Gesture Control

Thomaz Moon

Video Edition to show the start of possibilities

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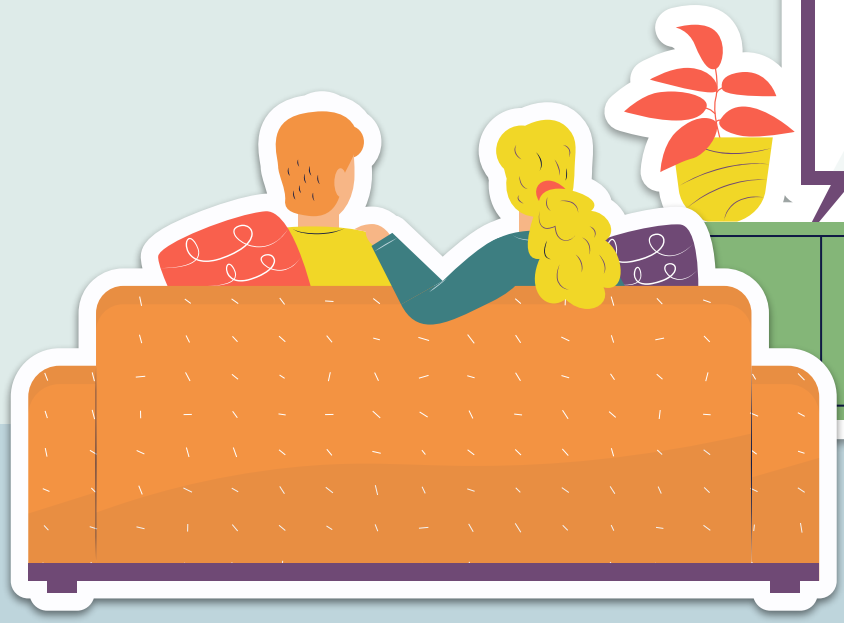
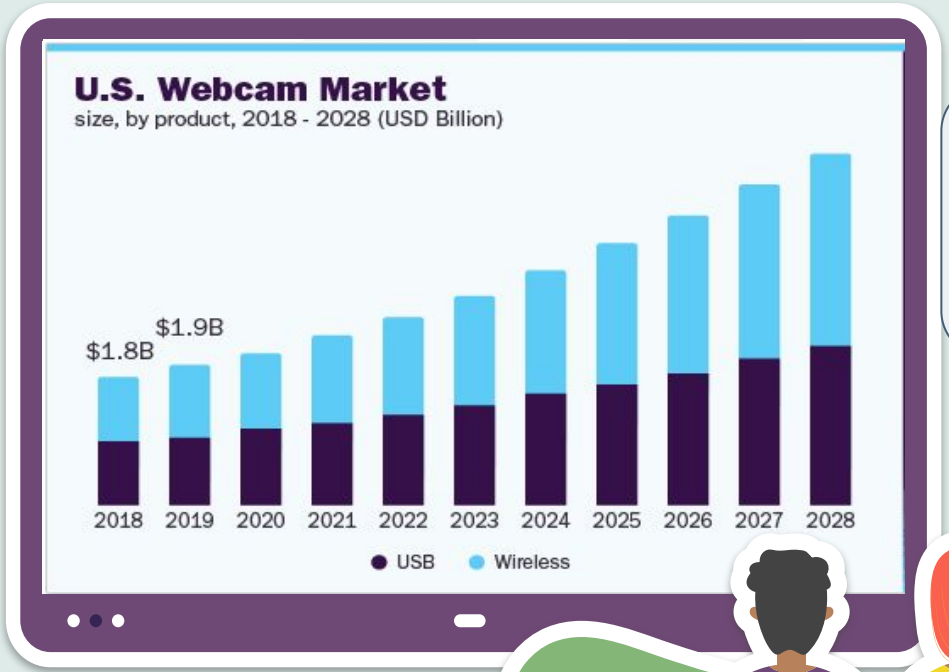
01
INTRODUCTION



This is a hypothetical situation, I do not work for Google

Picture These Scenarios

- Connecting your laptop to a tv with a very short HDMI cable and the couch 10 feet away. You don't have a wireless mouse and someone needs to walk up to the laptop in order to pause the video.
- You want to know what the next direction is on Google Maps but you can’t swipe your phone screen without reaching over in an unsafe manner.
- You're presenting via Google Slides but don't have a remote clicker to help you transition to new slides or go back. Or just want to have both hands free for dramatic effects and gestures



Because of the pandemic, there has been a rise in webcam use for work and school. Demands and usage are expected to grow even more in the future!

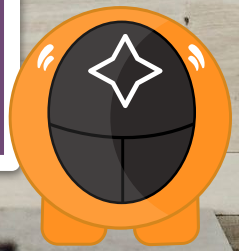
Noticing this trend, I decided to use my 20% time to think of ways to capitalize on this.

For this first project, I will simply focus on video aspect to prototype the idea.

