

BRAIN TUMOR

Classification

By Derik Vo
Last updated 6/11/2023

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evaluation**

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Next Steps



1

— *Introduction* —



You can enter a subtitle here if you need it

Introduction

MRI

Used to diagnose brain tumors.



Tumors

No tumor, Meningioma, Glioma,
pituitary tumors



Workload

Radiologist need to review 1 image
every 2-4 seconds





2

— *Problem statement* —

Problem

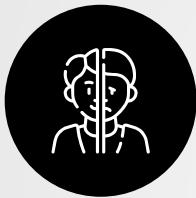
Because of the difficulty of manual classification of a brain tumor and the workload put on radiologist, building a classification model would greatly reduce the workload of a radiologist. As well as improve quality of care.



3

Exploratory Data Analysis

BRAIN TUMOR CLASS COUNT



No Tumor

1,595

Meningioma

1,339



Glioma

1,321

Pituitary

1,457

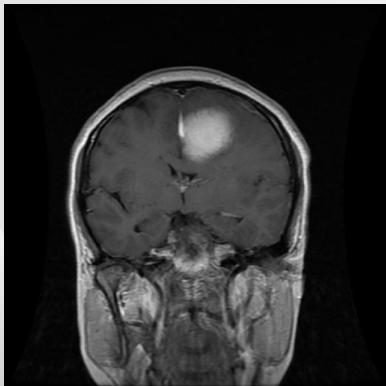


Graphic images
warning

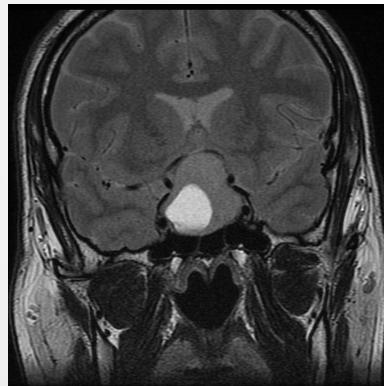


Image class preview

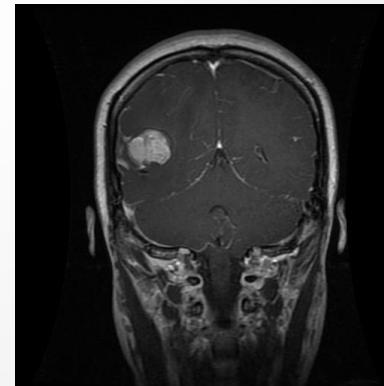
Meningioma



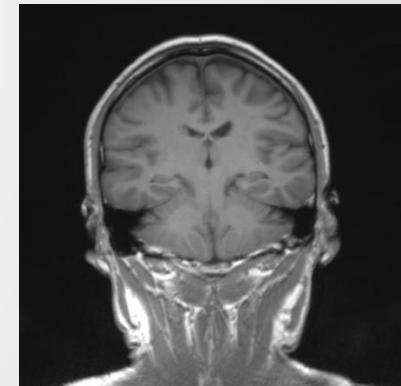
Pituitary



Glioma

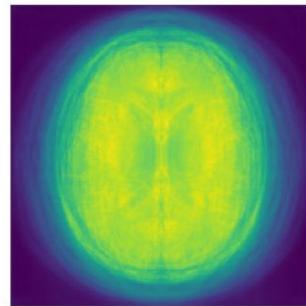


No Tumor

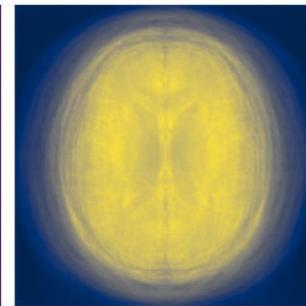


Pixel average: no tumor

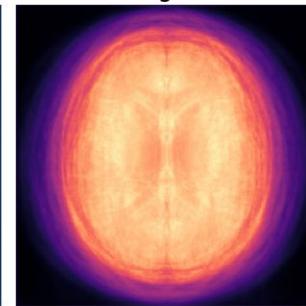
Viridis



cividis

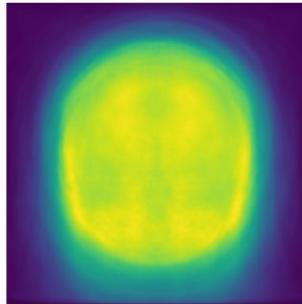


magma

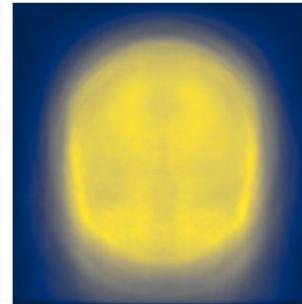


Pixel average: Meningioma

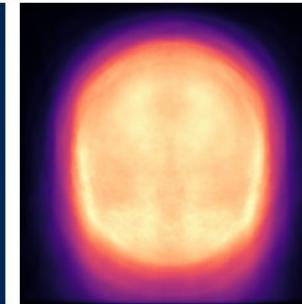
Viridis



cividis

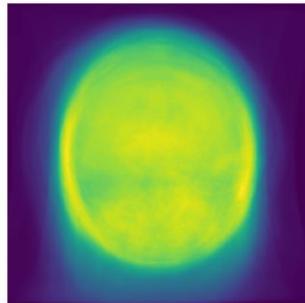


magma

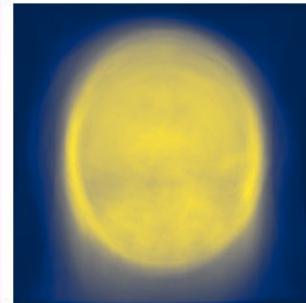


Pixel average: Glioma Tumor

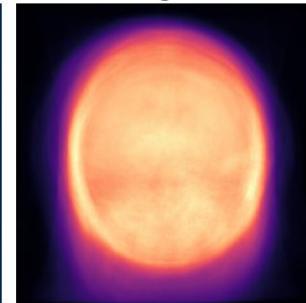
Viridis



cividis

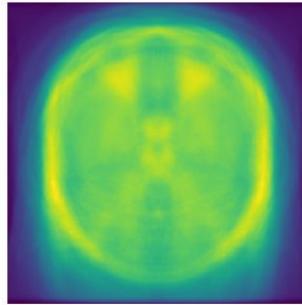


magma

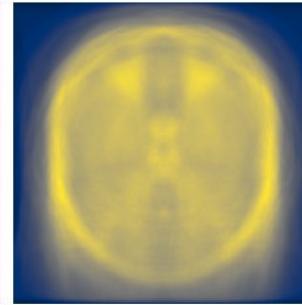


Pixel average: pituitary tumor

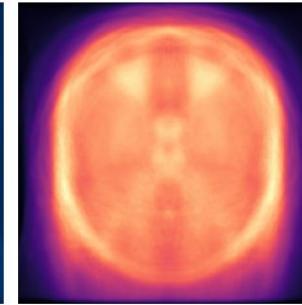
Viridis



cividis

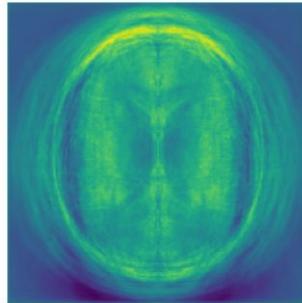


magma

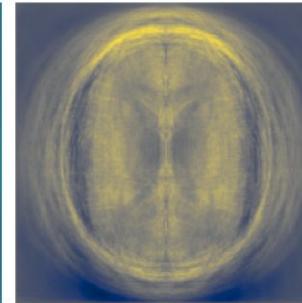


Pixel average: meningioma contrast

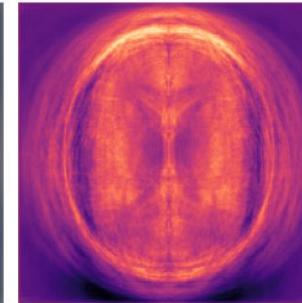
Viridis



cividis

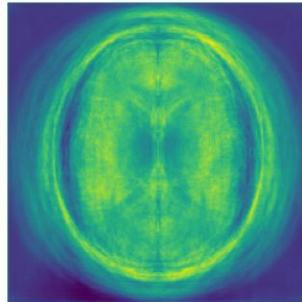


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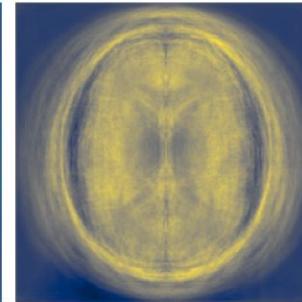


