patient based on their medical history, the treatment framework is a huge leap forward for many healthcare organizations. The majority of AI in healthcare that uses machine learning and precision medicine applications require data for training, for which the end result is known. This is known as supervised learning.

Footer

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Sign Up For Our Newsletter
 Email Address
 Submit

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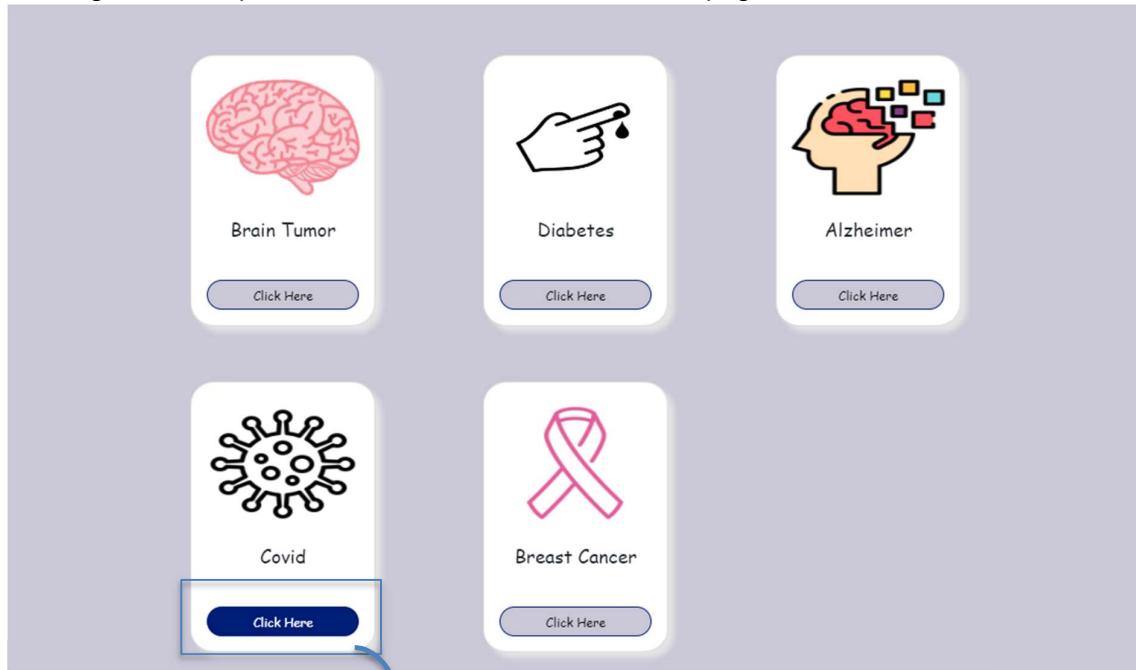
- **Section 1&2: Explore Disease Detection**

To navigate to a specific page, choose the corresponding option from the navigator bar.

Users have five options:

5. Covid Detection: Detect potential Covid-19 infections by uploading relevant medical data or symptoms.

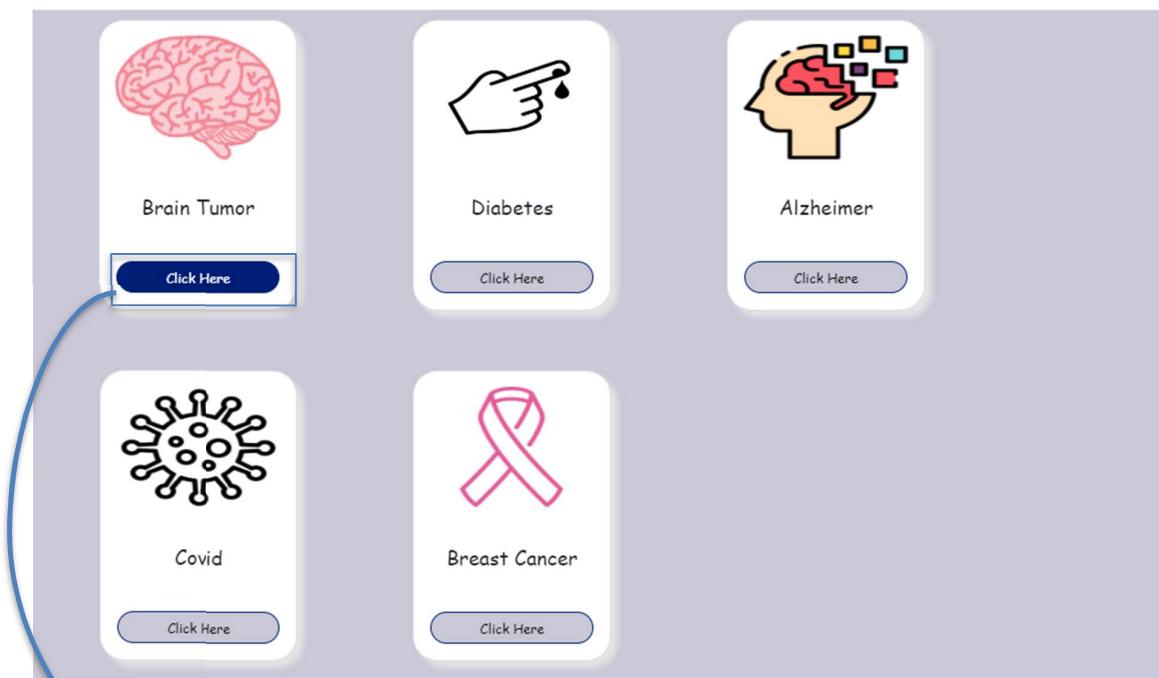
Clicking on covid option will take him to the COVID homepage web:



Leading To COVID web home page:



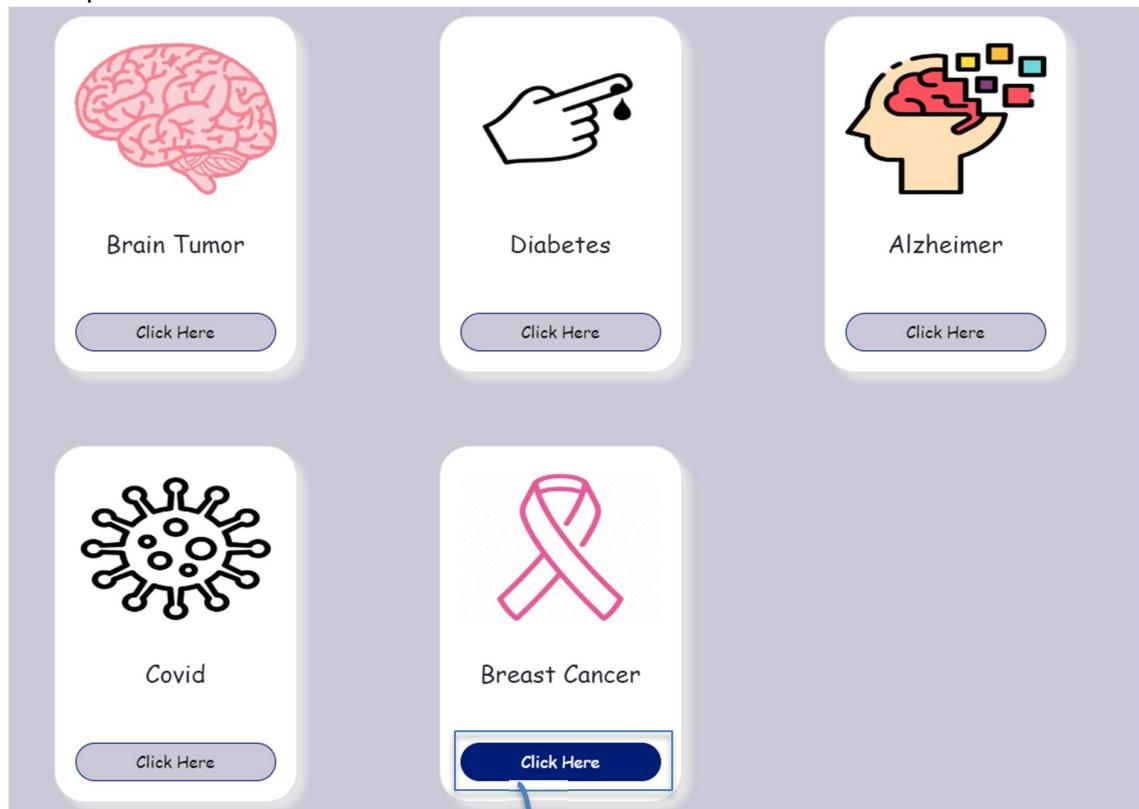
2. Brain Tumour Detection: Use advanced imaging technology to screen for brain tumours and receive early diagnosis.



Leading To Brain Tumour homepage:

The homepage has a blue header with a brain icon and navigation links: Home, About project, FAQS, Tumor Detection, News, More info, and Back to ProHealth360. The main content area features the text "DETECT YOUR SELF NOW!" in large white letters, followed by a quote: "The Human Brain Is Probably One Of The Most Complex Single Objects On The Face Of The Earth; I Think It Is, Quite Honestly." To the right is a 3D rendering of a human head profile with a glowing red tumor in the brain.

3. Breast Cancer Detection: Access tools for breast cancer screening and learn about preventive measures.

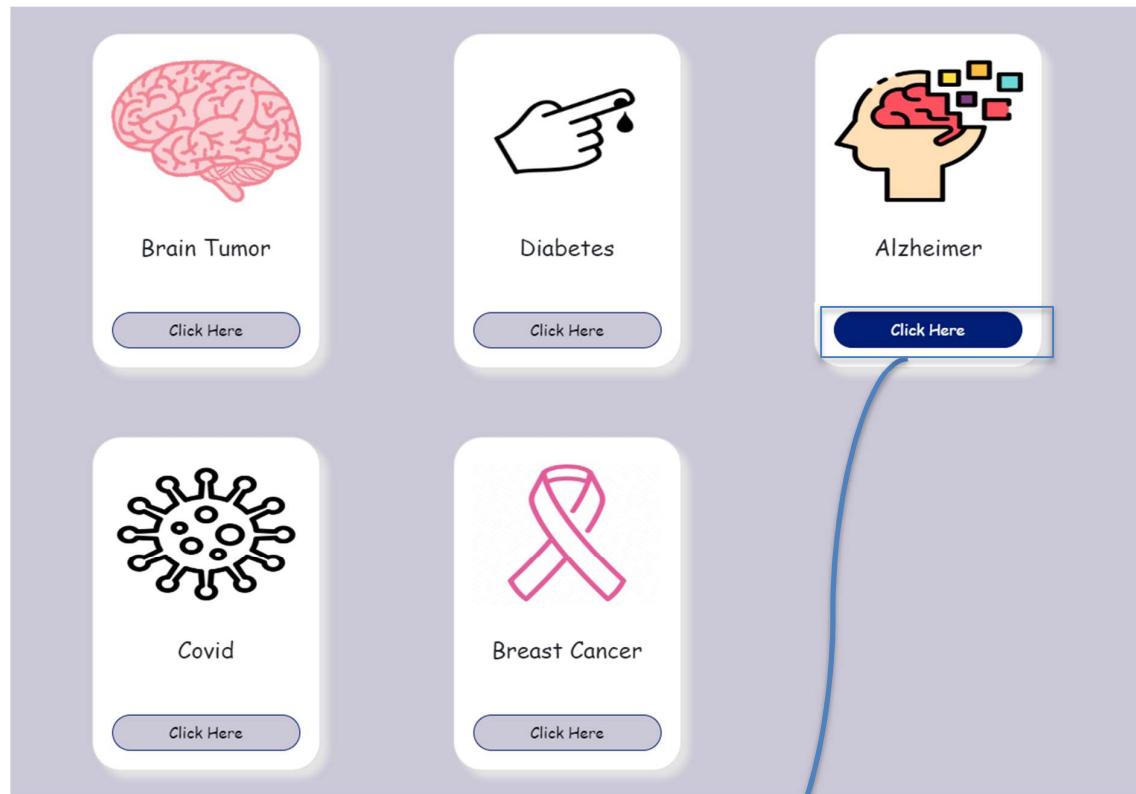


Leading To Breast Cancer homepage:



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4. Alzheimer Detection: Utilize cognitive assessment tools to detect early signs of Alzheimer's disease.

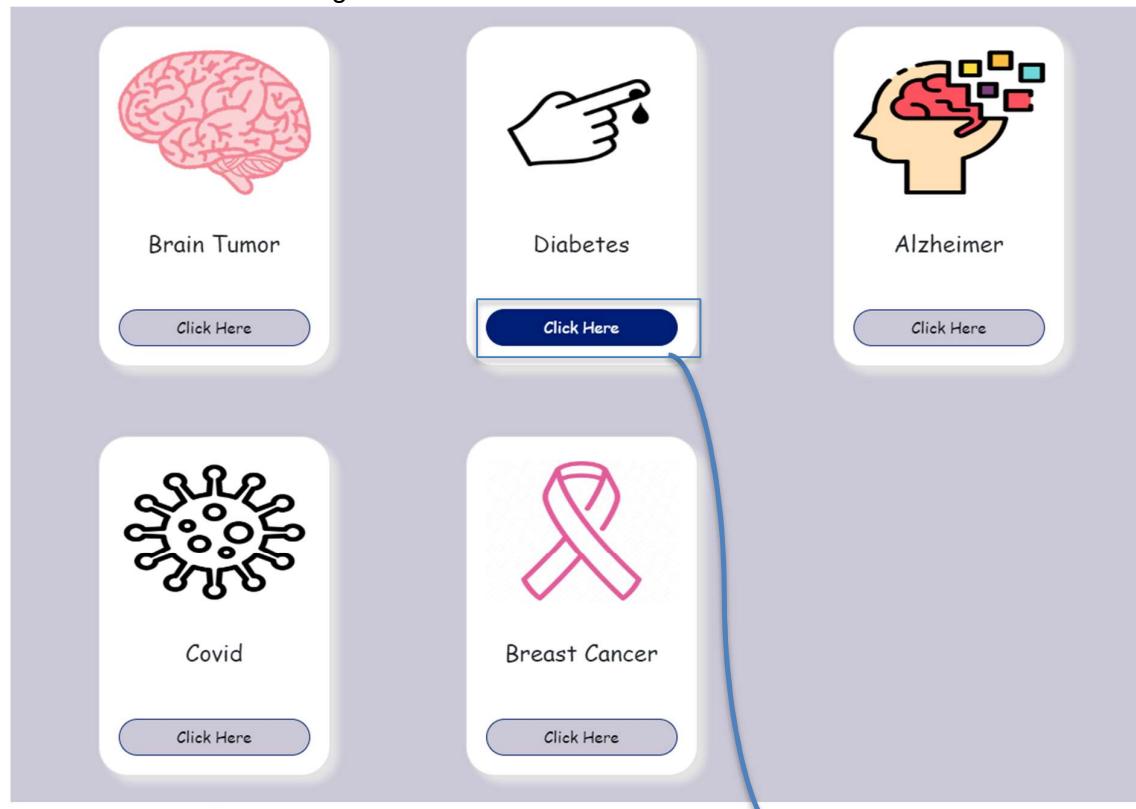


Leading To Alzheimer's homepage:

The screenshot shows the Alzheimer's Disease Prediction homepage. At the top, there is a navigation bar with links for HOME, About Us, Alzheimer's Disease Classifier, FAQS, Memory Game, and News. The main content area is titled "Alzheimer's Disease". It contains a brief description of the disease, a section titled "Stages of Alzheimer's disease:", and two numbered sections: "1.Mild Alzheimer's disease" and "2.Moderate Alzheimer's disease". To the right of the text, there is a large, colorful graphic of a brain, composed of many small triangles in shades of green, yellow, and orange.

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5. Diabetes Detection: Monitor blood sugar levels and assess the risk of developing diabetes with our screening tools.



Leading To Diabetes homepage:

Home ▾ Diabetes ▾ Healthy Living ▾ Health Tools ▾ Contact us ▾ Search Submit

Discover a life full of vitality and well-being – choose our diabetes care today! With us, you won't need to visit a hospital or go anywhere else to determine whether you have diabetes or not; we provide all the necessary information you need

Diabetes Detection

You could be one of the 1.5 million who have diabetes and don't know it. It's important to know the risk factors and ...