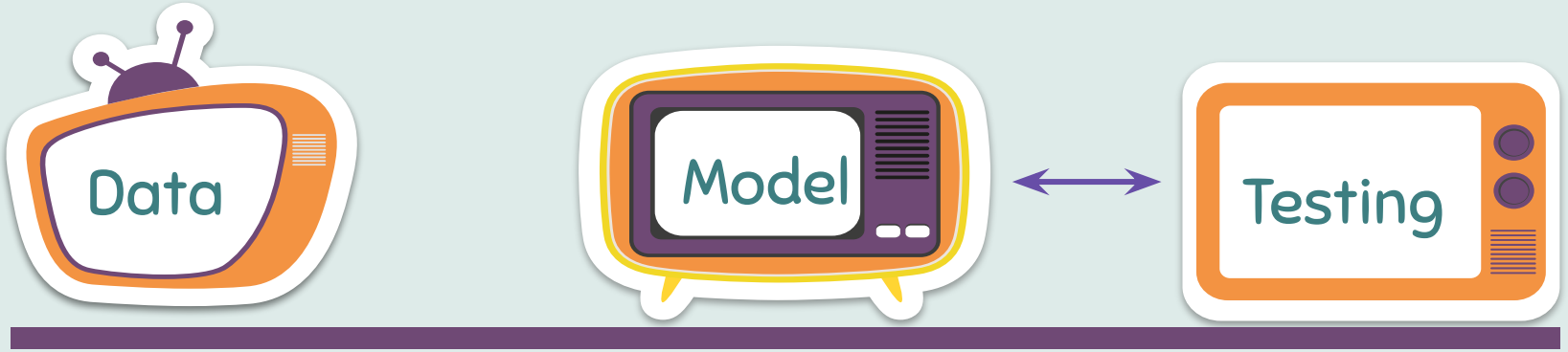
Google Developers

Problem Statement

Create a new feature utilizing webcams that Google could implement into their many services they already offer.



The Process

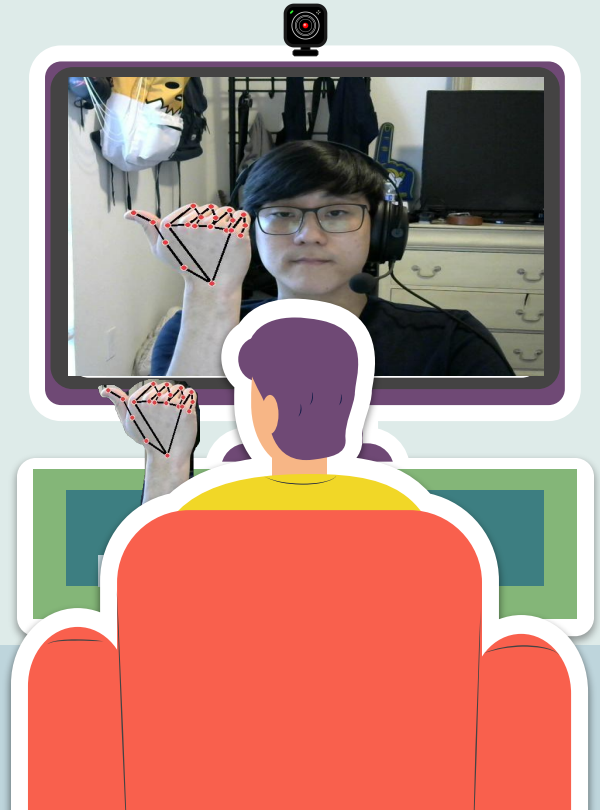


Collecting Data

Building a Model

Testing The Model

Collecting the Data (Notebook 01)



- Took ~150 images for each of the 6 poses for testing.
- Additional 2 - 3 pictures per pose for validation.
- Separate each image into its respective class' folder.
- Go through every picture to make sure the MediaPipe hand model was drawn correct.

02 (notebook 02)

“Making” the model

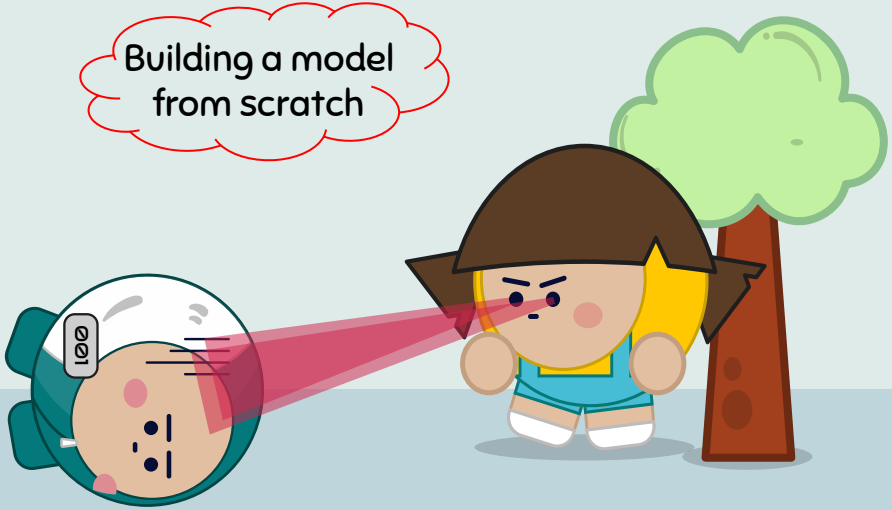
Modeling Process

using Colab Pro

Although at first I tried to build my own model, I ultimately ended up using a pretrained model offered by Google's tensorflow.keras.