Pixel average: glioma contrast

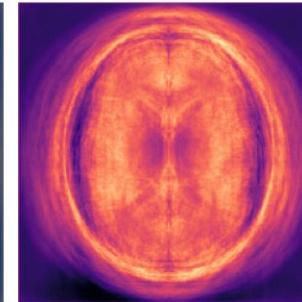
Viridis



cividis

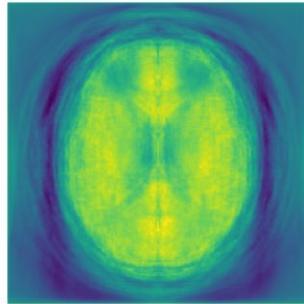


magma

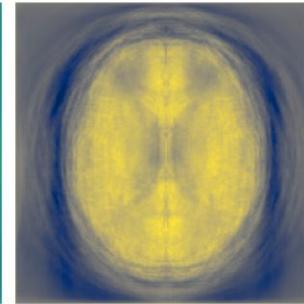


Pixel average: Pituitary contrast

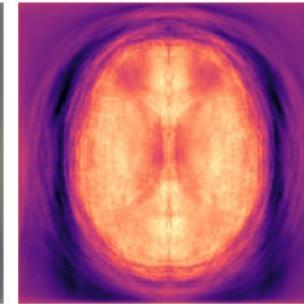
Viridis



cividis



magma





4

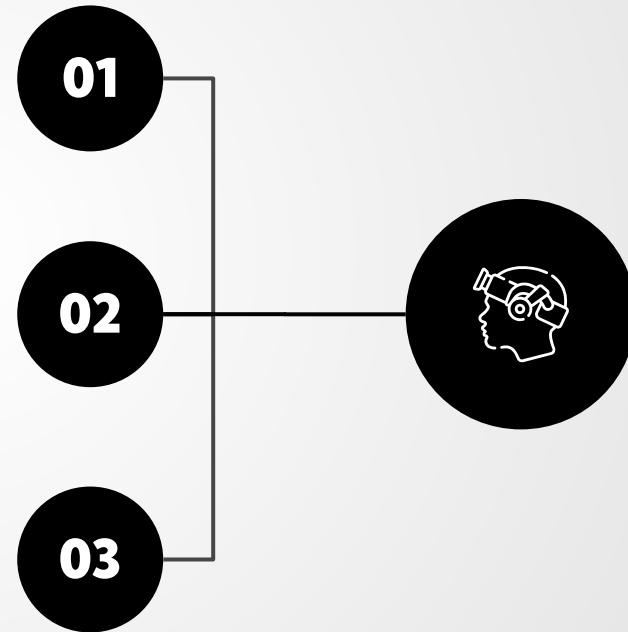
Modeling and Evaluation

Models Built

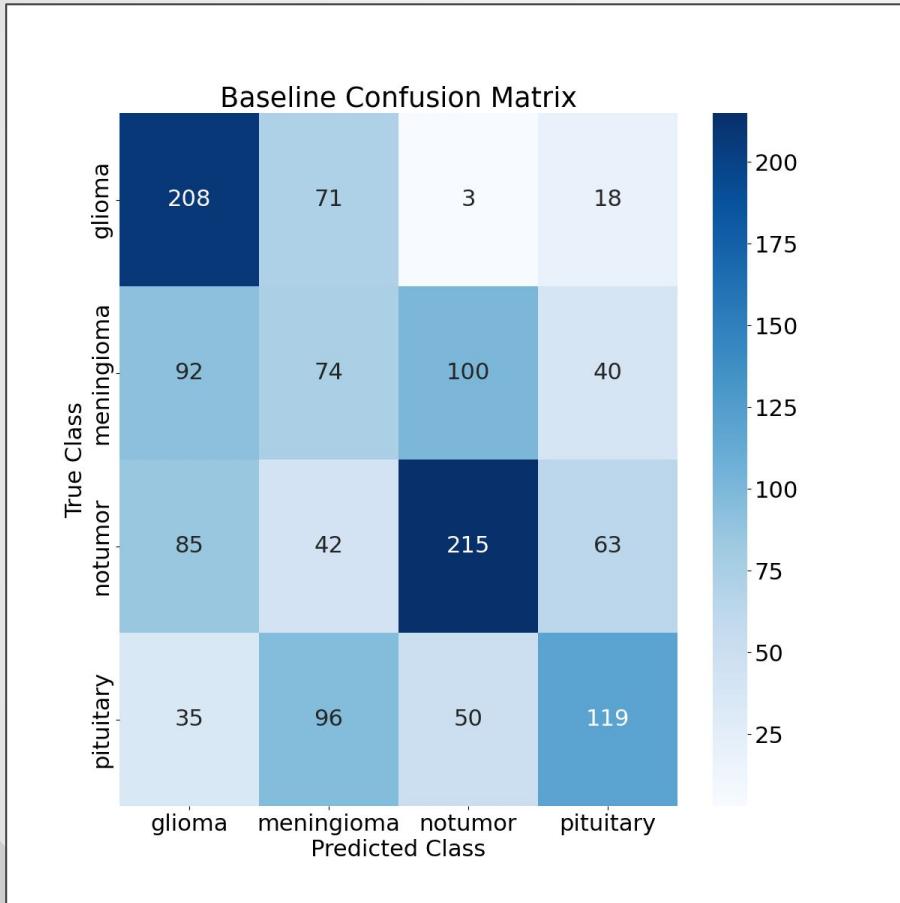
Baseline

**Convolutional
Neural Network**

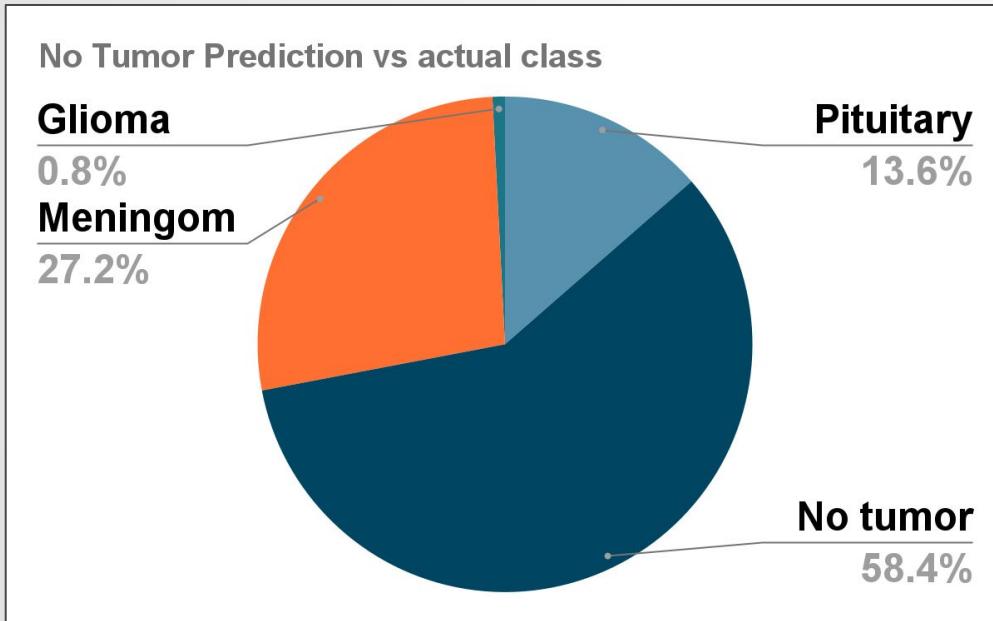
**Convolutional
Neural Network
With Regularization**