127.0.0.1:5000/indexdiabetes.html#myCarousel

Explore each section by clicking on the respective header to access detailed information and diagnostic tools for each disease. Whether you're looking for educational resources, self-assessment tools, or crucial information about specific conditions, ProHealth360 offers a comprehensive suite of features to support your healthcare journey – all available for free!

- **Section 3:**

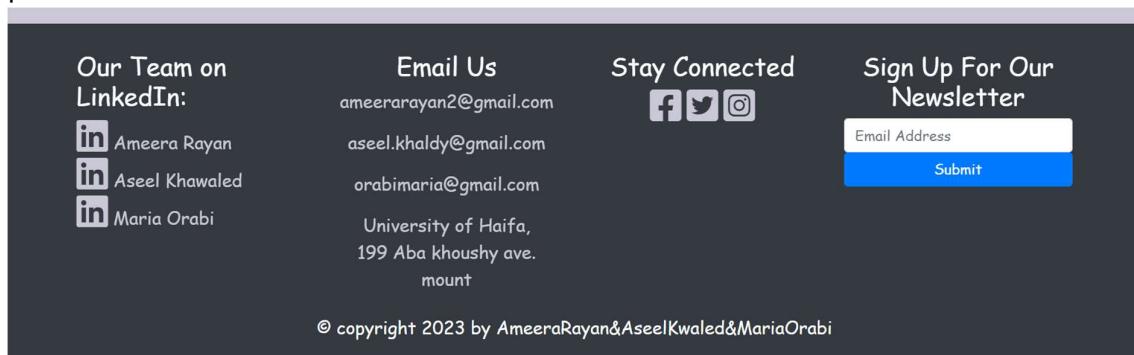
In this section, we delve into the innovative use of artificial intelligence (AI) within our platform, ProHealth360. Our AI-powered algorithms analyse medical data with precision, enabling accurate disease detection and early intervention.

- **Section 4:**

In this Section highlights our utilization of machine learning (ML) and deep learning techniques within ProHealth360. Through ML algorithms and deep learning models, our platform achieves unparalleled accuracy in disease detection and prediction.

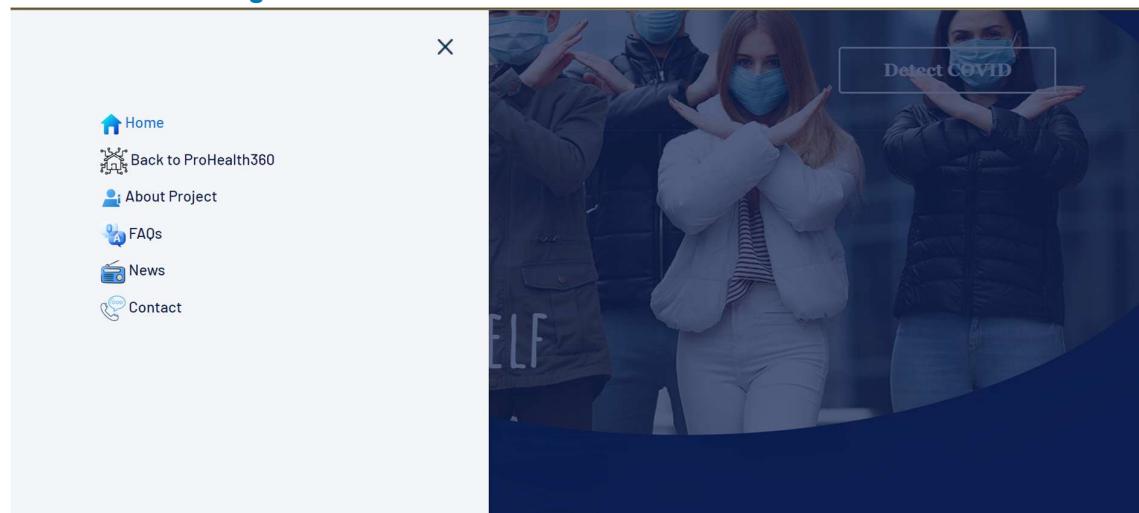
- **In the final section (footer):**

You can click on any of the social media icons to visit our respective pages on those platforms.



Also you'll find a footer containing information about our team and you can contact us, and sign up for our newsletter.

- **COVID web app home page :**
First section :navigation

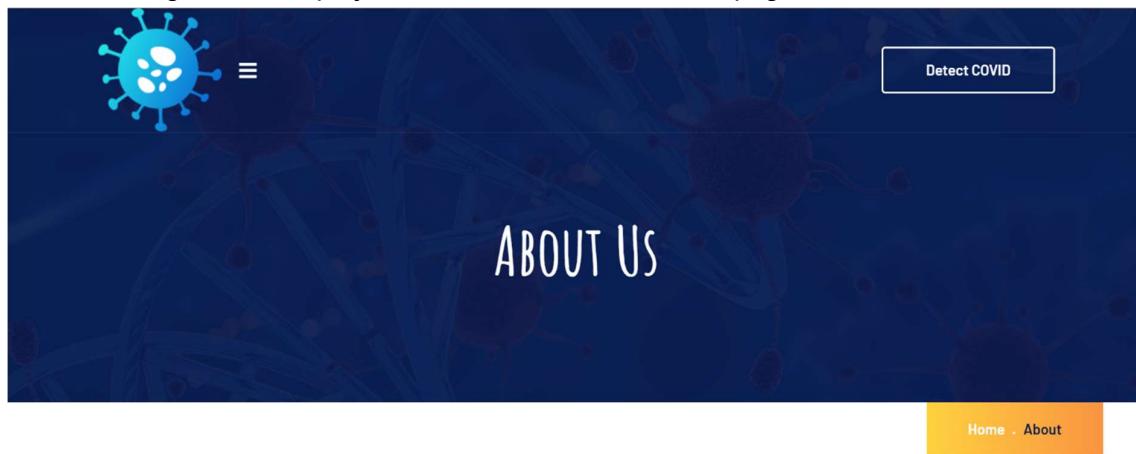


In this section users have 6 options :

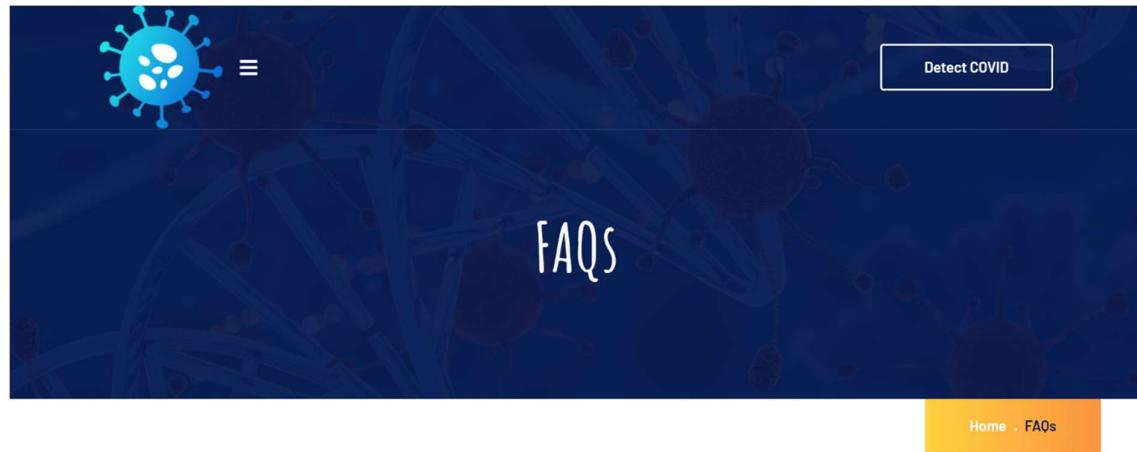
1. Clicking on the “Back to proHealth360” will lead the user back to the base web homepage.

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2. Clicking on “home” will lead the user to the Covid web homepage (existing page).
3. Clicking on “About project” will lead the user to this page:



4. Clicking on “FAQs” will lead the user to this page :



5. Clicking on “News” will lead the user to this page:

A screenshot of a Google News search results page. The search bar at the top contains the query "covid". Below the search bar is a navigation bar with links for Home, For you, Following, Israel, World, Local, Business, Technology, Entertainment, Sports, Science, and Health. The main content area displays several news articles from The New York Times. The first article, titled "What the Data Says About Pandemic School Closures, Four Years Later", includes a chart comparing average drop in math scores between in-person and remote learning across different grade levels. The second article, titled "Haiti's Hospitals Survived Cholera and Covid. Gangs Are Closing Them.", features a small image of people in red uniforms. The third article, from ON, is titled "A man deliberately got 217 Covid shots. Here's what happened" and includes an image of a medical professional holding a syringe. To the right of the news feed is a sidebar for "Nashville COVID-19 Response", which includes a "Follow" button and a "Share" button.

This page is out of our platform, it includes Google news about covid disease. We want to make sure if the used needs to know any news about the disease so he can by clicking on the “news” navigator and to make him updated.

6. Clicking on “Contact” will lead the user to this page :



- **Second section: Information on covid**

Also by clicking on this button, a short informative video about COVID-19 and about the vaccine will appear.

And if user clicks on “detect covid” will lead him to the detector page.

The diagram illustrates the user flow. It starts with a thumbnail for a video titled "HOW TO PROTECT YOURSELF FROM CORONAVIRUS?", which has a play button icon. A red box highlights the play button, and a blue arrow points from it to a YouTube video player window below. This video player shows a thumbnail for "HOW DOES COVID-19 AFFECT THE BODY?" with a play button and a progress bar at 0:00 / 5:14. Another blue arrow points from the video player to a "COVID DETECTOR" page. The "COVID DETECTOR" page has a dark blue background with a virus icon in the top left. In the center, it says "COVID DETECTOR". At the bottom, there is a "UPLOAD IMAGE" button and a note: "Please select the type of image you want to diagnose". Below this, there are two sections: "Chest X-Ray" and "CT Scan", each with a "Select Image" button, a "Choose File" input field, and a "Upload" button.

- **Second section: Information about COVID-19**

The screenshot shows a mobile application interface for COVID-19 information. At the top is a header bar with an exclamation mark icon, the text "Coronavirus Disease COVID-19 ALERT", and a "Help & Information" button. Below the header is a video player showing a medical professional in a mask. To the right of the video is a section titled "Introduction of Coronavirus: CORONAVIRUS DISEASE (COVID-19)". It includes a small virus icon and the text: "Coronavirus disease is an infectious disease caused by a new virus." A paragraph explains that COVID-19 is the infectious disease caused by the most recently discovered coronavirus. It advises simple steps to protect health. Below this are four cards with icons and text:

- COVID-19 Spreads Very Fast!**
- COVID-19 Stands for CoronaVirus Disease of 2019**
- COVID-19 Impacting many people!**
- COVID-19 Is caused by viruses!**

A blue "Detect COVID" button is highlighted with a red border. A blue arrow points from this button towards a molecular structure icon. To the right of the arrow is a text box containing the following note:

Also here , user can click on "Detect" button to lead him to detection page.

At the bottom of the screen are two small virus icons flanking the text "Millions of People are Infected by this Virus".

A general information about COVID-19 disease to ensure awareness to patients.

- **Third section: How virus is spreading ?**

The screenshot shows a section titled "How VIRUS IS SPREADING". It features three main illustrations and descriptions:

- Nose, Mouth, or Eyes TO HANDS TO OTHERS:** An illustration of a person covering their nose. The text explains that germs can spread to hands via sneezing, coughing, or rubbing eyes, and then be transferred to others.
- HANDS TO FOOD:** An illustration of hands near food. The text explains that germs from unclean hands can transfer to food if an infected food preparer didn't wash their hands after using the toilet.
- INFECTED CHILD TO HANDS TO OTHER CHILDREN:** An illustration of hands. The text explains that germs from a child with diarrhea can transfer to other children's hands if parents don't immediately wash them after diaper changing.

A blue arrow points from the right side of the third section towards a text box on the right.

This section explains how covid can be spread more than way to prevent the patient if he has covid not to spread it with others.

- **Fourth section: Things u should/should not do as a patient.**

THINGS YOU SHOULD DO	THINGS YOU SHOULDN'T DO
<p>WASH YOUR HANDS 20 SECONDS</p>  <p>Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water why?</p>	<p>AVOID BEING SEDENTARY </p> <p>"Just because we're told that we need to keep a social distance and be inside doesn't mean you can't exercise for a half-hour," licensed professional counselor Michelle Salerno Sigmund said while calling from her Philadelphia office. "Go take a jog, ride a bike, or go for a long walk. There's no need to sit in a chair all day. Kids want and need to be active."</p>
<p>COVER YOUR COUGH</p>  <p>Make sure that you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with the bend of your elbow or with a tissue when you cough or sneeze. Dispose of the used tissue immediately into a closed bin and wash your hands. why?</p>	<p>FORGET ABOUT NORMALCY FOR NOW</p>  <p>"Alleviate the perception of how we lived our lives every day before the coronavirus altered the way we live," Salerno-Sigmund said. "We have to let go of expectations. People keep thinking about when we will go back to normal. We'll get there, but it's not something that we should think about every day. People talk about it every day, but we need to stay in the now. People are optimistic and people are pessimistic. What we need to do is just live in the moment."</p>
<p>AVOID TOUCHING YOUR HANDS ,EYES, NOSE AND MOUTH</p>  <p>We often touch our faces without noticing it. Be aware of this, and avoid touching your eyes, nose and mouth. why?</p>	<p>DO NOT WASH FRUITS AND VEGETABLES WITH SOAP</p>  <p>Dr. Gregory Charlop said while calling from his Pasadena, California, office. "That's the last thing you want to do. Soap leaves a residue that will upset your stomach and cause GI problems. We are not supposed to ingest soap. Continue to eat fruit and vegetables after you wash them with cold water."</p>
<p>IF YOU HAVE A FEVER, COUGH AND DIFFICULTY BREATHING, SEEK MEDICAL CARE EARLY – BUT CALL FIRST</p>  <p>If you have a fever, cough and difficulty breathing, seek medical care early – if you can, call your hospital or health centre first so that they can tell you where you should go. why?</p>	

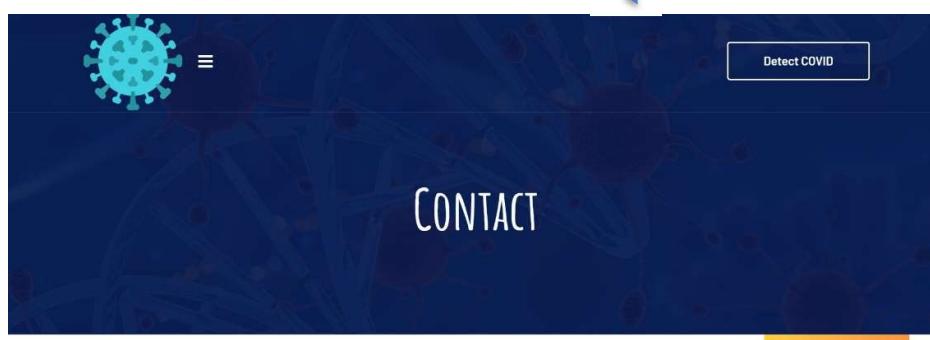


If u have been detected with a high probability of getting COVID-19 so u can find in our platform an instruction on things u should do, and things you shouldn't do.

- **Last Section : Contact**



This button will lead the user to the Contact page:



Feel free to contact us and send an email for any questions 😊 . Please provide the subject and to elaborate what the issue.

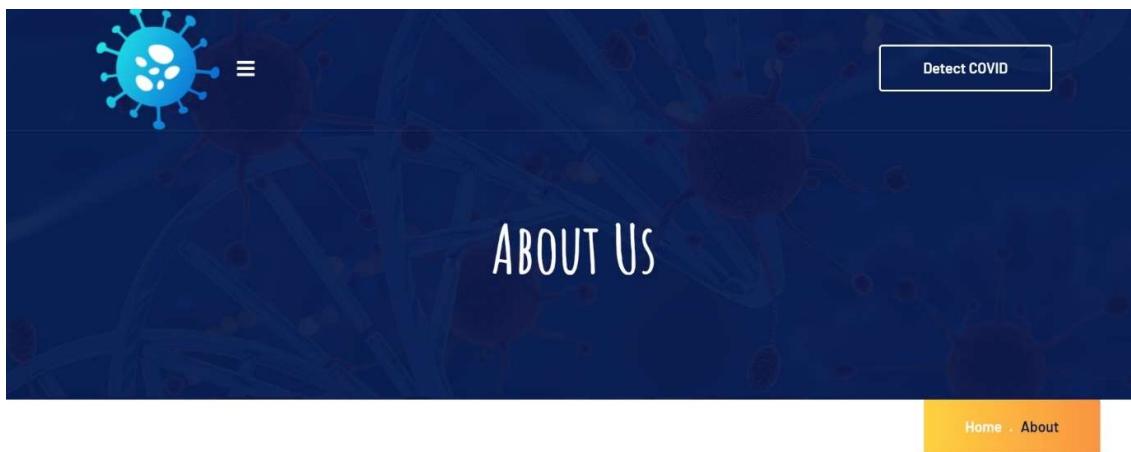
STILL HAVE A QUESTION?