Baseline Model

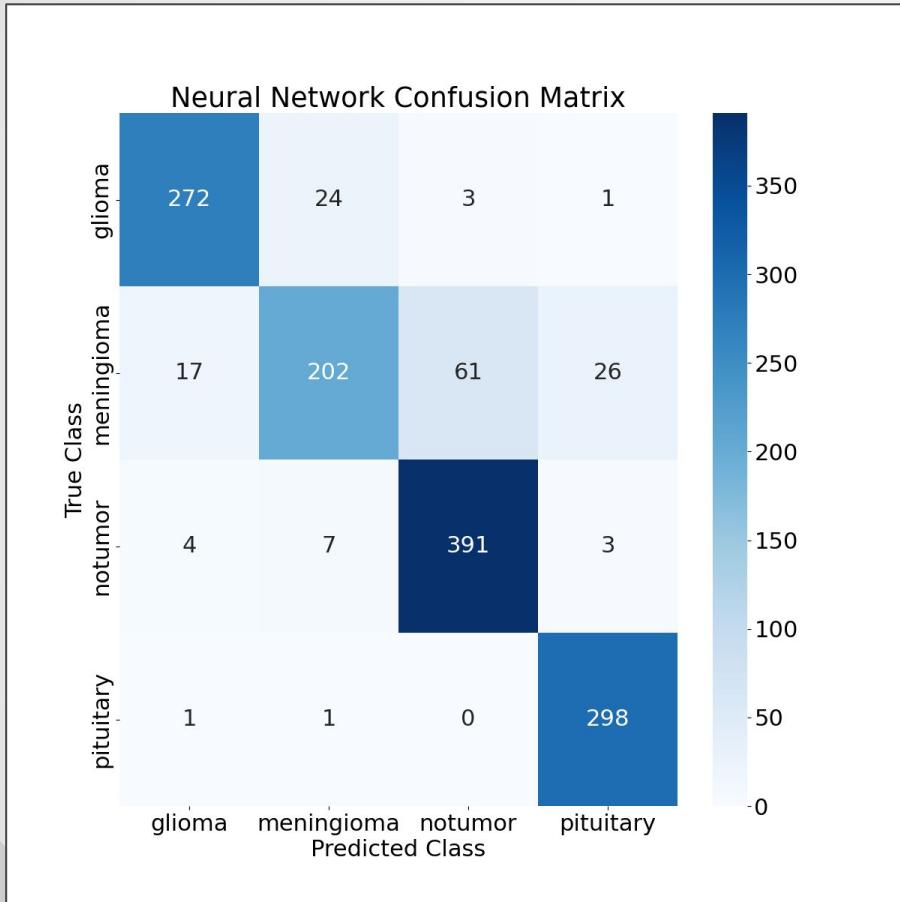


Baseline Model



Metrics:
No Tumor: 215
Pituitary: 50
Meningioma: 100
Glioma: 3

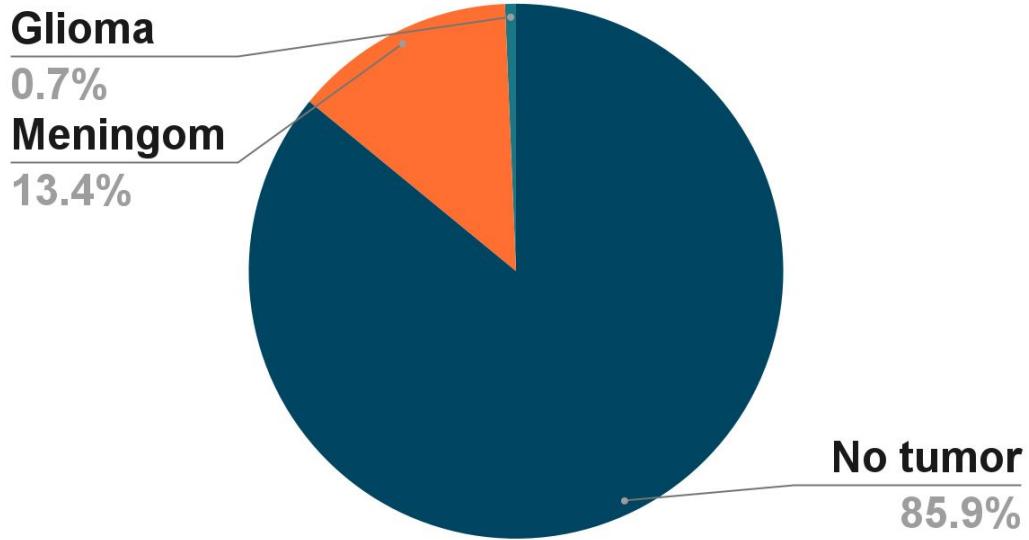
CNN Model



Metrics:
Accuracy: 89%
Precision: 89%
Recall: 89%
F1: 88%

CNN Model

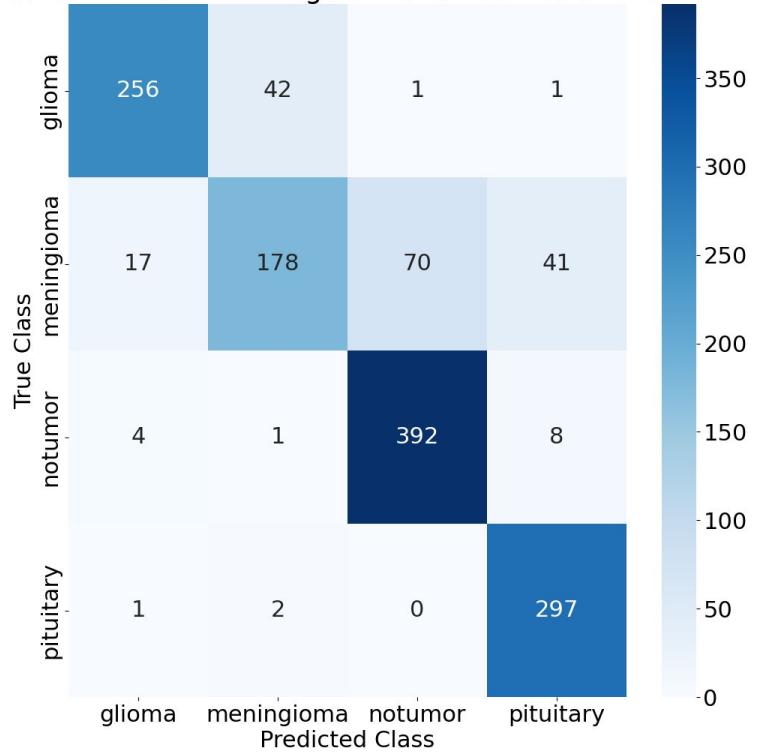
No Tumor Prediction vs actual class



Metrics:
No Tumor: 391
Pituitary: 0
Meningioma: 61
Glioma: 3

CNN with regularization

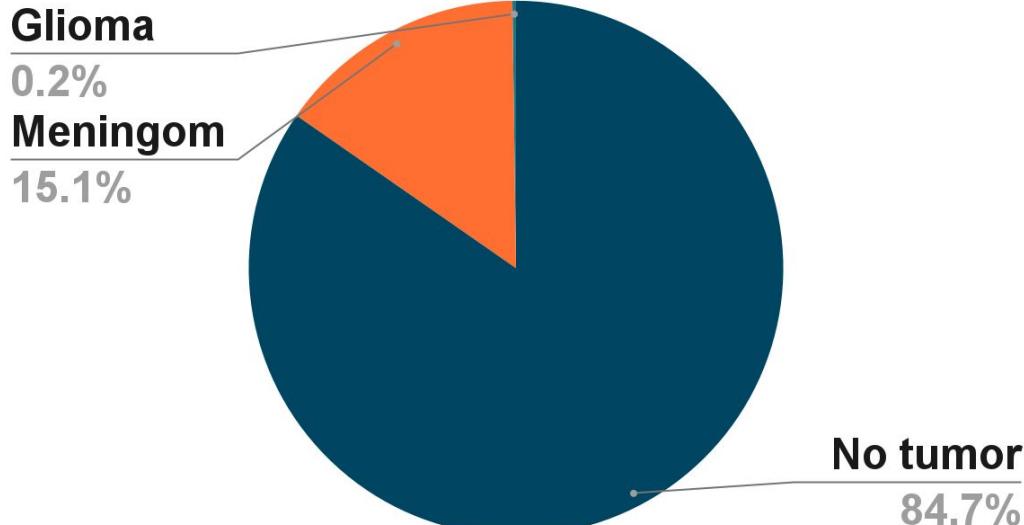
Neural Network with regularization Confusion Matrix



Metrics:
Accuracy: 86%
Precision: 85%
Recall: 86%
F1: 85%

CNN regularization Model

No Tumor Prediction vs actual class



Metrics:
No Tumor: 392
Pituitary: 0
Meningioma: 70
Glioma: 1



5

Conclusion