CONTACT WITH US

Name	Email Address
Phone Number	Discussion For
Subject	
Write Message	

Send Message

- About us page in covid web:



More Know About Corona PROTECT YOURSELF FROM CRONOAVIRUS

- First section: Selection of project

In this section we explain why we have chosen to detect COVID-19 especially for many reasons, so we have written all that.

SELECTION OF PROJECT

COVID-19, short for "Coronavirus Disease 2019," is a highly contagious respiratory illness caused by a novel coronavirus known as SARS-CoV-2. It first emerged in late 2019 in the city of Wuhan, Hubei province, China, and rapidly spread to become a global pandemic. COVID-19 is primarily transmitted through respiratory droplets when an infected person coughs, sneezes, or talks, and it can also spread by touching surfaces contaminated with the virus and then touching the face.

So why did we choose to focus on this disease?

First and foremost, COVID-19 has emerged as one of the most significant public health challenges in recent history. It has not only caused immense suffering and loss of life but has also strained healthcare infrastructure worldwide. By developing a machine learning web application for COVID-19 prediction, we are contributing to the ongoing efforts to combat the pandemic. This can potentially help in early detection, isolation, and treatment of infected individuals, thereby reducing the spread of the virus.

Moreover, the COVID-19 pandemic has highlighted the importance of leveraging technology and data science in healthcare. Our project demonstrates the power of machine learning and data analysis in aiding healthcare professionals and policymakers in making informed decisions. It showcases how technology can be harnessed for the benefit of public health, which is particularly relevant in the context of future pandemics or health crises.

Additionally, the development of such a web application aligns with the broader trend of digital health innovation. It offers a user-friendly platform for individuals to assess their risk of COVID-19 based on clinical parameters, making health information more accessible and empowering users to take proactive measures to protect themselves and others.

BY FOCUSING ON THIS PROJECT, YOU ARE NOT ONLY ADDRESSING A CRITICAL SOCIETAL ISSUE BUT ALSO SHOWCASING THE POTENTIAL OF MACHINE LEARNING AND DATA SCIENCE TO POSITIVELY IMPACT HEALTHCARE AND PUBLIC HEALTH OUTCOMES.

- **Section 2: project models**



HERE THE USER CAN UPLOAD CHEST X-RAYS OR CT SCANS AND GET THE OUTPUT OF POSSIBILITY OF COVID INFECTION :

COVID-19-DETECTION-BASED-ON-CHEST-X-RAYS-AND-CT-SCANS

COVID-19 Detection based on Chest X-rays and CT Scans using four Deep Learning algorithms : VGG16, ResNet50, InceptionV3, Xception. The models were trained for 500 epochs on around 1000 Chest X-rays and around 750 CT Scan images. After training, the accuracies achieved for the model are as follows:

	InceptionV3	VGG16	ResNet50	Xception
Chest X-rays	96%	94%	83%	92%
CT Scans	93%	93%	80%	95%

Accuracy of each 4 models that we have developed in our project to detect covid.

Our data is based on CT-scans and chest X-rays that we have gathered.

Before we build our model – we did a lot of data pre-processing , here we example one model in a simple way.

DATA GATHERING

The dataset for the project was gathered from two sources:

- Chest X-ray images (1000 images) were obtained from: [Chest X-ray Repository](#)
- CT Scan images (750 images) were obtained from: [CT Scan Repository](#)

80% of the images were used for training the models and the remaining 20% for testing

BUILDING THE MODEL

we first added 3 custom layers to the pretrained models so that they can be trained on our dataset . The code for adding custom layers, for example, to the ResNet50 model is shown below. We added a Flatten layer to flatten all our features and a Dropout layer to overcome overfitting. Finally, We added the Dense output layer using softmax function as the activation function.

In this section, we elaborate on how we detect COVID and give a high probability of getting covid to the user.

- **Covid detector page :**

Here users can upload either CT-scan images or chest X-ray image, for example:

UPLOAD IMAGE

Please select the type of image you want to diagnose

Chest X-Ray



Select Image

Choose File No file chosen

Upload

CT Scan



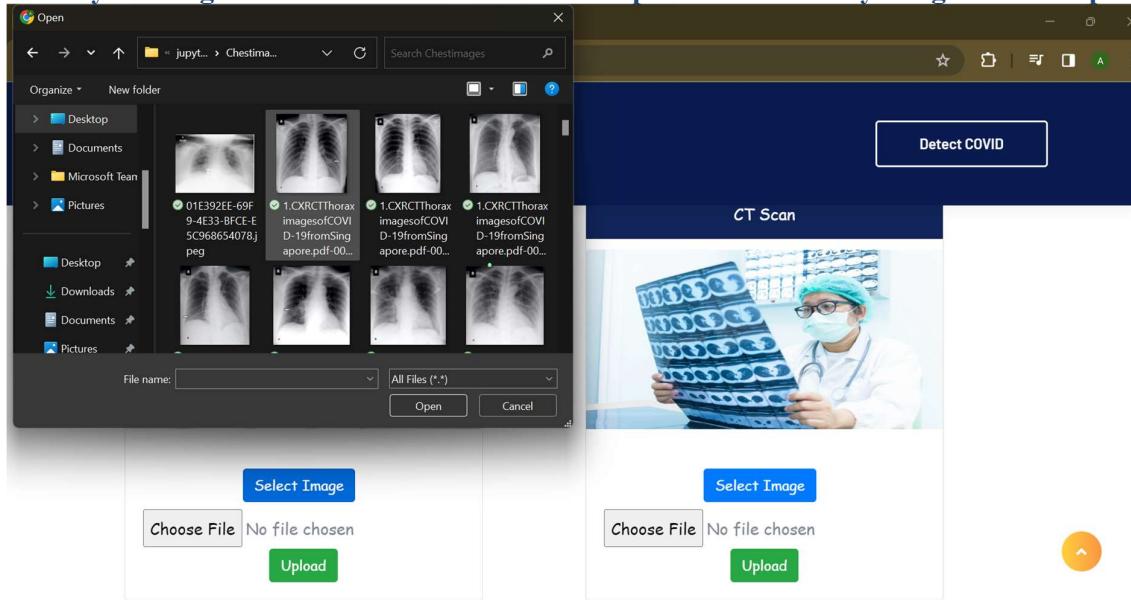
Select Image

Choose File No file chosen

Upload

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User by clicking on “choose file” button he can upload his CT/x-ray image for example:



Then by clicking on “upload” button, the user will get an immediate result which is probability of getting covid Relatively to each model.(we have 4 models)

<p>Inception Classification Report</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>precision</th> <th>recall</th> <th>f1-score</th> <th>support</th> </tr> </thead> <tbody> <tr> <td>*</td> <td>0.77</td> <td>0.61</td> <td>0.68</td> <td>70</td> </tr> <tr> <td>0</td> <td>0.71</td> <td>0.84</td> <td>0.77</td> <td>80</td> </tr> <tr> <td>accuracy</td> <td></td> <td></td> <td>0.73</td> <td>150</td> </tr> <tr> <td>macro avg</td> <td>0.74</td> <td>0.73</td> <td>0.73</td> <td>150</td> </tr> <tr> <td>weighted avg</td> <td>0.74</td> <td>0.73</td> <td>0.73</td> <td>150</td> </tr> </tbody> </table> <p>Inception Prediction Result</p> <div style="background-color: #007bff; color: white; padding: 10px; text-align: center;">100.00% COVID</div>		precision	recall	f1-score	support	*	0.77	0.61	0.68	70	0	0.71	0.84	0.77	80	accuracy			0.73	150	macro avg	0.74	0.73	0.73	150	weighted avg	0.74	0.73	0.73	150	<p>VGG Classification Report</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>precision</th> <th>recall</th> <th>f1-score</th> <th>support</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0.56</td> <td>1.00</td> <td>0.72</td> <td>70</td> </tr> <tr> <td>1</td> <td>1.00</td> <td>0.31</td> <td>0.48</td> <td>80</td> </tr> <tr> <td>accuracy</td> <td></td> <td></td> <td>0.63</td> <td>150</td> </tr> <tr> <td>macro avg</td> <td>0.78</td> <td>0.66</td> <td>0.60</td> <td>150</td> </tr> <tr> <td>weighted avg</td> <td>0.79</td> <td>0.63</td> <td>0.59</td> <td>150</td> </tr> </tbody> </table> <p>VGG Prediction Result</p> <div style="background-color: #ff9933; color: white; padding: 10px; text-align: center;">90.67% COVID</div>		precision	recall	f1-score	support	0	0.56	1.00	0.72	70	1	1.00	0.31	0.48	80	accuracy			0.63	150	macro avg	0.78	0.66	0.60	150	weighted avg	0.79	0.63	0.59	150
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<p>Xception Classification Report</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>precision</th> <th>recall</th> <th>f1-score</th> <th>support</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0.76</td> <td>0.74</td> <td>0.75</td> <td>70</td> </tr> <tr> <td>1</td> <td>0.78</td> <td>0.80</td> <td>0.79</td> <td>80</td> </tr> <tr> <td>accuracy</td> <td></td> <td></td> <td>0.77</td> <td>150</td> </tr> <tr> <td>macro avg</td> <td>0.77</td> <td>0.77</td> <td>0.77</td> <td>150</td> </tr> <tr> <td>weighted avg</td> <td>0.77</td> <td>0.77</td> <td>0.77</td> <td>150</td> </tr> </tbody> </table> <p>Xception Prediction Result</p> <div style="background-color: #007bff; color: white; padding: 10px; text-align: center;">96.73% COVID</div>		precision	recall	f1-score	support	0	0.76	0.74	0.75	70	1	0.78	0.80	0.79	80	accuracy			0.77	150	macro avg	0.77	0.77	0.77	150	weighted avg	0.77	0.77	0.77	150	<p>Resnet Classification Report</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>precision</th> <th>recall</th> <th>f1-score</th> <th>support</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0.78</td> <td>0.26</td> <td>0.39</td> <td>70</td> </tr> <tr> <td>1</td> <td>0.59</td> <td>0.94</td> <td>0.72</td> <td>80</td> </tr> <tr> <td>accuracy</td> <td></td> <td></td> <td>0.62</td> <td>150</td> </tr> <tr> <td>macro avg</td> <td>0.69</td> <td>0.60</td> <td>0.56</td> <td>150</td> </tr> <tr> <td>weighted avg</td> <td>0.68</td> <td>0.62</td> <td>0.57</td> <td>150</td> </tr> </tbody> </table> <p>Resnet Prediction Result</p> <div style="background-color: #ff9933; color: white; padding: 10px; text-align: center;">93.16% NonCOVID</div>		precision	recall	f1-score	support	0	0.78	0.26	0.39	70	1	0.59	0.94	0.72	80	accuracy			0.62	150	macro avg	0.69	0.60	0.56	150	weighted avg	0.68	0.62	0.57	150
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Final project – information system department

- **Section 3: accuracy metrics**

Classification Report

Chest X-rays(Left) and CT scans(Right)

Classification Reports of VGG16 model for Chest X-rays and CT scans

	precision	recall	f1-score	support		precision	recall	f1-score	support
0	0.88	0.99	0.93	87	0	0.93	0.93	0.93	70
1	0.99	0.88	0.93	101	1	0.94	0.94	0.94	80
accuracy			0.93	188	accuracy		0.93	0.93	150
macro avg	0.93	0.93	0.93	188	macro avg	0.93	0.93	0.93	150
weighted avg	0.94	0.93	0.93	188	weighted avg	0.93	0.93	0.93	150

Classification Reports of ResNet50 model for Chest X-rays and CT scans

	precision	recall	f1-score	support		precision	recall	f1-score	support
0	0.75	0.91	0.82	87	0	0.82	0.73	0.77	70
1	0.90	0.74	0.82	101	1	0.78	0.86	0.82	80
accuracy			0.82	188	accuracy			0.80	150
macro avg	0.83	0.83	0.82	188	macro avg	0.80	0.80	0.80	150
weighted avg	0.83	0.82	0.82	188	weighted avg	0.80	0.80	0.80	150

Classification Reports of InceptionV3 model for Chest X-rays and CT scans

	precision	recall	f1-score	support		precision	recall	f1-score	support
0	0.92	0.99	0.96	87	0	0.88	0.97	0.93	70
1	0.99	0.93	0.96	101	1	0.97	0.89	0.93	80
accuracy			0.96	188	accuracy		0.93	0.93	150
macro avg	0.96	0.96	0.96	188	macro avg	0.93	0.93	0.93	150
weighted avg	0.96	0.96	0.96	188	weighted avg	0.93	0.93	0.93	150

Classification Reports of Xception model for Chest X-rays and CT scans

	precision	recall	f1-score	support		precision	recall	f1-score	support
0	0.96	0.86	0.91	87	0	0.92	0.97	0.94	70
1	0.89	0.97	0.93	101	1	0.97	0.93	0.95	80
accuracy			0.92	188	accuracy		0.95	0.95	150
macro avg	0.93	0.92	0.92	188	macro avg	0.95	0.95	0.95	150
weighted avg	0.92	0.92	0.92	188	weighted avg	0.95	0.95	0.95	150

- **FAQs page in covid web:**

In this section user can look up to frequently asked questions by other users.

The screenshot shows a dark-themed COVID-19 FAQ page. At the top right is a 'Detect COVID' button. Below it is a 'FAQs' section. A question 'HAVE ANY QUESTION? Sure you are!' has a '+' sign next to it. Another question 'ARE THE COVID-19 VACCINES SAFE AND EFFECTIVE?' also has a '+' sign. A third question 'Coronavirus disease (COVID-19) advice for the public so if you wanna advice click on me' has a '+' sign. A video player for 'Novel coronavirus' is visible at the bottom left. A sidebar on the right lists common COVID-19 symptoms with corresponding icons.

Frequently Asked Questions

HAVE ANY QUESTION?

Sure you are!

ARE THE COVID-19 VACCINES SAFE AND
EFFECTIVE?

Coronavirus disease (COVID-19)
advice for the public
so if you wanna advice [click on me](#)



WHAT ARE THE CORONAVIRUS SYMPTOMS?

Common symptoms of COVID-19 include:
Fever or chills
Cough
Shortness of breath or difficulty breathing
Fatigue
Muscle or body aches
Headache
New loss of taste or smell
Sore throat
Nausea or vomiting
Diarrhea

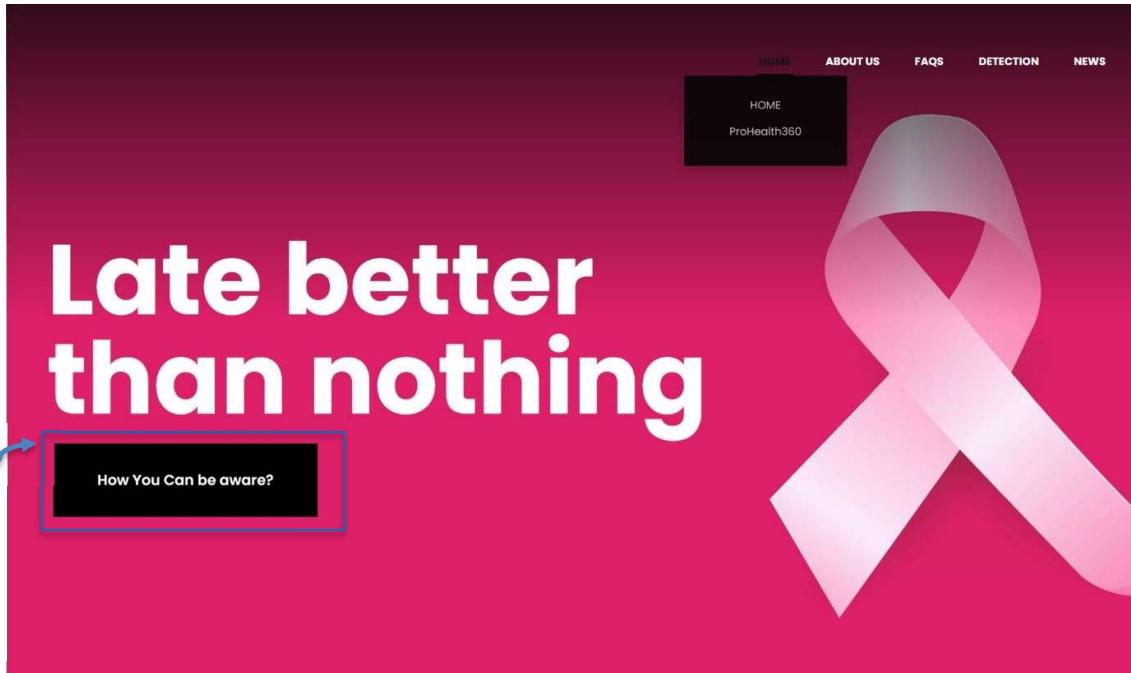
WHY WE SHOULD STAY AT HOME?

COVID-19 ILLNESS CAN AFFECT YOUR LUNGS?

FIND OUT HOW WE ARE MONITORING A COVID PATIENT?

By clicking on "+" user can see the answer of a specific question.

- **Breast cancer homepage:**
- **First section : Navigator**



If user decided to click on “breast cancer” option will lead him to this home page and he has 5 navigation options:

1. “ProHealth” that will lead him to the landing homepage.
2. “About us” will lead the user to about us page.
- 3.”FAQS” will lead the user to the frequently asked question page.
4. “Detect” will lead the user to classifier page .
5. “News” page. If the user click on “news” will lead him to Google news in breast cancer:

The screenshot shows a Google News search results page for the query "breast cancer". The search bar at the top contains the text "breast cancer". Below the search bar is a navigation bar with categories: Home, For you, Following, Israel, World, Local, Business, Technology, Entertainment, Sports, Science, and Health. The main content area displays several news articles. The first article is from The Guardian and discusses a breast cancer drug. The second article is from NoCamels - Israeli Innovation News and discusses an Israeli tumor treatment trial. The third article is from The New York Times and discusses breast cancer risk calculators. On the right side of the screen, there is a sidebar for the "Breast Cancer Foundation NZ" source, which includes a follow button and a share button.

- Second section: General information

General brief information about what is breast cancer and how it affects patient's body.

Learn about breast cancer

what is breast cancer?

Cancer is a broad term for a class of diseases characterized by abnormal cells that grow and invade healthy cells in the body. Breast cancer starts in the cells of the breast as a group of cancer cells that can then invade surrounding tissues or spread (metastasize) to other areas of the body.

what cause Breast cancer?

Cancer grows when a cell's DNA is damaged, but why or how that DNA becomes damaged is still unknown. The damage could be caused by genetic or environmental and lifestyle factors, or in most cases, a combination of the two. Also, Women who have inherited changes (mutations) to certain genes, such as BRCA1 and BRCA2, are at higher risk of breast and ovarian cancer.

THESE DO NOT CAUSE BREAST CANCER

Ask us

This click will lead the user to the FAQs page.

Get Involved

This click will lead the user to an external web that supports women who suffer from breast cancer.

Self Exam

General brief information about what cause breast cancer and things do not cause breast cancer.

Self exam click will lead the user to a short video that explain about diagnoses.

- Third section: symptoms

This section represent few breast cancer symptoms by clicking on symptom will show the user an short explanation.

Breast cancer Symptoms

Learn about each breast symptom

Symptom 1: Hard Lump

The most common sign of breast cancer is a lump, deep in the breast. It often feels hard, like a lemon seed, and usually immovable. It can be any shape or size. A lump is not always easy to feel. If you have access to breast cancer screening, use it—a mammogram can detect a lump long before it can be felt. Most lumps turn out to be harmless, such as a fluid-filled cyst or a fibroadenoma. But if you notice a hard lump (or any change) that doesn't come and go with your menstrual cycle, don't ignore it. The sooner breast cancer is found, the more easily it can be treated.

Symptom 2: Thick Area

Symptom 3: Growing Vein

Symptom 4: Skin Sores

Symptom 5: New Shape or Size

Symptom 6: "Orange Peel" Skin

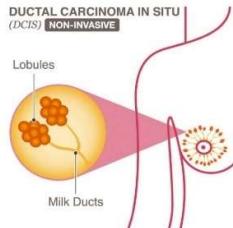
Statistics about breast cancer patients

15 Types of breast cancer	297790 new cases	95% Survive cancer	\$48477 Treatment cost
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- Fourth section: raise awareness

Types of Breast Cancer

Types of breast cancer include ductal carcinoma in situ, invasive ductal carcinoma, inflammatory breast cancer, and metastatic breast cancer.



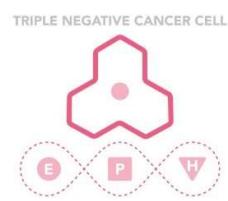
What Is Ductal Carcinoma In Situ? (DCIS)

Ductal carcinoma in situ (DCIS) is a non-invasive cancer where abnormal cells have been found in the lining of the breast milk duct. The atypical cells have not spread outside of the ducts into the surrounding breast tissue. Ductal carcinoma in situ is very early cancer that is highly treatable, but if it's left untreated or undetected, it may spread into the surrounding breast tissue.



What Is Invasive Ductal Carcinoma? (IDC)

Invasive Ductal Carcinoma (IDC) is an invasive cancer where abnormal cancer cells that began forming in the milk ducts have spread beyond the ducts into other parts of the breast tissue. Invasive cancer cells can also spread to other parts of the body. It is also sometimes called infiltrative ductal carcinoma. IDC is the most common type of breast cancer, making up nearly 70-80% of all breast cancer diagnoses. IDC is also the type of breast cancer that most commonly affects men.



What Is Triple Negative Breast Cancer?

A diagnosis of triple negative breast cancer means that the three most common types of receptors known to fuel most breast cancer growth—estrogen, progesterone, and the HER-2/neu gene—are not present in the cancer tumor. This means that the breast cancer cells have tested negative for hormone epidermal growth factor receptor 2 (HER-2), estrogen receptors (ER), and progesterone receptors (PR).

This section include more specific information for patient who has detected with breast cancer. Its describes each type of breast cancer and how it differs form another types.

Empowerment Through Education & Research

Breast Health Education

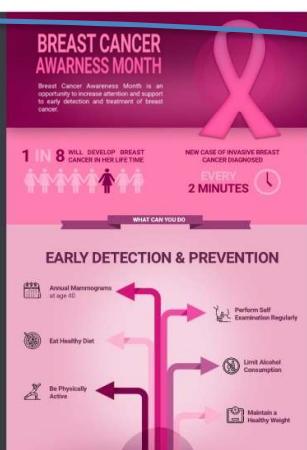
Take control and learn about your breast health, there is many resources that help and give free Educational Guides. Don't let that be late and know more about your Breast Health.

Breast Cancer check

Adult women of all ages are encouraged to perform breast self-exams at least once a month. Lillie D. Shockney, Johns Hopkins University Distinguished Service Professor of Breast Cancer states, check and don't forget yourself.

Prompts to Mindfulness

This can be difficult to remember when you get frustrated or overwhelmed, but it is an important distinction to make. Whether you are a cancer patient, survivor, caregiver, loved one, or simply looking to strengthen your mind-body connection, practicing mindfulness can help you center your thoughts and bring you back to contentment.



Reminder to raise awareness to women to go and check themselves every year and protect their health!

Breast cancer awareness

Some Tips for Breast cancer patient that gives education and awareness

Food for Breast Cancer Prevention

Eating well can support your overall health and wellness, no matter where you are in your cancer journey so boost yourself, and optimize your health.



Steps for early detection

According to the American Cancer Society, when breast cancer is detected early, and is in the localized stage, the 5-year relative survival rate is 91%. Early detection may save your life from cancer.



Breast cancer Awareness

So important to be aware of your breast cancer, and know more about which level you stand in your cancer. Be aware on the risk factors, symptoms and signs.



Get Support

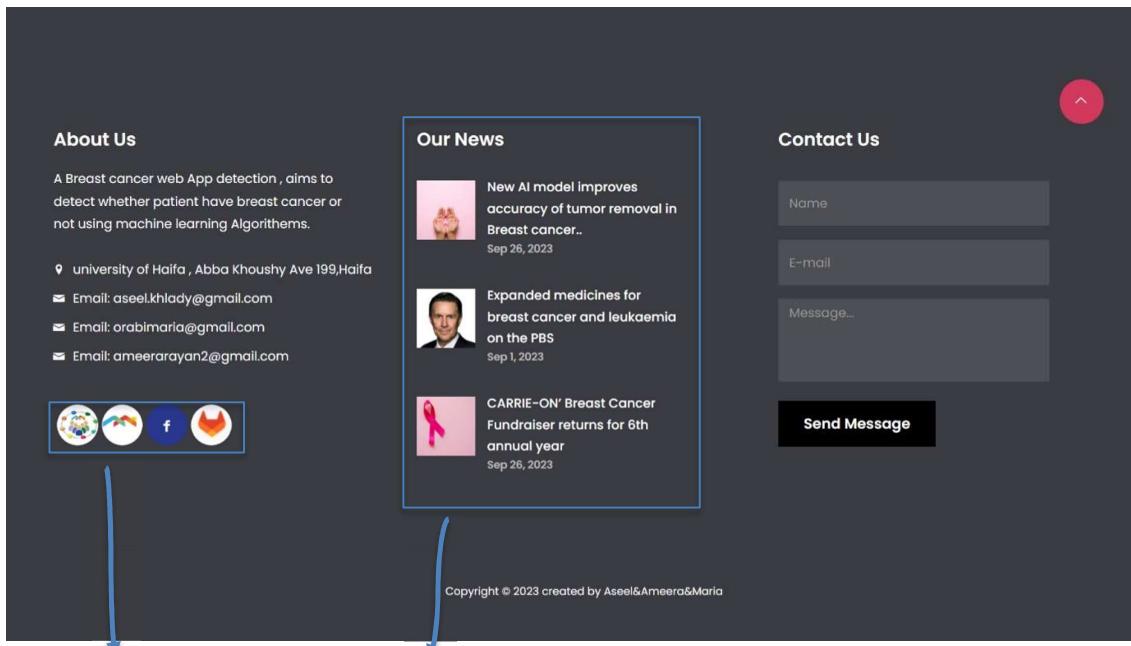
Support is so important in your breast cancer era, it could boost you and give you energy so surround yourself with supportive people.

Tips and steps to support the breast cancer community.

For more Question

Final project – information system department

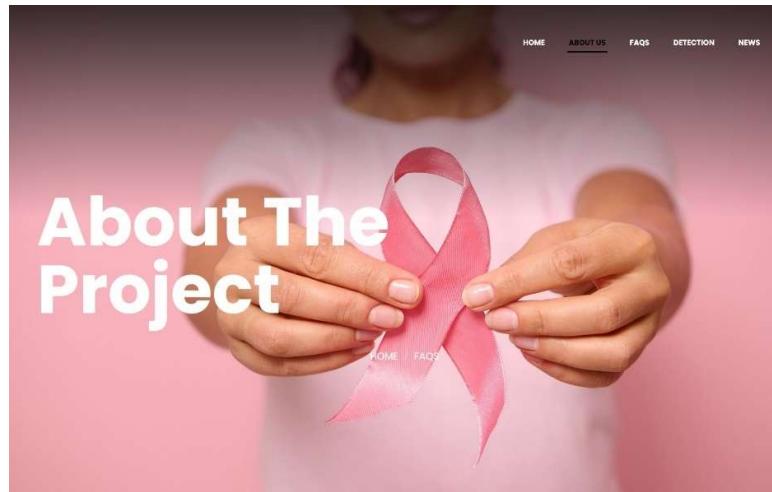
- **Last section: Footer**



You can find us in our other social platform!

News on breast cancer.

- **About us page: first section**



In data section, here we have explained about data that we have collected.

About Data
To build a train model and tests it , we collected human cell records, to classify cells whether the samples are benign or malignant.

The Samples arrive periodically as the doctors reports his clinical cases. The database therefore reflects this chronological grouping of the data. We have collected 699 samples. We have been dealing with A Data pre-processing like drop irrelevant columns and Feature selection during the confusion matrix. The Data have a missing values , so we did handle this during replacing them with ? question mark. To train and test the data we Split the data into predictor variables and target variable, following by breaking them into train and test sets.

Additional Variable Information

1. Sample code number: Id number
2. Clump Thickness: 1 - 10
3. Uniformity of Cell Size: 1 - 10
4. Uniformity of Cell Shape: 1 - 10
5. Marginal Adhesion: 1 - 10
6. Single Epithelial Cell Size: 1 - 10
7. Bare Nuclei: 1 - 10
8. Bland Chromatin: 1 - 10
9. Normal Nucleoli: 1 - 10
10. Mitoses: 1 - 10
11. Class: (2 for benign, 4 for malignant)

Here we explain about each feature that users have to input in order to make data scanning and prediction, also we explain the range of each value. we assume that user is familiar with data if not this section will help him.

- Second section: how we predict.

Model Selection

Baseline algorithm checking

- * Analyse and build a model to predict if a given set of symptoms lead to breast cancer. This is a binary classification problem, and a few algorithms are appropriate for use.
- * As we do not know which one will perform the best at the point, we will do a quick test on the few appropriate algorithms with default setting to get an early indication of how each of them perform.
- * We will use 10-fold cross validation for each testing.
- * The following non-linear algorithms will be used, namely:
 - * Classification and Regression Trees (CART)
 - * Linear Support Vector Machines (SVM)
 - * Gaussian Naive Bayes (NB)
 - * k-Nearest Neighbors (KNN).

Performance comparison

Model	precision	recall	f1-score	support
CART	0.90	0.96	0.93	133
SVM	0.93	0.81	0.86	77
NB	0.93	0.89	0.90	210
KNN	0.93	0.90	0.90	210

CART, SVM, GaussianNB and KNN performed the best with above 95% mean accuracy

Support Vector Machines

Confusion matrix of SVM without normalization

	precision	recall	f1-score	support
2	0.98	0.98	0.98	133
4	0.96	0.96	0.96	77

Confusion matrix, without normalization

```
[[130  3]
 [ 3  74]]
```

Confusion matrix

True label \ Predicted label	Benign(2)	Malignant(4)
Benign(2)	130	3
Malignant(4)	3	74

Model Selection

Baseline algorithm checking

- * Analyse and build a model to predict if a given set of symptoms lead to breast cancer. This is a binary classification problem, and a few algorithms are appropriate for use.
- * As we do not know which one will perform the best at the point, we will do a quick test on the few appropriate algorithms with default setting to get an early indication of how each of them perform.
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- * The following non-linear algorithms will be used, namely:
 - * Classification and Regression Trees (CART)
 - * Linear Support Vector Machines (SVM)
 - * Gaussian Naive Bayes (NB)
 - * k-Nearest Neighbors (KNN).

Make predictions on validation dataset I

Accuracy – ratio of correctly predicted observation to the total observations.
Precision – ratio of correctly predicted positive observations to the total predicted positive observations
Recall (Sensitivity) – ratio of correctly predicted positive observations to the all observations in actual class – yes.
F1 score – F1 Score is the weighted average of Precision and Recall.

Model	precision	recall	f1-score	support
CART	0.90	0.96	0.93	133
SVM	0.93	0.81	0.86	77
NB	0.93	0.89	0.90	210
KNN	0.93	0.90	0.90	210

Make predictions on validation dataset II

Values for rest of the Algorithms

Model	precision	recall	f1-score	support
NB	0.96	0.96	0.96	133
SVM	0.96	0.96	0.96	77
KNN	0.96	0.96	0.96	210

Different evaluation metrics on train data

Model: CART

Accuracy score: 0.9047619047619048

Classification report:

	precision	recall	f1-score	support
2	0.90	0.96	0.93	133
4	0.93	0.81	0.86	77

accuracy

macro avg

weighted avg

Model: SVM

Accuracy score: 0.9714285714285714

Classification report:

	precision	recall	f1-score	support
2	0.98	0.98	0.98	133
4	0.96	0.96	0.96	77

accuracy

macro avg

weighted avg

Model: NB

Accuracy score: 0.9523809523809523

Classification report:

	precision	recall	f1-score	support
2	0.96	0.96	0.96	133
4	0.94	0.94	0.94	77

accuracy

macro avg

weighted avg

Model: KNN

Accuracy score: 0.9571428571428572

Classification report:

	precision	recall	f1-score	support
2	0.96	0.97	0.97	133
4	0.95	0.94	0.94	77

accuracy

macro avg

weighted avg

16
Missing Values

699
Samples collected

95%
Accuracy Score

97%
Test Accuracy

In this section we explain about different model that we implemented on our train data, eventually have selected the model that led us to the best accuracy.