Conclusion



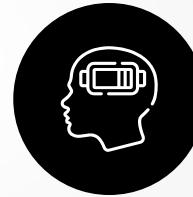
CNN did well



**Struggled with
meningioma**



**Can be used
to assistant**



**The preliminary
website has been
built**



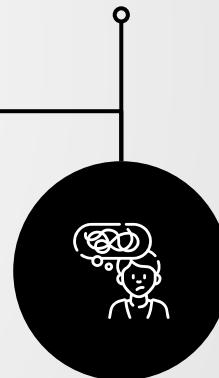
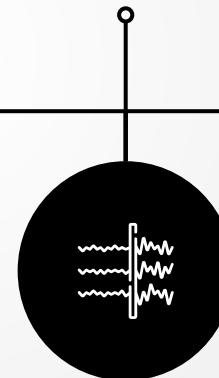
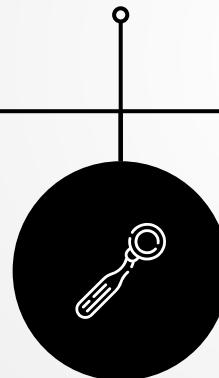
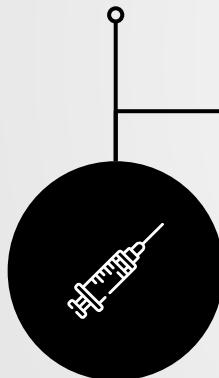
Recommendations

**MRI
Machine
type**

**Identify
data
leakage**

**Build an
anomaly
detector**

**Consult
with
experts**



THANKS!

Do you have any questions?

Derikvosanjose@gmail.com

<https://derikvo.github.io/Portfolio/>



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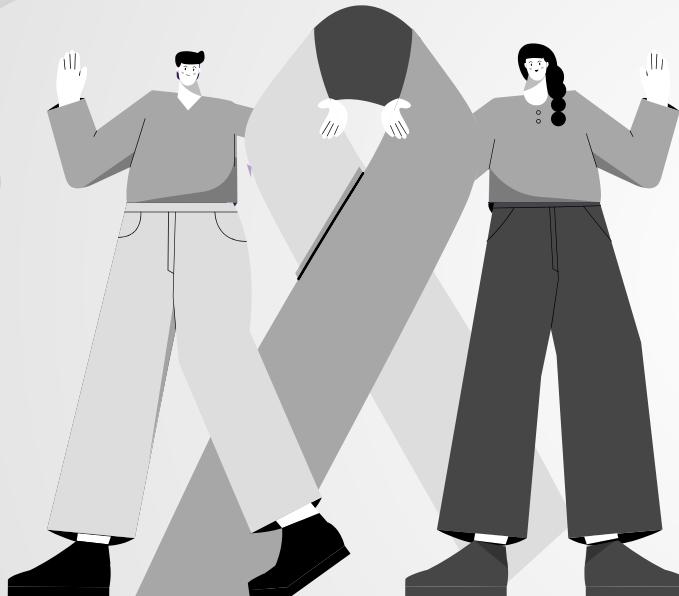
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WHOA!