Different evaluation metrics on train data

Different evaluation metrics on test data.

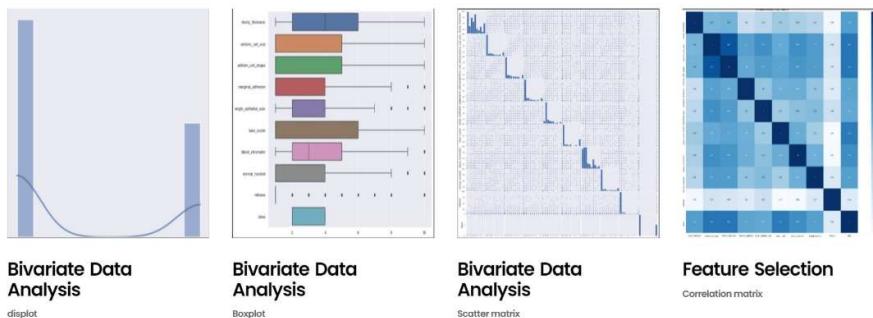
Eventually we have selected SVM due to high accuracy he gave.

24

- **Third section: visualization.**

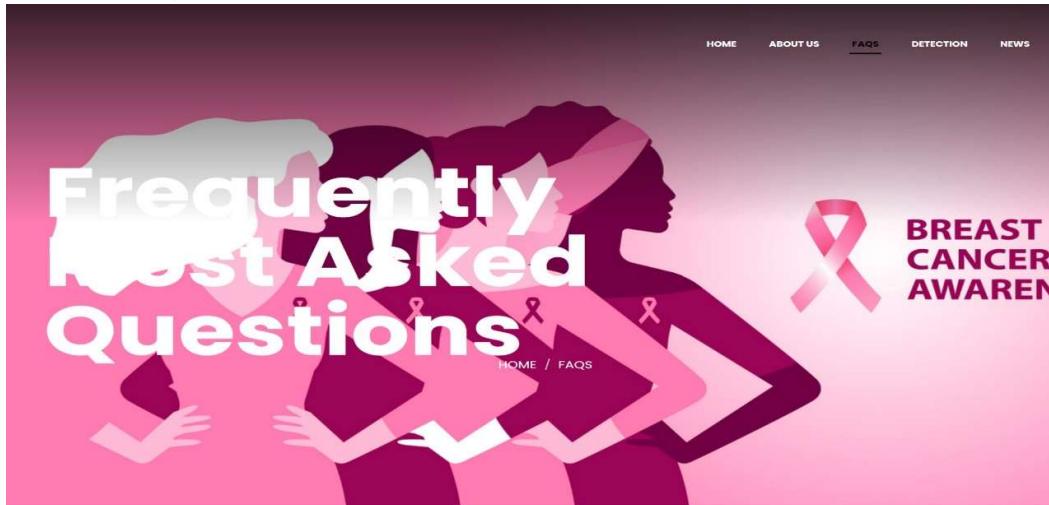
Visualization

Show some Data exploratory and findings



We implemented different visualizations of our data before we built the model in order to explore more the data.
here is some of our visualization.

- FAQs page:



Self Check~

Get answers to frequently asked questions about breast cancer

What is breast cancer?+ Breast cancer is cancer that forms in the breast. Breast cancer is the second most common cancer in women... Regular check-ups and screening tests can find breast cancer at an early stage.	Does smoking cause breast cancer?+ + Smoking is a confirmed risk factor for developing many types of cancer, including breast cancer. Additionally, second hand smoke is also a risk factor for cancer.
Can a healthy diet help to prevent breast cancer?+ + A nutritious, low-fat diet (30 grams or less) with plenty of fruits and green vegetables can help prevent breast cancer. Regular check-ups and screening tests can find breast cancer at an early stage.	Is there a link between hormone replacement therapy (HRT) and breast cancer?+ + Yes, there is. HRT was added to the carcinogenic list by the American Cancer Society.
Can physical activity reduce the risk of breast cancer?+ + Exercise boosts the immune system and helps you to keep your weight in a healthy range. Regular check-ups and screening tests can find breast cancer at an early stage.	How often should I go to my doctor for a check-up?+ + You should have a physical every year which should include a clinical breast exam.
What kind of impact does stress have on breast cancer?+ + Research studies have shown that factors such as traumatic events and long-term stress can increase the risk of breast cancer.	How can I lower my chances of getting breast cancer?+ + Research is being done on ways to prevent breast cancer. Although there is no sure way to prevent breast cancer, there are some things you can do to reduce your risk.

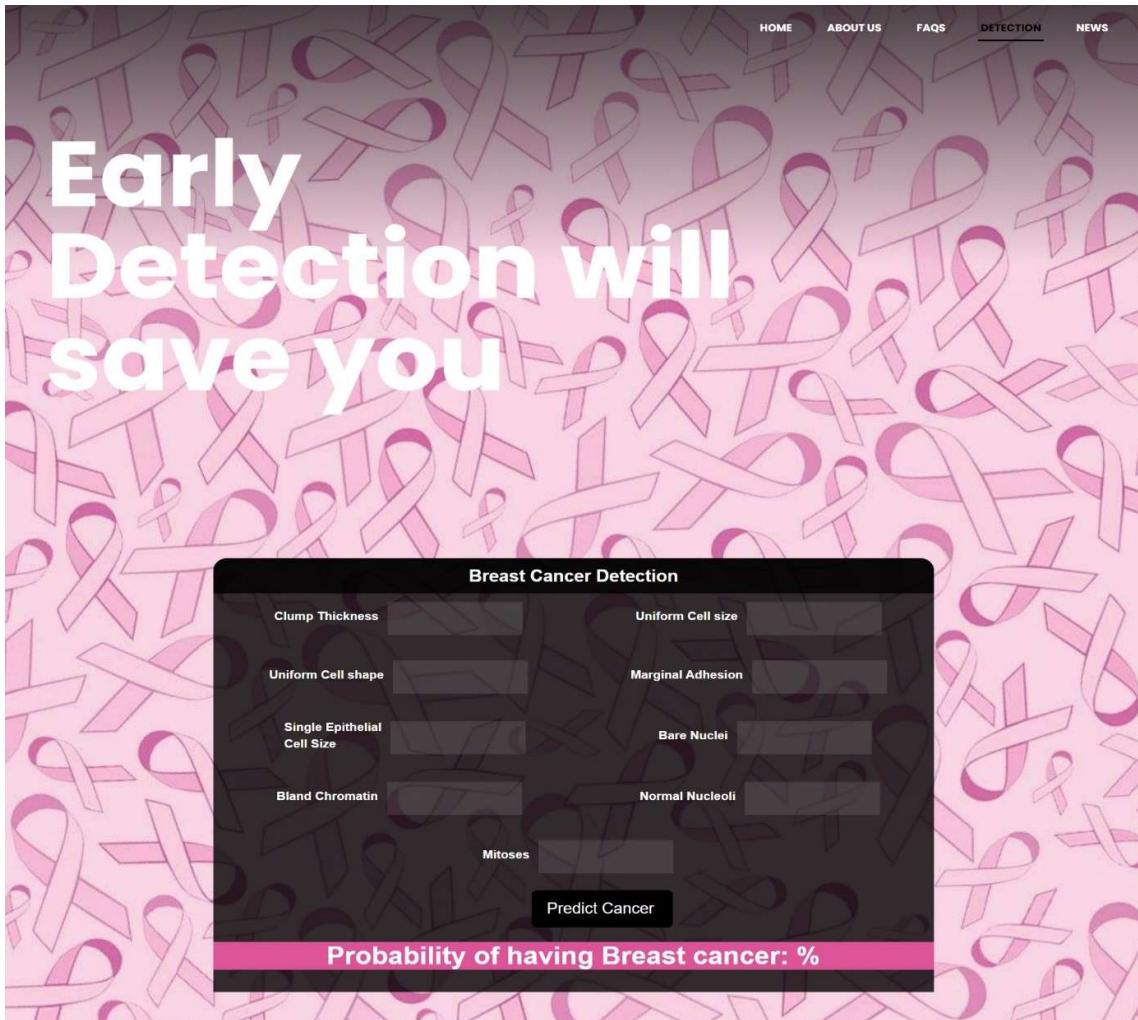
This page represents part of the frequently asked questions that patients asked before. by clicking on “+” user can see the whole elaborated answer. **For example:**

Self Check~ Breast Cancer Awareness~ Get Involved and raise your knowl

Get answers to frequently asked questions about breast cancer

What is breast cancer?+ + Breast cancer is cancer that forms in the breast. Breast cancer is the second most common cancer in women... Regular check-ups and screening tests can find breast cancer at an early stage.	Does smoking cause breast cancer?+ - Smoking is a confirmed risk factor for developing many types of cancer, including breast cancer. Additionally, second hand smoke is also a risk factor for cancer.
--	---

- Detection page:



The landing page features a large, bold title "Early Detection will save you" centered over a background filled with numerous pink ribbon icons. At the top right, there is a navigation bar with links: HOME, ABOUT US, FAQS, DETECTION (which is underlined), and NEWS.

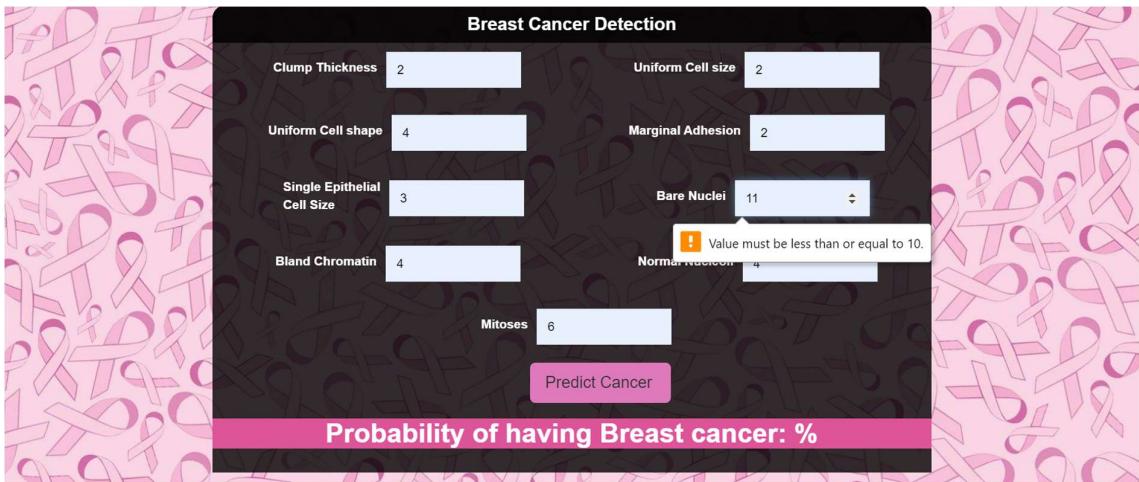
The main content area is titled "Breast Cancer Detection". It contains a form with nine input fields for user input. The fields are arranged in two columns:

Clump Thickness	Uniform Cell size
Uniform Cell shape	Marginal Adhesion
Single Epithelial Cell Size	Bare Nuclei
Bland Chromatin	Normal Nucleoli
Mitoses	
<input type="button" value="Predict Cancer"/>	

Below the form is a pink horizontal bar containing the text "Probability of having Breast cancer: %".

The user to detect himself should input 9 attributes, each one of them is ranged from 1 to 10.

for example :



The form is identical to the one on the landing page, but it shows specific values entered by the user:

Clump Thickness	Uniform Cell size
2	2
Uniform Cell shape	Marginal Adhesion
4	2
Single Epithelial Cell Size	Bare Nuclei
3	11
Bland Chromatin	Normal Nucleoli
4	4
Mitoses	
6	
<input type="button" value="Predict Cancer"/>	

A validation message is displayed next to the "Bare Nuclei" field: "Value must be less than or equal to 10." Below the form is a pink horizontal bar containing the text "Probability of having Breast cancer: %".

Another example:

Breast Cancer Detection

Clump Thickness: 2 Uniform Cell size: 2

Uniform Cell shape: 4 Marginal Adhesion: 2

Single Epithelial Cell Size: 2 Bare Nuclei: 5

Bland Chromatin: 2 Normal Nucleoli: 4

Mitoses: 6

Predict Cancer

Probability of having Breast cancer: 88.07970779778823 %

- Brain tumor home page:

Home About project FAQS Tumor Detection News More info Back to ProHealth360

BRAIN TUMOR DETECTION

A Brain Tumor Diagnosis Can Be A Daunting Experience. That's Why We're Here To Provide You With Accurate Information And The Resources You Need To Make Informed Decisions About Your Health.

Learn More

What is Brain Tumor

A brain tumor is a mass or growth of abnormal cells in your brain.

Learn More

This click can lead user to an external web that have an general information about the disease.

navigator to brain tumor web. Users have 7 options each option lead to a specific page.

- Second section: short video

A short video that explains about brain tumor symptoms and warnings.

The video player interface includes a brain icon at the top left, a navigation bar with links to Home, About project, FAQS, Tumor Detection, News, More info, and Back to ProHealth360. The video title is "6 WARNING SIGNS OF BRAIN TUMORS" from Cleveland Clinic. A "Watch Later" button and a "Share" icon are visible in the top right corner. The video content shows a 3D rendering of a human brain against a dark background.

- Third section:

A more information about the disease cases and how user can protect himself.

The screenshot shows a blue-themed interface. At the top center is a laptop icon displaying a brain diagram. To the right is a quote: "Don't Let Fear Or Denial Keep You From Getting A Brain Tumor Screening. Early Detection Can Save Your Life." Below the quote is a red-bordered button labeled "Detect now!". A callout box with a black arrow points to this button, stating: "This button will lead the user to the detection page."

In the center, there is a box titled "Precaution To Be Taken" with the sub-instruction "Follow The instructions and stay safe".

Below this are three cards representing different cases:

- Regular Case:** Represented by a phone icon. It has a "Precaution" button and a list of 6 items:
 1. Get regular check-ups
 2. Wear protective gear
 3. Avoid exposure to radiation
 4. Exercise regularly
 5. Manage stress
 6. Know the warning signs
- Serious Case:** Represented by a calendar icon. It has a "Precaution" button and a list of 7 items:
 1. Work with a team of specialists
 2. Follow your treatment plan
 3. Manage side effects
 4. Practice self-care
 5. Seek Support
 6. Monitor your symptoms
 7. Consider clinical trials
- Emergency Case:** Represented by a speech bubble icon. It has a "Precaution" button and a list of 7 items:
 1. Call 101
 2. Stay calm
 3. Provide information
 4. Bring medical records
 5. Follow medical advice
 6. Monitor your symptoms
 7. Seek support

- About us page: first section:

Selection of project

Brain tumor is an unexpected lump of flesh where cells grow and multiply uncontrollably. It is a very common and devastating problem these days. Efficient tumor identification, extraction, segmentation, and classification are some of the challenging tasks for physicians and radiologists. The proper diagnosis of brain tumor is difficult because of the complex structure of tumor in terms of their stature, form and presence. Manual detection of brain tumor by radiologists may be inaccurate and results can vary from one radiologist to another and may not necessarily guarantee proper diagnosis.

In this section we provided an explanation to why we choose to detect brain tumour diseases and how we ended up with this idea.

- Second section :

Phase 3 : Data Gathering

The dataset contains a total of **10000** images of MRI Scanned clear images of patients with and without brain tumors. There are 3 major types of tumors which we're dealing with in this dataset:

- Meningioma Tumor
- Glioma Tumor
- Pituitary Tumor Along with this, we also train the model on MRI Scanned images of patients who do **not** have a brain tumor.

In this section we elaborate on our data gathering and the labels for the train set (the classes).

Phase 4: Model Building

Here we built a CNN based model. Convolutional Neural Network(CNN / CovNet) is a very famous and extremely useful Deep Learning algorithm which specializes in image based training.

CNN, with enough training is capable of learning the characteristics(features) about the image on itself.

Here we explain about the model building part and we have selected CNN algorithm.



- Third section: trained data

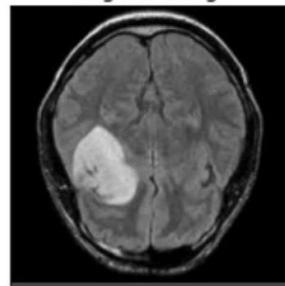
We provided a glimpse of data pre-processing we have done.

While Preprocessing, we converted our RGB images to grayscale, in order to reduce computation time.

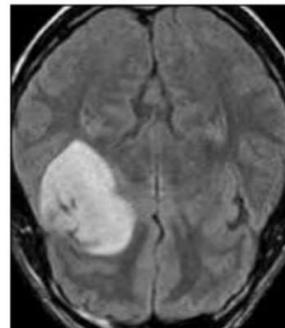
Then the images were resized to a size of 240 X 240.

How we trained our model?

Original Image

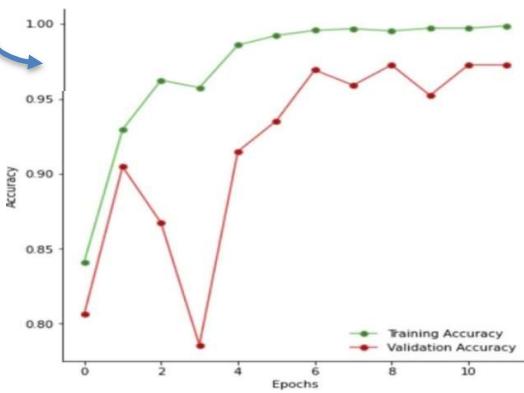


Cropped Image

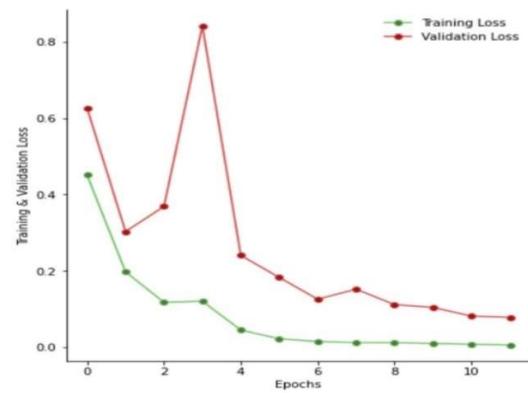


Training

Evaluation metrics on training set.



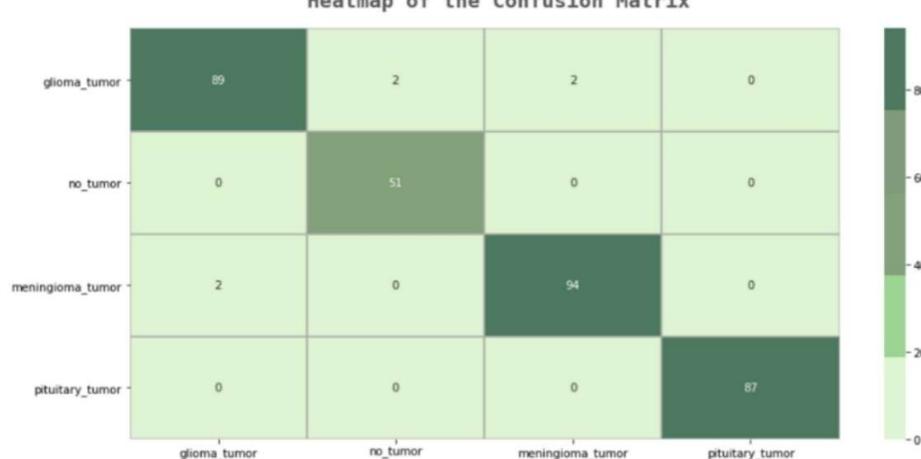
Epochs vs. Training and Validation Accuracy/Loss



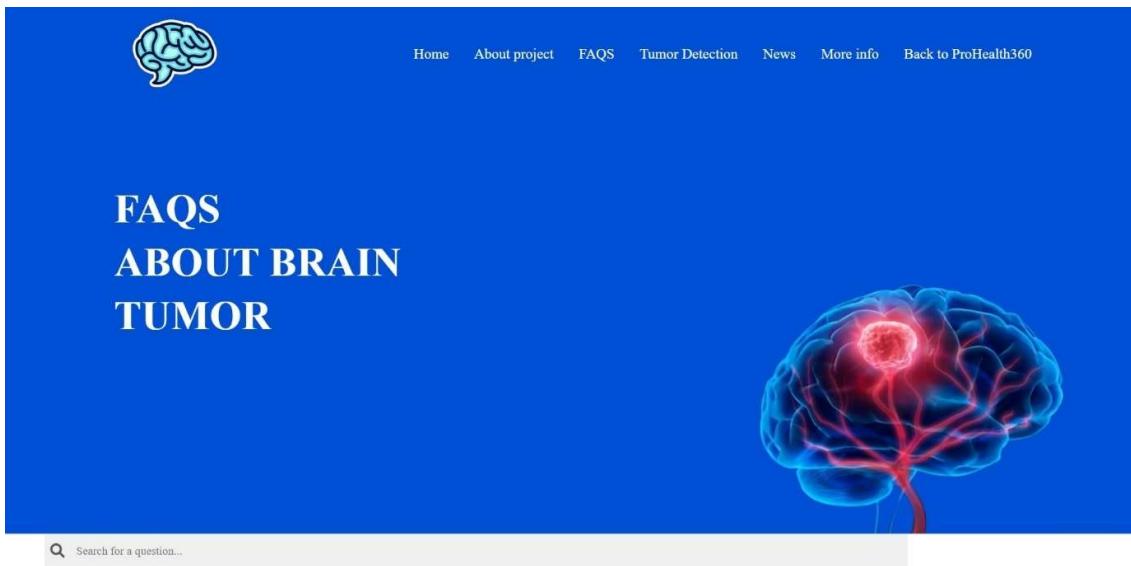
Results:

Evaluation metrics on test set.

We got an accuracy of around 98%.



- **FAQ's page :**



The image shows a screenshot of a website titled "FAQS ABOUT BRAIN TUMOR". The background is blue with a white brain graphic on the right side. At the top, there is a navigation bar with links: Home, About project, FAQS, Tumor Detection, News, More info, and Back to ProHealth360. A search bar at the bottom left contains the placeholder text "Search for a question...".

General Questions:

What Is A Brain Tumor?

A brain tumor is an abnormal growth of cells in the brain. It can be benign (non-cancerous) or malignant (cancerous).

What Are The Common Symptoms Of A Brain Tumor?

Common symptoms may include headaches, seizures, changes in vision or hearing, and personality changes.

How Are Brain Tumors Diagnosed?

What Are The Treatment Options For Brain Tumors?

What Is The Success Rate Of Brain Tumor Surgery?

Is Radiation Therapy Always Required After Brain Tumor Surgery?

Are There Alternative Or Complementary Therapies For Brain Tumor Treatment?

Can Brain Tumors Be Hereditary?

What Are The Different Types Of Brain Tumors?

What Are The Potential Complications Of Brain Tumor Surgery?

Are There Any Preventive Measures To Reduce The Risk Of Brain Tumors?

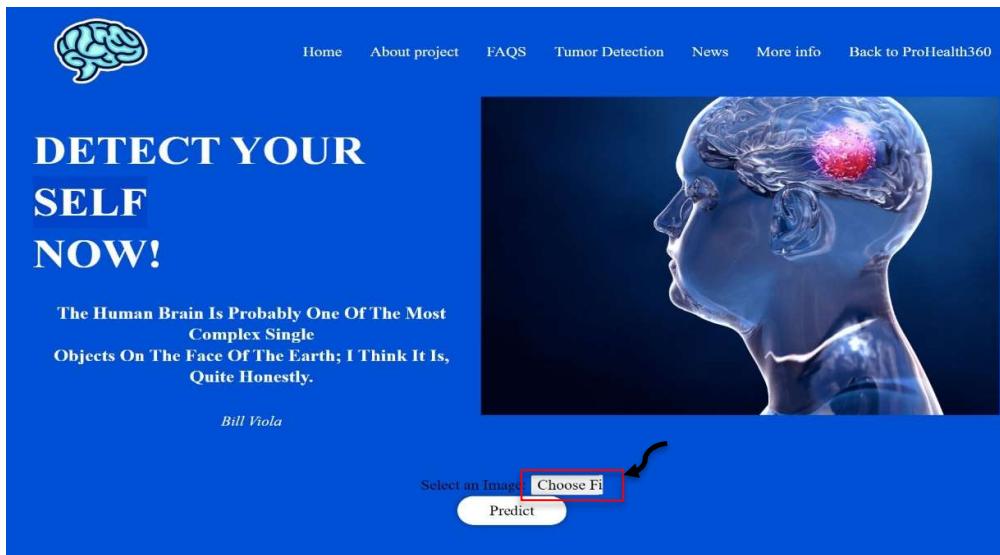
What Support And Resources Are Available For Individuals And Families Affected By Brain Tumors?



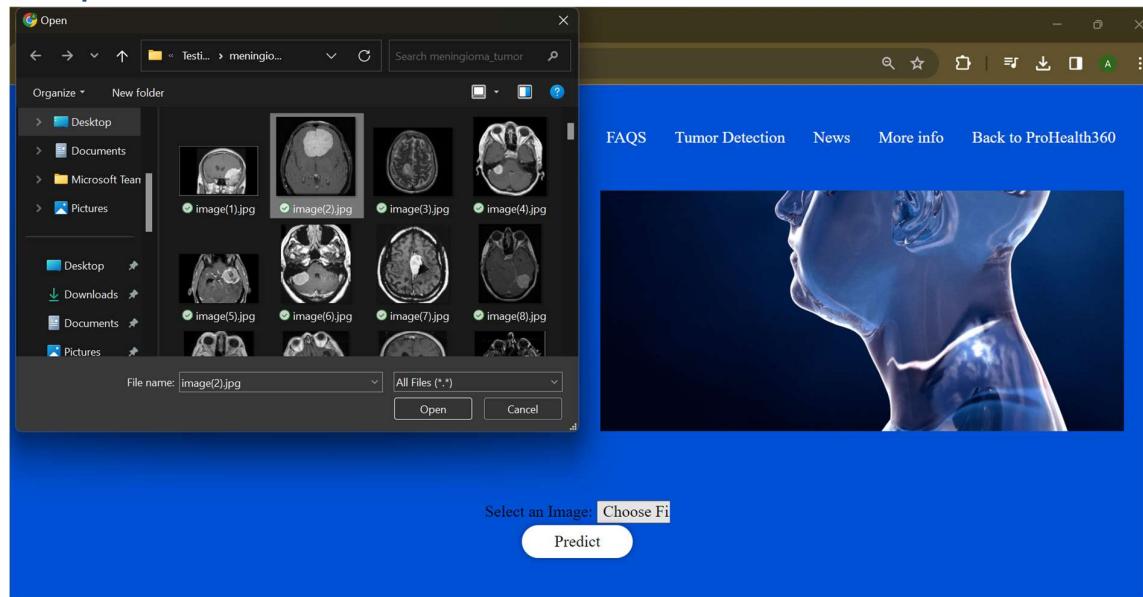
The footer section includes copyright information ("COPYRIGHT © 2023"), location details ("LOCATION Haifa, Israel"), a "BRAIN DETECTION" button with a "Detect Now" link, social media links for "FOLLOW US" (Facebook, Instagram, Twitter), and contact email addresses for "CONTACT US": ameerarayun2@gmail.com, aseelkhaldy@gmail.com, and arabinmaria@gmail.com.

This page provided the frequently asked questions by the community. Clicking on the question will show the user the answer to the specific question.

- **Detection page :**



This page user can upload his MRI image by clicking on “choose file” button for example:



Select your MRI image and click on the “predict” button.

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And immediately you will get your result :

Home About project FAQS Tumor Detection News More info Back to ProHealth360

Here Is Your 🧠 Tumor Report!

RESULT Meningioma Tumor
Probability 83.08581113815308%

Here is some more information which might help you:

and at the bottom will be presented info on the predicted type of brain tumor disease and how you can treated it (unless you got no tumor result 😊).

- **News page:**

When the user clicks on news in the navigator section of each page will lead him to google news about brain tumor diseases.

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- More info page:

Risk Factors For Brain Tumors

Several risk factors for brain tumors include:

Family History
Only about 5 to 10 percent of all cancers are genetically inherited. It's rare for brain tumors to be genetically inherited. If several family members have been diagnosed with brain tumors, consult your doctor who may recommend a genetic counselor.

Age
The risk for most types of brain tumors increases with age.

Race
While brain tumors are more common among Caucasians, meningiomas are more likely to occur in African-American individuals.

Chemical Exposure
Exposure to certain chemicals, especially in the workplace, can increase the risk of brain cancer. Check the list of potential cancer-causing chemicals provided by the National Institute for Occupational Safety and Health.

This page provides more information about brain tumor risks and how to treat the disease.

- Alzheimer's web homepage: first section

In this **Alzheimer's Disease**

Alzheimer's disease is the most common type of dementia. It is a progressive disease beginning with mild memory loss and possibly leading to loss of the ability to carry on a conversation and respond to the environment. Alzheimer's disease involves parts of the brain that control thought, memory, and language.

Stages of Alzheimer's disease:

1.Mild Alzheimer's disease

As Alzheimer's worsens, people experience greater memory loss and other cognitive difficulties. Problems can include wandering and getting lost, trouble handling money and paying bills, repeating questions, taking longer to complete normal daily tasks, and personality and behavior changes. People are often diagnosed in this stage.

2.Moderate Alzheimer's disease

In this stage, damage occurs in areas of the brain that control language, reasoning, conscious thought, and sensory processing, such as the ability to correctly detect sounds and smells. Memory loss and confusion grow worse, and people begin to have problems recognizing family and friends. They may be unable to learn new things, carry out multistep tasks such as getting dressed, or cope with new situations. In addition, people at this stage may have hallucinations, delusions, and paranoia and may behave impulsively

3.Severe Alzheimer's disease

Ultimately, plaques and tangles spread throughout the brain, and brain tissue shrinks significantly. People with severe Alzheimer's cannot communicate and are completely dependent on others for their care. Near the end of life, the person may be in bed most or all of the time as the body shuts down.

This navigator has 6 option each option will lead the user to a specific page.

For example we also provide a comprehensive explanation on different stages in Alzheimer's diseases.

- **Second section: more information.**

In this section
provided the
common signs of
different stages of
Alzheimer's.

What are the warning signs of Alzheimer's disease?

Alzheimer's disease is not a normal part of aging. Memory problems are typically one of the first warning signs of Alzheimer's disease and related dementias. In addition to memory problems, someone with symptoms of Alzheimer's disease may experience one or more of the following:

- Memory loss that disrupts daily life, such as getting lost in a familiar place or repeating questions.
- Trouble handling money and paying bills.
- Difficulty completing familiar tasks at home, at work or at leisure.
- Decreased or poor judgment.
- Misplacing things and being unable to retrace steps to find them.
- Changes in mood, personality, or behavior.

Even if you or someone you know has several or even most of these signs, it doesn't mean it's Alzheimer's disease.

Memory loss explaining video

Short explaining Video.
about the disease and
what would cause !



A short explanation about what
are the common causes
Alzheimer's that researchers
discuss.

What causes Alzheimer's disease?

In recent years, scientists have made tremendous progress in better understanding Alzheimer's and the momentum continues to grow. Still, scientists don't yet fully understand what causes Alzheimer's disease in most people. The causes probably include a combination of age-related changes in the brain, along with genetic, environmental, and lifestyle factors. The importance of any one of these factors in increasing or decreasing the risk of developing Alzheimer's may differ from person to person.

Self Protect~ Alzheimer Disease detection~ Get Involved and raise)

- About us page: first section

In this section, we explain about the labels and models in a short way.



About the project

Using this website, you can find out if an MRI image is Alzheimer's disease. It is classified according to four different stages of Alzheimer's disease.

- 1. Mild Demented
- 2. Moderate Demented
- 3. Non Demented
- 4. Very Mild Demented

So how the classifier works?

Firstly, we've tested CNN, InceptionV3, ResNet50, VGG16 and DenseNet121 models using Alzheimer's Dataset (4 class of Images). Then, according to results, we decided to improve our CNN model and change our dataset because it was not clarified. We improved our CNN model and we named it "Custom CNN".