This can be the part of the presentation where you introduce yourself, write your email...

ABOUT BRAIN TUMOR

Do you know what helps you make your point clear?
Lists like this one:

- They're simple
- You can organize your ideas clearly
- You'll never forget to buy milk!

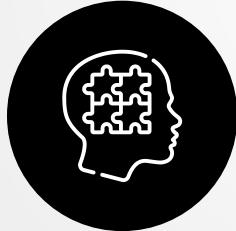
And the most important thing: the audience won't miss the point of your presentation



Types of Tumors



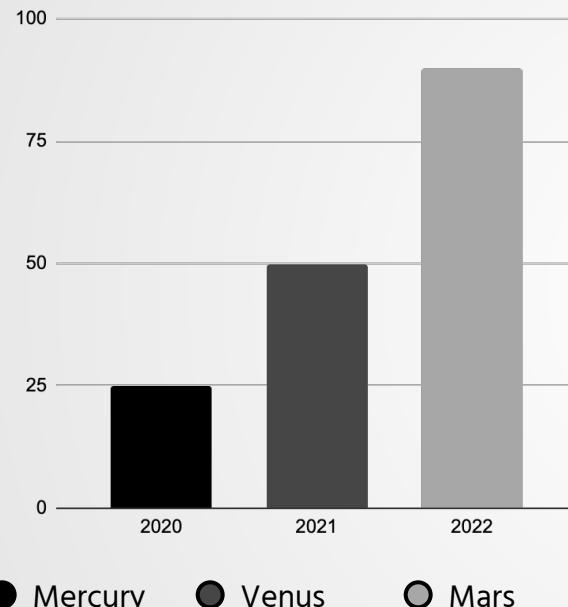
Mercury



Venus

Venus has a beautiful name and is the second planet from the Sun

NUMBER OF NEW CASES



- **25%**

Mercury is the closest planet to the Sun and the smallest one in the Solar System

- **50%**

Venus has a beautiful name and is the second planet from the Sun

- **90%**

Despite being red, Mars is actually a cold place. It's full of iron oxide dust

Follow the link in the graph to modify its data and then paste the new one here. [For more info, click here](#)

BRAIN TUMORS DIAGNOSED

Jupiter

Jupiter is the biggest planet

Saturn

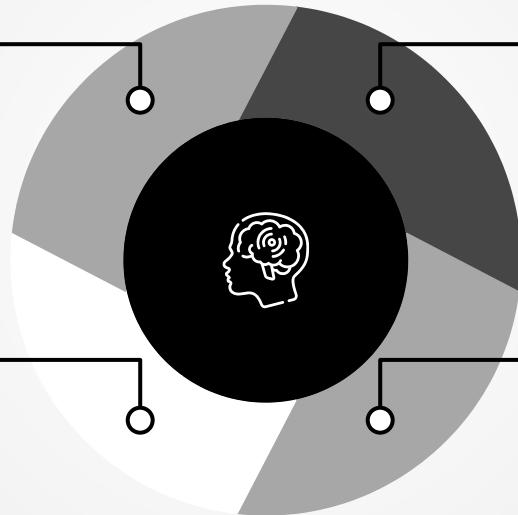
Saturn is the ringed planet

Mercury

Mercury is the smallest planet

Venus

Venus has a beautiful name



AWESOME WORDS

“This is a quote, words full of wisdom that someone important said and can make the reader get inspired.”

—**SOMEONE FAMOUS**

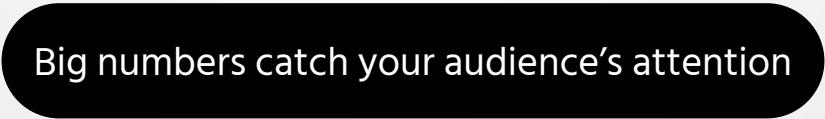


**A PICTURE ALWAYS
REINFORCES THE CONCEPT**

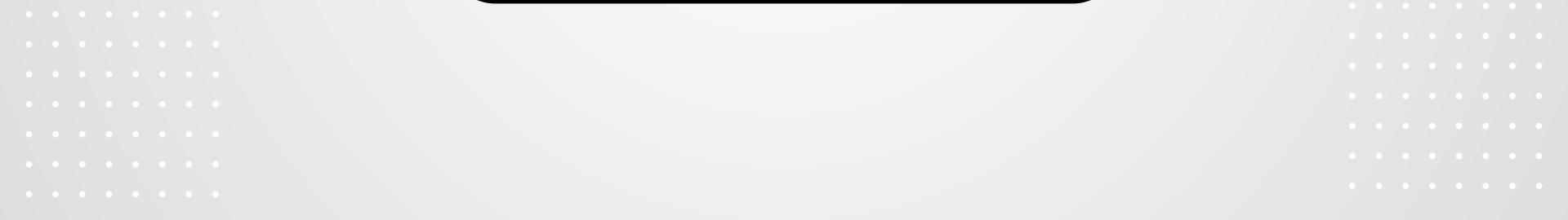
Images reveal large amounts of data, so remember: use an image instead of a long text. Your audience will appreciate it



150,000



Big numbers catch your audience's attention



9h 55m 23s

Jupiter's rotation period

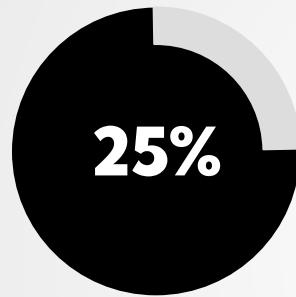
333,000

The Sun's mass compared to Earth's

386,000 km

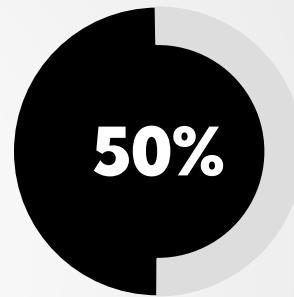
Distance between Earth and the Moon

STATS OF PATIENTS



Mercury

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon



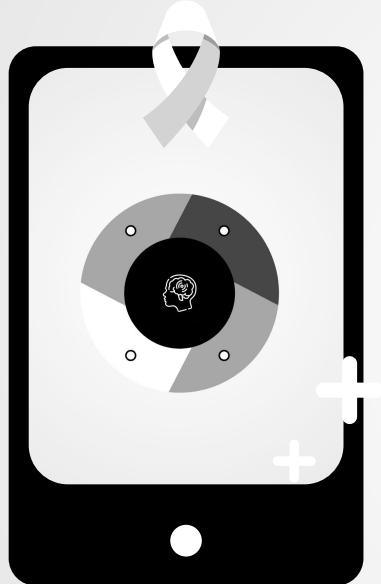
Venus

Venus has a beautiful name and is the second planet from the Sun. It's hot and has a poisonous atmosphere