Dataset

Here we explain about the data gathering and preprocessed dataset.

Alzheimer MRI Preprocessed Dataset

- The data is collected from several websites, hospitals, and public repositories.
- The dataset consists of Preprocessed MRI (Magnetic Resonance Imaging) Images.
- All the images are resized into 128 x 128 pixels.

ADNI (The Alzheimer's Disease Neuroimaging Initiative)

- The Alzheimer's Disease Neuroimaging Initiative (ADNI) is a longitudinal multicenter study designed to develop clinical, imaging, genetic, and biochemical biomarkers for the early detection and tracking of Alzheimer's disease (AD).
- ADNI researchers collect, validate and utilize data, including MRI and PET images, genetics, cognitive tests, CSF and blood biomarkers as predictors of the disease.

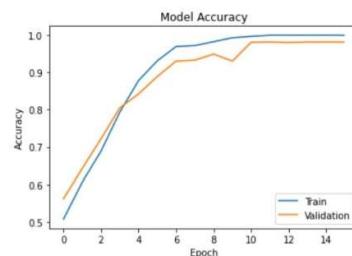
- Second section: evaluation to data

Accuracy result for each Model

Model	Accuracy
Custom CNN	%98.18
CNN	%86.48
DenseNet121	%88.36
InceptionV3	%76.80
ResNet50	%78.20
VGG16	%79.45

In this section, we present each model and its accuracy , here we can see CNN made the highest accuracy.

As we see We improved our CNN model and we named it "Custom CNN".

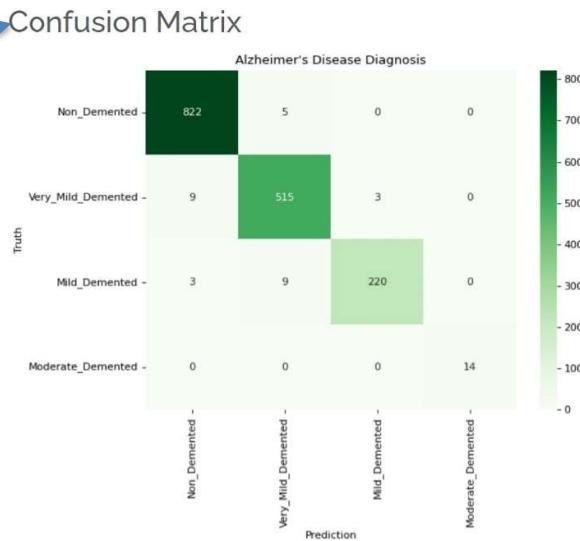


In this section, we present accuracy on train and validation set.

We can see a high accuracy on validation and train set but after testing it on test set we have 0.981875 Accuracy. According to results, we see that Custom CNN model is trained properly and tested well.

- **Third section:**

Confusion matrix on test set after prediction.

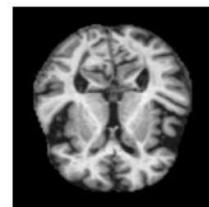


More about prediction results.

The classifier made a total of 1600 predictions.

- In reality, 827 patients in the sample is "Non Demented", but the classifier predicted 822 patients correctly.
- In reality, 527 patients in the sample is "Very Mild Demented", but the classifier predicted 515 patients correctly.
- In reality, 232 patients in the sample is "Mild Demented", but the classifier predicted 220 patients correctly.
- In reality, 14 patients in the sample is "Moderate Demented", and the classifier predicted all patients correctly.

about images



We did a few images pre-processing until we reached these features pf the MRI image.

- Image Shape: (128, 128, 3)
- Image Height: 128
- Image Width: 128
- Image Dimension: 3
- Image Size: 48kb
- Image Data Type: uint8
- Maximum RGB value of the image: 255
- Minimum RGB value of the image: 0

The image under review is an MRI image, but it has 3 channels, so this image is in RGB scale. In short, even though the image we are examining is an X-Ray image, it is in RGB scale.

- **FAQ's page: first section**

The screenshot shows the homepage of the Alzheimer's Disease Prediction website. At the top, there is a navigation bar with links to HOME, About Us, Alzheimer's Disease Classifier, FAQS, Memory Game, and News. Below the navigation bar, there is a large title "Frequently Asked questions About Alzheimer Disease" in blue text. To the right of the title is a stylized, colorful 3D rendering of a human brain. On the left side of the main content area, there is a small icon of a smartphone displaying a colorful screen. Below the title, there is a subtitle "To get an clear answer and be more aware about your health".

Scroll down to see all the questions.

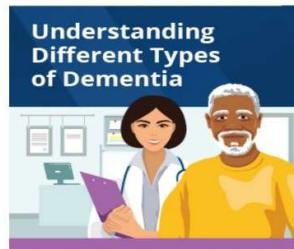
Second section: question and answers.

1. What is the difference between Alzheimer's disease and dementia?

Alzheimer's disease is a type of dementia. Dementia is a loss of thinking, remembering, and reasoning skills that interferes with a person's daily life and activities. Alzheimer's disease is the most common cause of dementia among older people. Other types of dementia include frontotemporal disorders, Lewy body dementia, and vascular dementia.

Learn more about Alzheimer's disease and dementia.

[About dementia](#)



In this section presented all the frequently asked question by the community and the answer below each question.

2. Is Alzheimer's disease hereditary?

Just because a family member has Alzheimer's disease does not mean that you will get it, too. Most cases of Alzheimer's are late-onset. This form of the disease occurs in a person's mid-60s and is not linked to a specific change in genes. However, genetic factors appear to increase a person's risk of developing late-onset Alzheimer's. Early-onset Alzheimer's disease, which is rare, can be caused by genetic variants, or changes in certain genes. If one of the genetic variants is passed down, the child will usually — but not always — have the disease. For other cases of early-onset Alzheimer's, research shows other genetic components are involved.

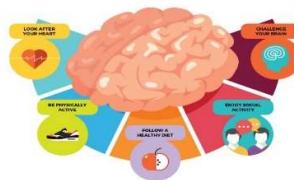
[About assessing risk for Alzheimer's disease](#)



3. Is there a way to prevent Alzheimer's disease?

Currently, there is no definitive evidence about what can prevent Alzheimer's disease or age-related cognitive decline. What we do know is that a healthy lifestyle — one that includes a healthy diet, physical activity, appropriate weight, and control of high blood pressure — can lower the risk of certain chronic diseases and boost overall health and well-being. Scientists are very interested in the possibility that a healthy lifestyle might delay, slow down, or even prevent Alzheimer's. They are also studying the role of social activity and intellectual stimulation in Alzheimer's disease risk.

[About reducing your risk for Alzheimer's disease](#)



4. Is there a cure for Alzheimer's disease?

Currently, there is no cure for Alzheimer's disease. Some sources claim that products such as coconut oil or dietary supplements can cure or delay Alzheimer's. However, there is no scientific evidence to support these claims. The U.S. Food and Drug Administration (FDA) has approved several drugs to treat people with Alzheimer's disease, and certain medicines and interventions may help control behavioral symptoms. Scientists are developing and testing possible new treatments for Alzheimer's. You can learn more about taking part in clinical trials that help scientists learn about the brain in healthy aging and what happens in Alzheimer's and other dementias. Results of these trials are used to improve diagnosis, treatment, and prevention methods.

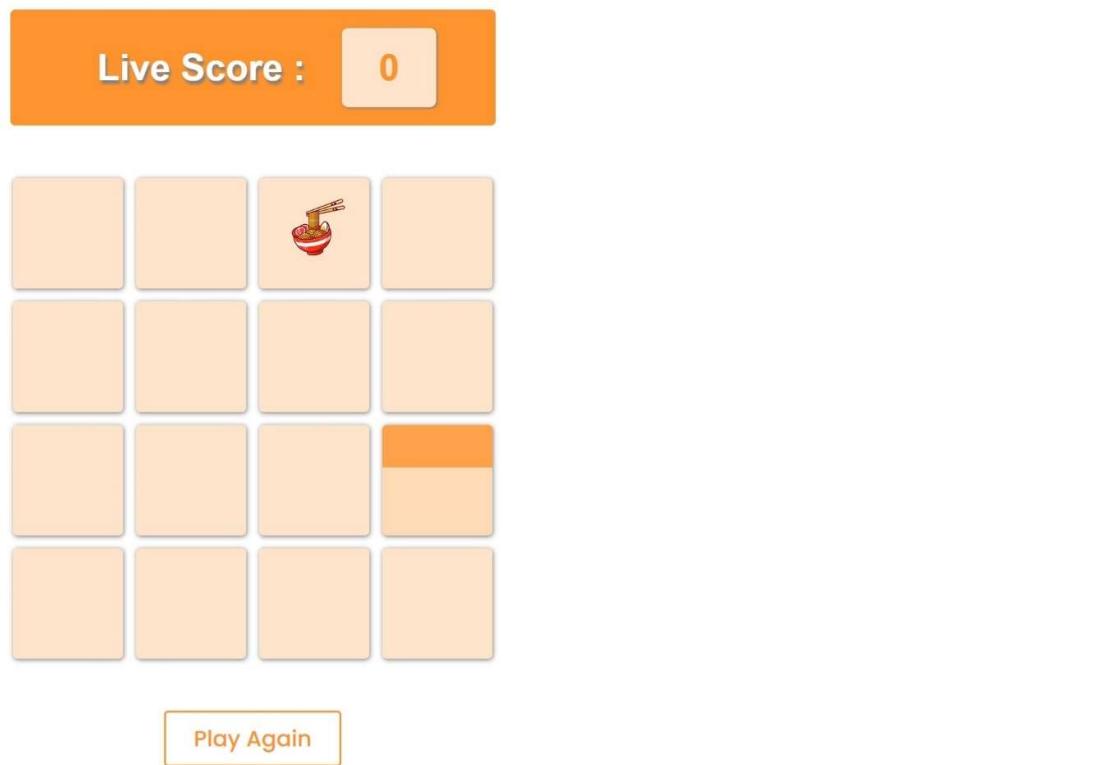
[About how Alzheimer's disease is treated](#)



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- **Memory game page:**

On this page, we developed a little game to check the user memory (to make it extraordinary).



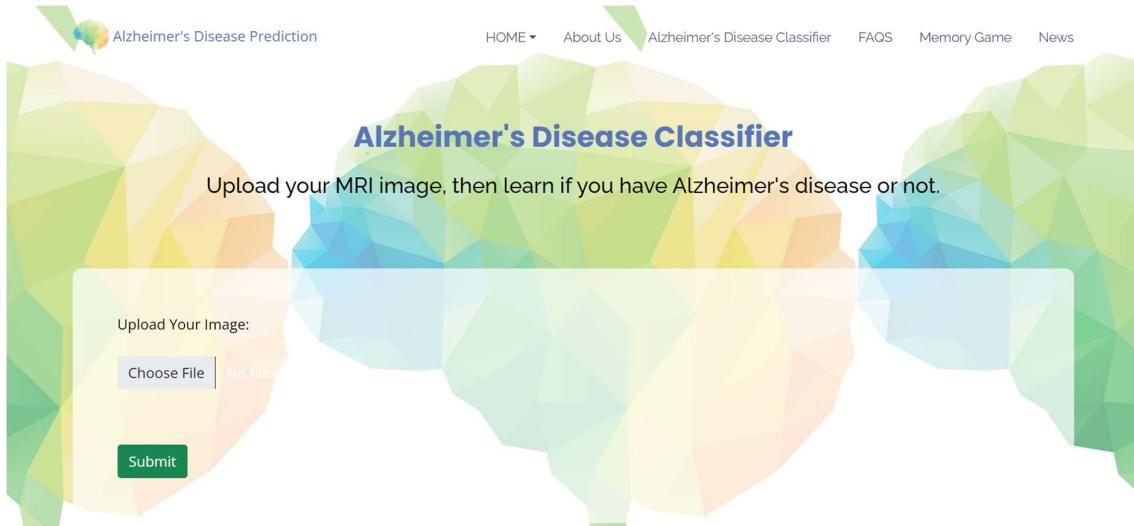
- **New pages:**

when the user clicks on the news navigator, then will lead him to google news about Alzheimer's disease. For example:

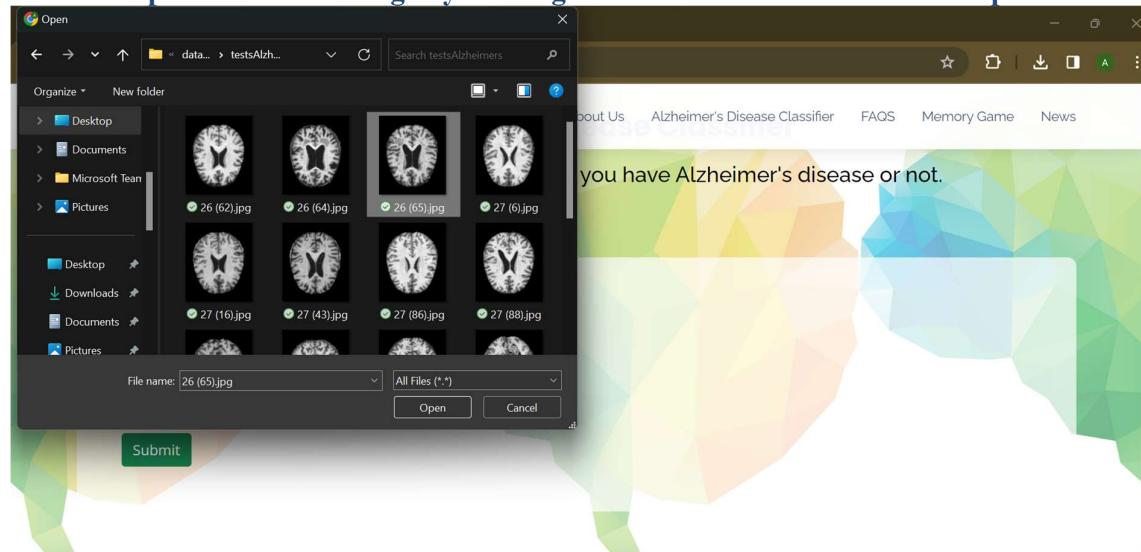
A screenshot of a Google News search results page for "Alzheimer's". The search bar at the top shows the query. Below the search bar is a navigation bar with categories: Home, For you, Following, Israel, World, Local, Business, Technology, Entertainment, Sports, Science, and Health. The main content area displays three news articles. The first article, from MedCityNews, is titled "Root cause of Alzheimer's may be fat buildup in brain cells, research suggests" and includes a small image of brain tissue. The second article, from The Washington Post, is titled "Trump's experience with father's dementia colors his political attacks on Biden" and features a photo of Donald Trump. The third article, from The Jerusalem Post, is titled "Israeli and Italian researchers suggest treatment for early Alzheimer's" and includes a photo of a scientist in a lab. On the right side of the screen, there is a sidebar for "Alzheimer's News Today" with a "Follow" button and a "Share" button.