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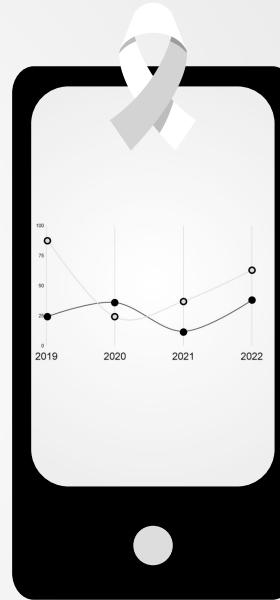


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OUR PRINCIPAL DOCTORS



Peter Smith

You can speak a bit about this person here



Jenna Jameson

You can speak a bit about this person here

MALIGNANT TUMORS

Mars

Mars is actually a
very cold place



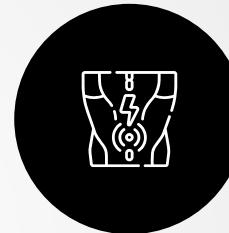
Neptune

Neptune is very
far away from us

Mercury

It's the closest
planet to the Sun

COMPARING DISEASES



Brain tumor

Mercury is quite a small planet

2,500

Lungs tumor

Venus has a beautiful name

130,000

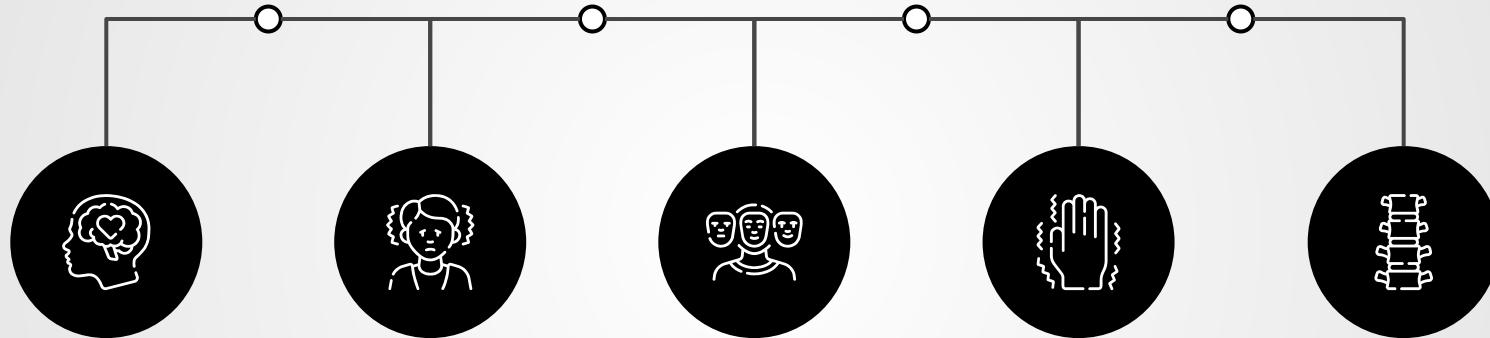
HEALTHCARE CENTERS



○ Saturn

Saturn, the ringed planet, is composed mostly of hydrogen and helium. It was named after a Roman god

EXPOSURE TO RADIATION



Mercury

Mercury is the smallest planet

Mars

Mars is a very cold place

Venus

Venus has a beautiful name

Neptune

Neptune is far away from us

Jupiter

Jupiter is the biggest planet

ABOUT THE DAY

Mon	Tue	Wed	Thu	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			



○ Mercury

It's the closest planet to the Sun
and the smallest in the Solar System

BRAIN BIOPSY



Mars

Mars is actually a very cold place



Mercury

It's the closest planet to the Sun



Venus

It's the second planet from the Sun



Saturn

Saturn is a gas giant and has several rings



Neptune

Neptune is far away from Earth



Jupiter

Jupiter is the biggest planet of them all

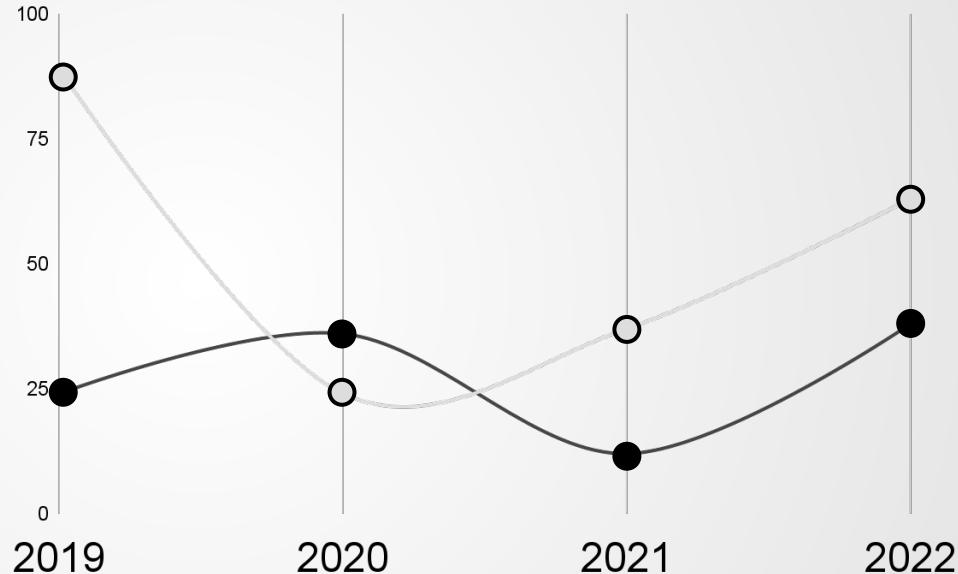
DISEASE GROWTH

○ Pluto

Pluto is now considered a dwarf planet

● Ceres

Ceres is located in the main asteroid belt



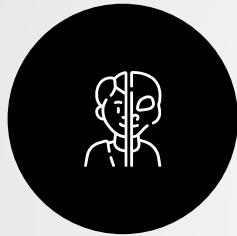
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2