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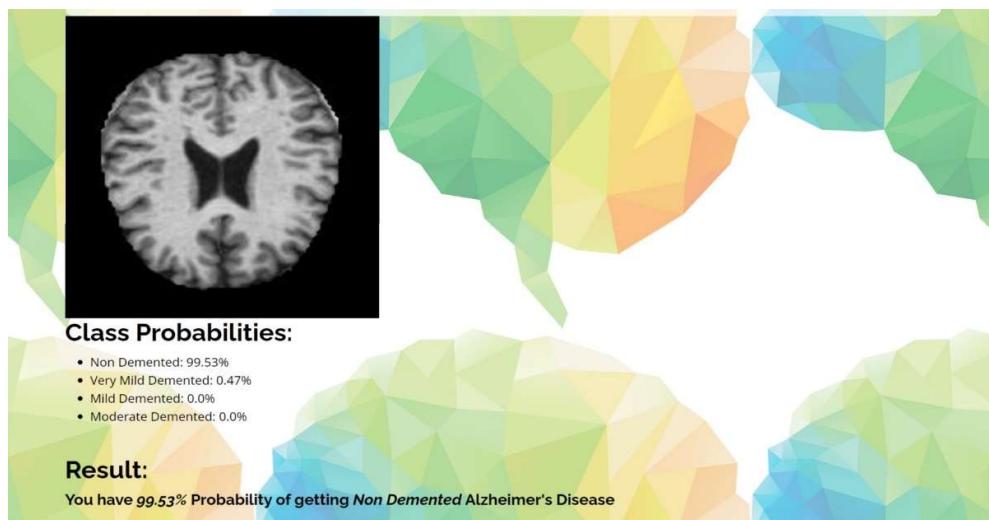
- **Alzheimer's classifier:**



User can upload his MRI image by clicking on “choose file” button for example:



after he clicks on “submit” button immediately will see the result like this:



Final project – information system department

- **Diabetes home page:**



Take control of your health with our diabetes management solutions

Say goodbye to sugar spikes and hello to a healthier you 

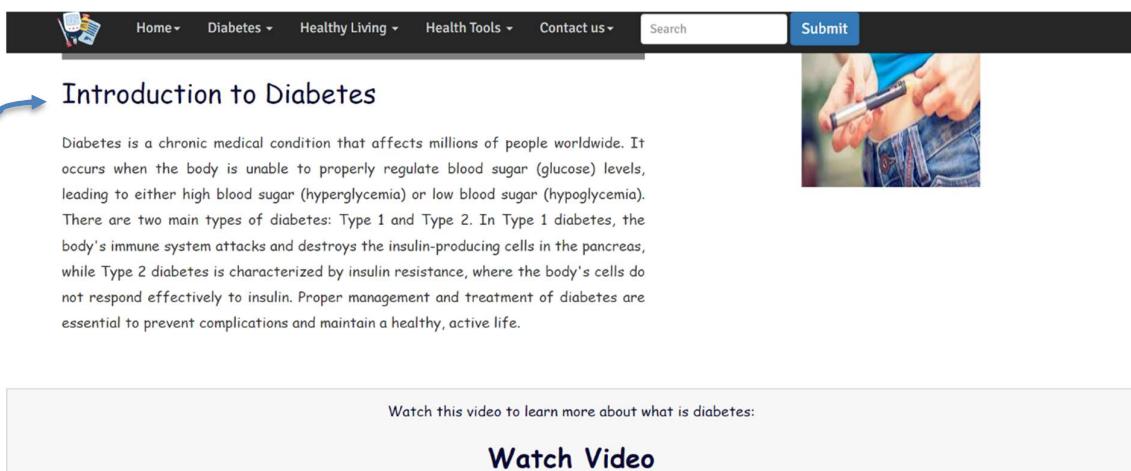
 Diabetes Detection

You could be one of the 1.5 million who have diabetes and don't know it. It's important to know the risk factors and get checked.

In this page user will find an introduction of diabetes disease and general information.

- First section:

General information each person should know.



Introduction to Diabetes

Diabetes is a chronic medical condition that affects millions of people worldwide. It occurs when the body is unable to properly regulate blood sugar (glucose) levels, leading to either high blood sugar (hyperglycemia) or low blood sugar (hypoglycemia). There are two main types of diabetes: Type 1 and Type 2. In Type 1 diabetes, the body's immune system attacks and destroys the insulin-producing cells in the pancreas, while Type 2 diabetes is characterized by insulin resistance, where the body's cells do not respond effectively to insulin. Proper management and treatment of diabetes are essential to prevent complications and maintain a healthy, active life.

Watch this video to learn more about what is diabetes:

Watch Video

Final project – information system department

- **Signs and symptoms page:**

There are many signs and symptoms that can indicate diabetes.

Signs and symptoms can include the following:

- Frequent urination
- Unusual thirst
- Weight change (gain or loss)
- Extreme fatigue or lack of energy
- Blurred vision
- Frequent or recurring infections
- Cuts and bruises that are slow to heal
- Tingling or numbness in the hands or feet
- Trouble getting or maintaining an erection

On this page, we describe all the signs and symptoms that the patient would have, which help him to protect himself and to care about this more.

- **Types of diabetes page:**

What is Diabetes?

Diabetes is a group of diseases in which the body either doesn't produce enough or any insulin, does not properly use the insulin that is produced, or a combination of both. When any of these things happen, the body is unable to get sugar from the blood into the cells. That leads to high blood sugar levels. Glucose, the form of sugar found in your blood, is one of your chief energy sources. Lack of insulin or resistance to insulin causes sugar to build up in your blood. This can lead to many health problems.

The three main types of diabetes are:

- Type 1 Diabetes
- Type 2 Diabetes
- Gestational Diabetes

on this page we present 3 types of diabetes, explaining each type and its complications.

- **Risk factors page:**

What are the risk factors for type 1 diabetes? [Click one me to know :\)](#)

What are the risk factors for type 2 diabetes? [Click one me to know :\)](#)

Risk factors are:

- Having a parent, brother, or sister with diabetes;
- Being a member of a high-risk group (Aboriginal, Hispanic, South Asian, Asian, or African descent);
- health complications that are associated with diabetes;
- Having given birth to a baby that weighed more than four kilograms (nine pounds) at birth or having had gestational diabetes (diabetes during pregnancy);
- Having been diagnosed with prediabetes (impaired glucose tolerance or impaired fasting glucose);

This page represented the risks of diabetes disease. each type of diabetes and its factors.

- **Diabetes and hypertension page:**

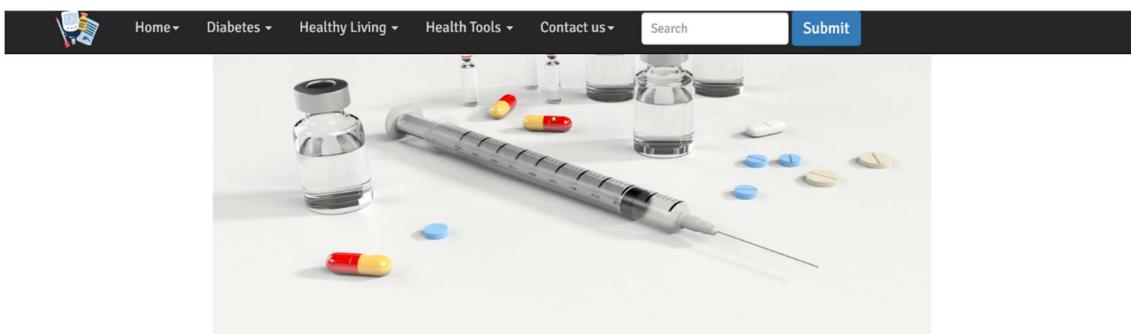


Studies have found that at least 1 in 3 patients with type 1 diabetes also have hypertension. When hypertension and diabetes co-exist, the effects of one disease tend to make the other worse. This makes for a deadly combination. Diabetes does three things that may increase blood pressure:

- Decreasing the blood vessels' ability to stretch
- Increasing the amount of fluid in the body

On this page, we provide the relationship between diabetes and hypertension and how diabetes affects patient blood pressure. How this operation happens is explained on this page in a comprehensive way.

- **Treatments page:**



TREATMENT AND MEDICATIONS FOR DIABETES

People with diabetes can expect to live active, independent and vital lives if they make a lifelong commitment to careful diabetes management.

Key elements in diabetes management

- **Education:** Diabetes education is an important first step. All people with diabetes need to be informed about their condition.

this page represents the treatment of diabetes of each type and how patients can treat it. However, always ensure that you see a doctor before taking any medications for diabetes.

- Diet and Nutrition page:

DIET AND NUTRITION - Managing diabetes and Hypertension through nutrition

Nutrition is an important part of a healthy lifestyle when you have diabetes and hypertension. What you choose to eat, how much you eat, and when you eat are all

In Healthy Living Navigator included this page which represents the healthy nutrition each diabetes patient should eat and follow. Diet and nutrition are a part of treatment for patients, so this page provides so many tips and instructions for a healthy diet.

- Physical activity page:

PHYSICAL ACTIVITY AND EXERCISE

Get Active!
Exercise boosts mood and stress.

PRECAUTIONARY MEASURES

There are some exercise precautions which people with diabetes must take, however, when done safely, exercise is a valuable aid to optimal health.

Exercise precautions are designed to help people with diabetes avoid problems which can result from unwise exercise choices. Hypoglycemia can occur if a person who is taking blood sugar lowering medication has:

- Eaten too little carbohydrate (fruit, milk, starch) relative to the exercise.
- Taken too much medication relative to the exercise.
- Combined effect of food and medication imbalances relative to the exercise.

Also in the healthy living navigator included this page “physical activity”. This page provides how physical activity can reduce and improve the patient's status and make him feel better. Following the instructions on this page will make the user already feel better.

- **About us page: first section**

Selection of Project

In this section we explain why we choose diabetes disease to be detected.

Diabetes is a chronic metabolic disorder characterized by elevated levels of blood glucose (sugar). This occurs either because the body does not produce enough insulin (a hormone responsible for regulating blood sugar) or because the cells do not respond effectively to the insulin produced, leading to a condition known as insulin resistance. Diabetes can have serious health consequences if not properly managed, including cardiovascular problems, kidney disease, vision impairment, nerve damage, and more. Effective management through medication, lifestyle changes, and regular monitoring of blood sugar levels is crucial in mitigating the risks associated with diabetes.

So why did we choose to focus on this disease?

First and foremost, diabetes is a prevalent and growing health concern globally, affecting millions of people and placing a substantial burden on healthcare systems. By addressing diabetes, we have an opportunity to make a meaningful impact on public health.

- **Second section: model building**

Building the Model

Note : We will display now how we Building the model/models to predict if someone has diabetes or not and its the same for predict the other diseases , so we will display one of them :)

Then, we separating the data and labels

```
#X has all the columns except for 'Outcome'  
#Y only has 'Outcome'  
  
X = diabetes_dataset.drop(columns = 'Outcome', axis=1)  
Y = diabetes_dataset['Outcome']
```

The label is "Outcome," and it consists of two values: 0 and 1.

```
diabetes_dataset['Outcome'].value_counts()  
  
0    500  
1    268  
Name: Outcome, dtype: int64
```

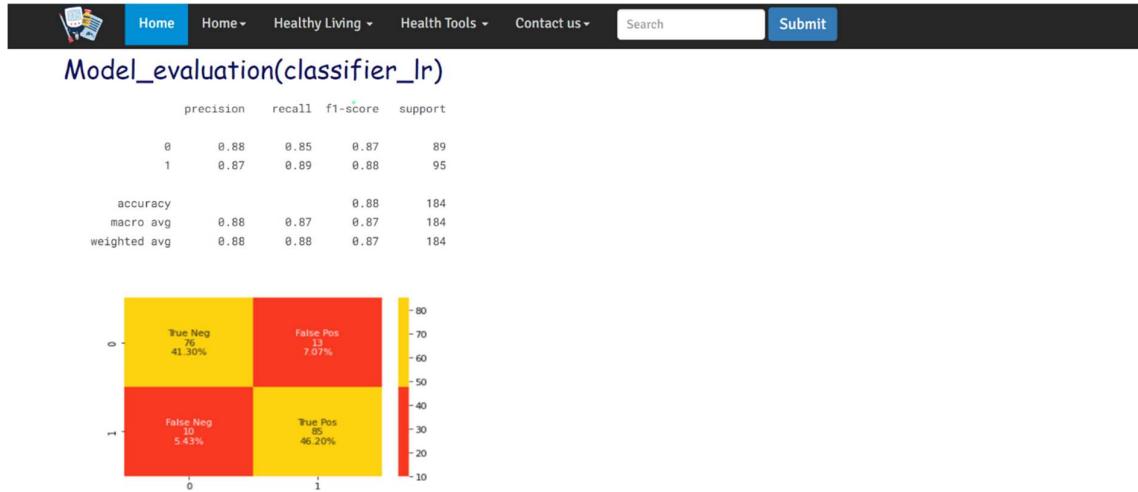
```
diabetes_dataset.shape  
  
(768, 9)
```

After that, we used **StandardScaler** inorder to ensure that the input features are appropriately scaled and centered, making the machine learning model more effective and stable. It's a standard practice to improve the performance and interpretability of various machine learning algorithms.

In this section, we explain all the data pre-processing we did on a data set that we gathered before we developed the model. Then we split the data to train and make predictions on the test set.

we implemented more of the model but eventually, we chose the SVM model.

- Third section: model evaluation



as we can see in this section we computed more than one evaluation metric.
That's why we chose SVM because it gave us the highest accuracy.

- BMI calculator:

The figure shows a screenshot of a BMI calculator web application. At the top, there is a navigation bar with links for Home, Diabetes, Healthy Living, Health Tools, Contact us, a search bar, and a Submit button. Below the navigation bar, the title "BMI (BODY MASS INDEX) CALCULATOR" is displayed. To the left of the form area, there is a photograph of a digital scale with an apple and a measuring tape on it.

Complete the form below to determine your Body Mass Index

1.59
Metres

57
Kilograms

Your BMI is 22.55
This means you are in a healthy weight for your height.

What is BMI?

On this page user can calculate his BMI by entering his height and weight.
Immediately user will know his BMI and if he has a healthy weight and height. And on the bottom of the page users can read more about what is under-average BMI and what is over-average BMI.

- Calorie calculator page:



What are Calories?

A calorie is a unit that measures energy. Calories are usually used to measure the energy content of foods and beverages. In order to lose weight, you need to eat fewer calories than your body burns each day.

How to Reduce Calorie Intake Without Starving Yourself?

Calories are simply a measure of energy. It is known that in order to gain weight, more calories need to be entering your body than leaving it. Conversely, if more calories leave your body than enter it, then you lose weight. That being said, just cutting calories without regards to the foods you eat is usually not a sustainable way to lose weight. Although it works for some people, the majority of people end up hungry and eventually give up on their diet. For this reason, it is highly recommended to make a few other permanent changes to help you maintain a calorie deficit in the long term, without feeling

Enter your details in the calorie calculator below to find out the amount of calories you should be taking in a day, to achieve your weight goal.

Gender
<input type="radio"/> Male <input type="radio"/> Female
Age
<input type="text"/> Age (Years) ×
Weight (Kgs)
<input type="text"/> Weight (Kgs) ×
Height (cms)
<input type="text"/> Height (cms) ×
Activity Level
<input type="text"/> Select an Activity Level ×
Choose a Goal:
<input type="text"/> Select a Goal ×
<input type="button" value="Reset"/> <input type="button" value="Calculate"/>

Users can enter their data (age, weight, height, activity level and theirs goal how much they want to lose or gain) and based on that will calculate the user how much their body burns calories each day.

- Diabetes detection page:

Diabetes Detection

A machine learning model that can help you determine if you are close to developing diabetes.

Diabetes Prediction
Please fill in the following form below. You may press Enter to proceed to the next input field

<input type="text"/> Number of pregnancies	<input type="text"/> Plasma Glucose Concentration	
<input type="text"/> Diastolic Blood Pressure	<input type="text"/> Triceps skin fold thickness (mm)	<input type="text"/> Insulin(2-Hour serum insulin (mu U/ml))
<input type="text"/> BMI	<input type="text"/> Diabetes Pedigree Function	<input type="text"/> Age
<input type="button" value="Submit"/>		

[Back to home](#)

Users can enter their data on this page and data scanning and all the used algorithms we

have done will present to the user the probability of getting diabetes for example:

Diabetes Prediction

Please fill in the following form below. You may press Enter to proceed to the next input field

Number of pregnancies	Plasma Glucose Concentration	
<input type="text" value="12"/>	<input type="text" value="175"/>	
Diastolic Blood Pressure	Triceps skin fold thickness (mm)	Insulin(2-Hour serum insulin (mu U/ml))
<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="2"/>
BMI	Diabetes Pedigree Function	Age
<input type="text" value="25"/>	<input type="text" value="0.627"/>	<input type="text" value="45"/>

clicking on the “submit” button immediately will present the user result:

The screenshot shows a mobile application interface for diabetes detection. At the top, there is a navigation bar with a doctor icon and the text "Diabetes Detection". Below the navigation bar, there is a status message: "STATUS: Probability of having diabetes: 65%". A blue arrow points from this status message to the right, where the text "Result : probability of getting diabetes detection." is displayed. Below the status message, there is a link: "You may check this [link](#) to know tips on how to manage diabetes. Never forget to stay healthy always!". At the bottom of the screen, there are two buttons: "Heart-Disease Detection" and "Kidney-Disease Detection". Arrows point from these buttons down to two boxes containing explanatory text. The "Heart-Disease Detection" box states: "One of the diabetes complications is heart disease so here we also detect the probability of the user getting this disease.". The "Kidney-Disease Detection" box states: "Also, we do the same thing for kidney disease as it is also known as one of the diabetes complications.".

And it is an end!!!✓