RESEARCH

You can enter a subtitle here if you need it

TREATMENT OF BRAIN TUMORS



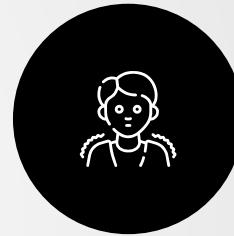
Mercury

It's the closest planet to the Sun and the smallest in the Solar System



Venus

Venus has a beautiful name and is the second planet from the Sun

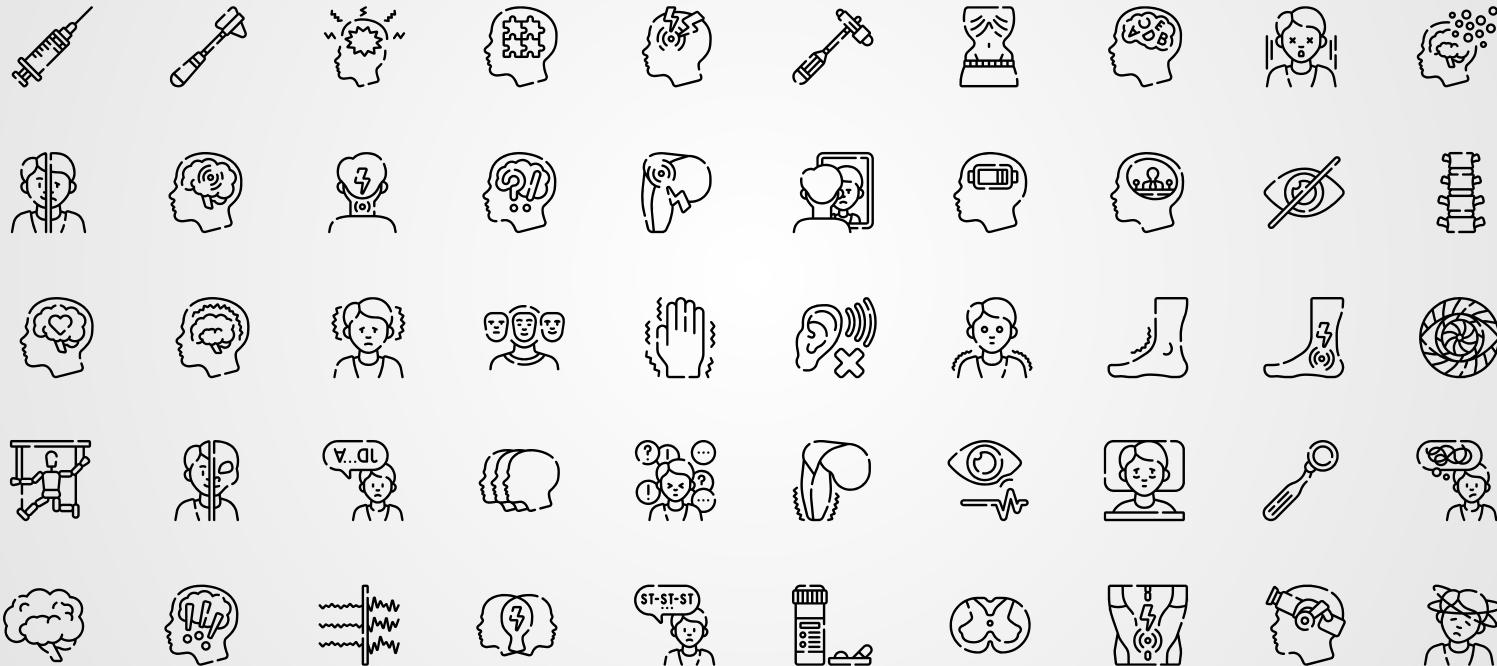


Mars

Despite being red, Mars is actually a cold place. It's full of iron oxide dust



ICON PACK: NEUROLOGICAL DISORDERS



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- Flat world cancer day vertical poster template
- Flat world cancer day brochure template



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- Medium shot smiley doctor holding clipboard
- Medium shot smiley doctor wearing coat
- Different doctors doing a surgical procedure on a patient

Icons:

- Icon pack: Neurological Disorders

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#ffffff

#464646

#dddddd

#a7a7a7

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Create your Story with our illustrated concepts. Choose the style you like the most, edit its colors, pick the background and layers you want to show and bring them to life with the animator panel! It will boost your presentation. Check out how it works.



Pana



Amico



Bro



Rafiki



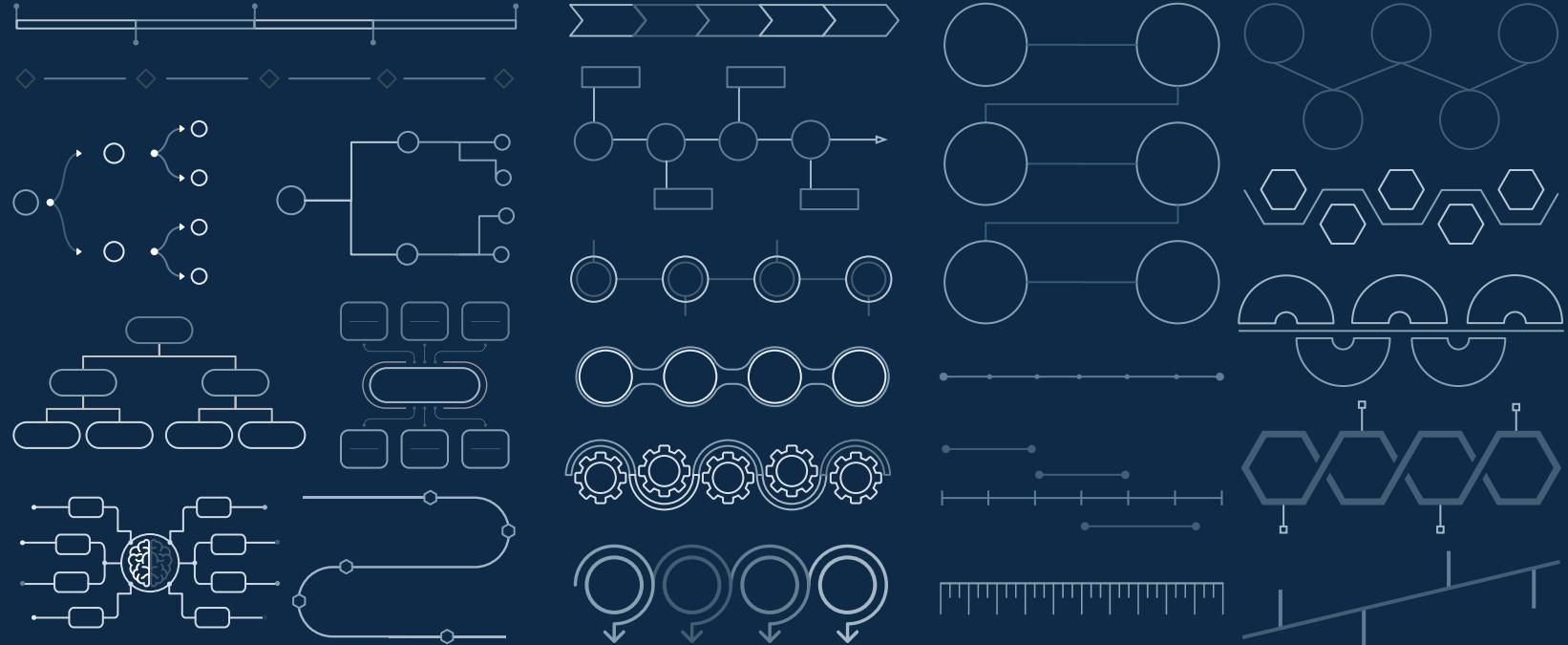
Cuate

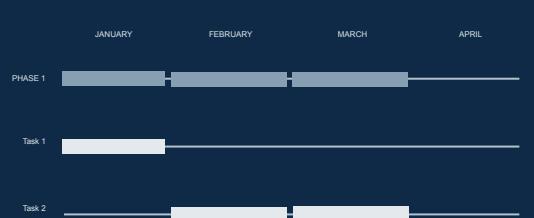
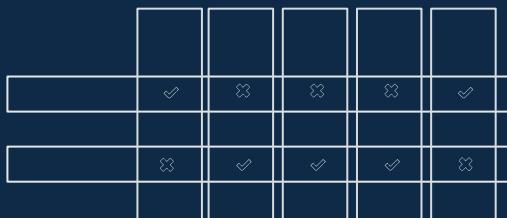
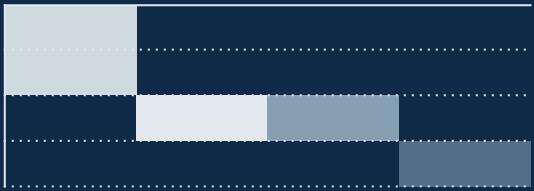
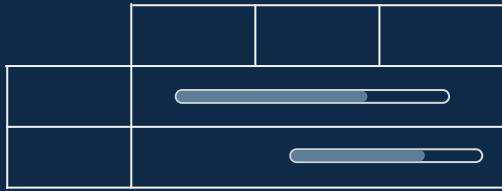
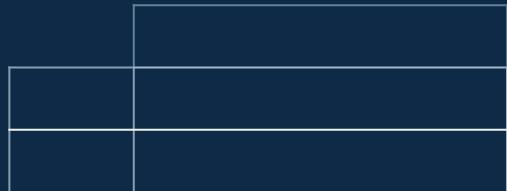
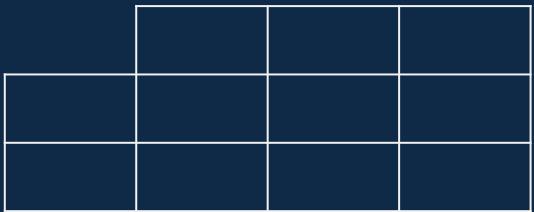
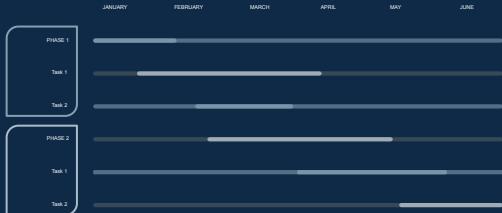
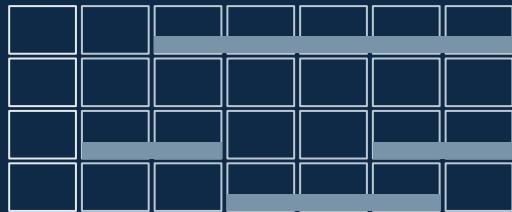
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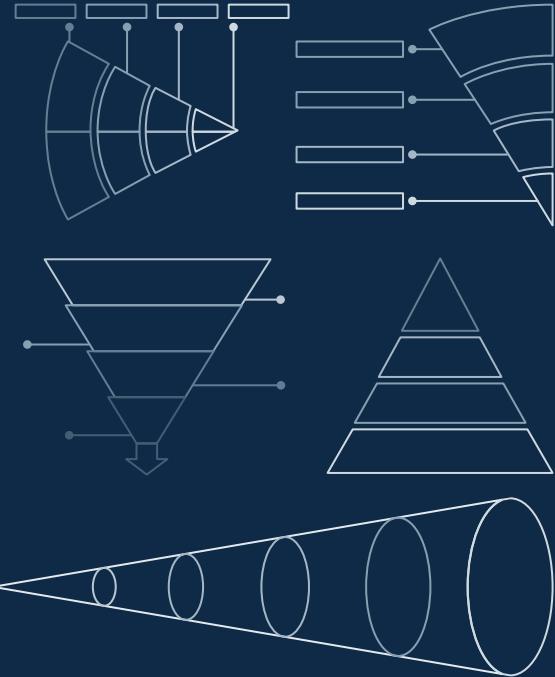
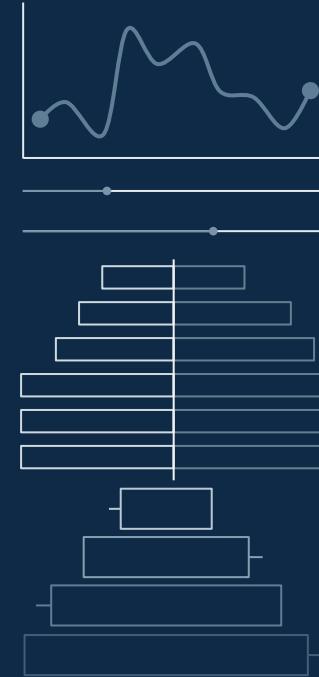
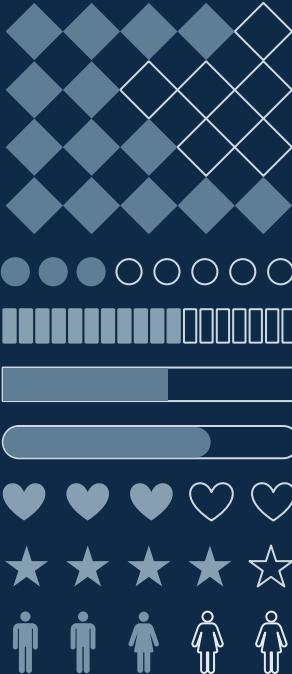
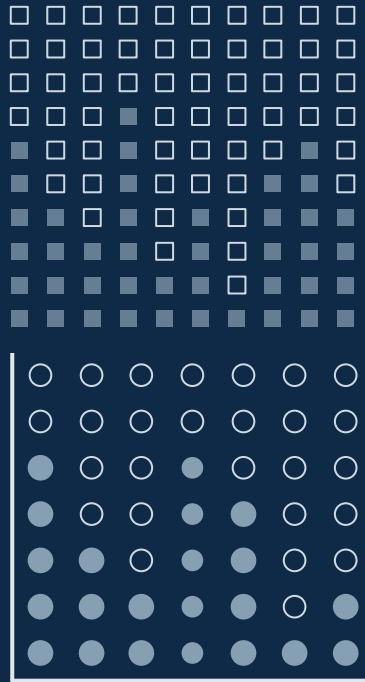












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