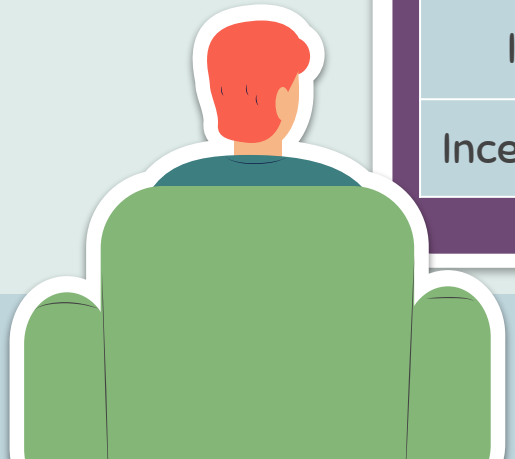
Pretrained Model

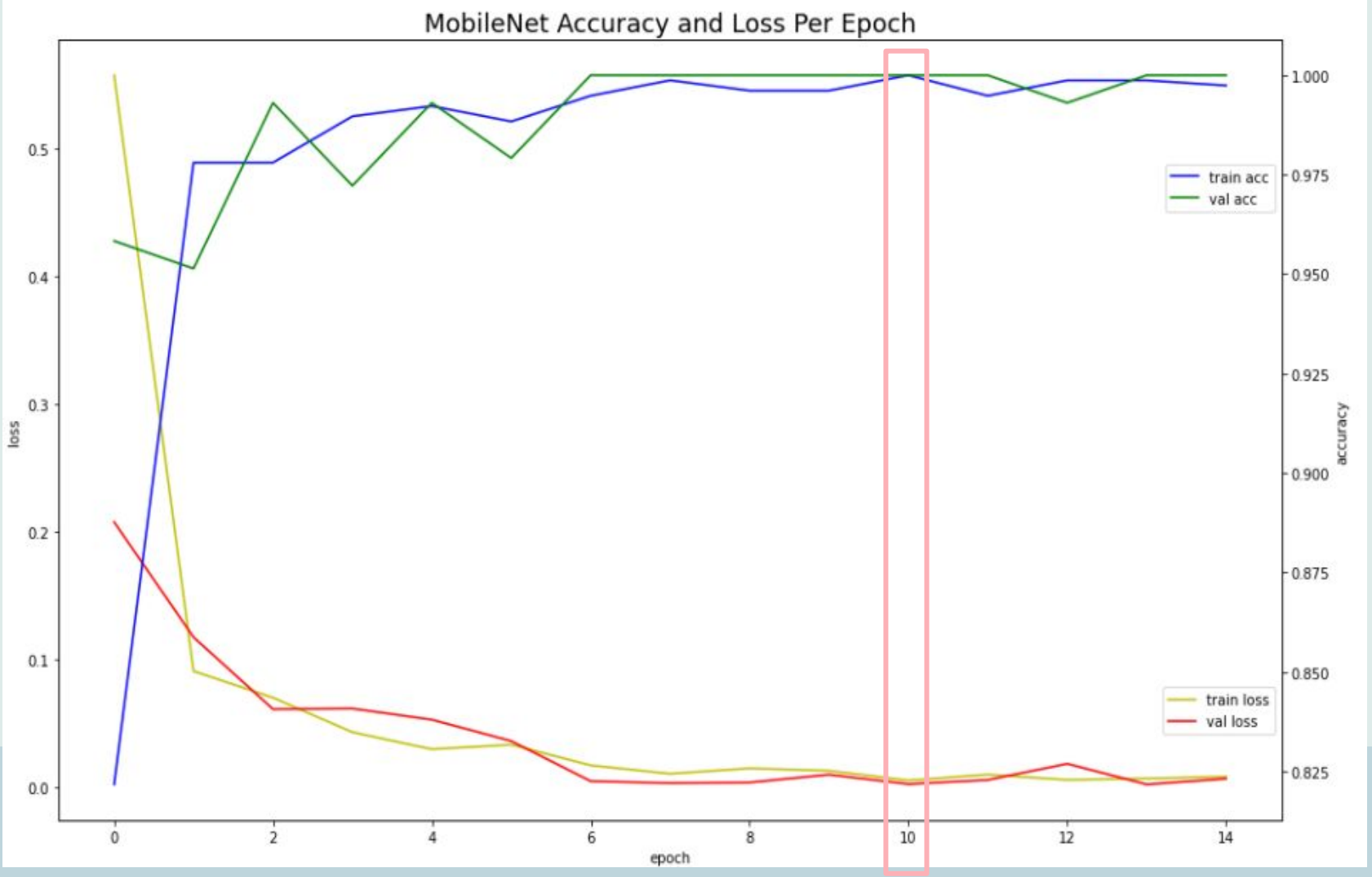
Building a model from scratch



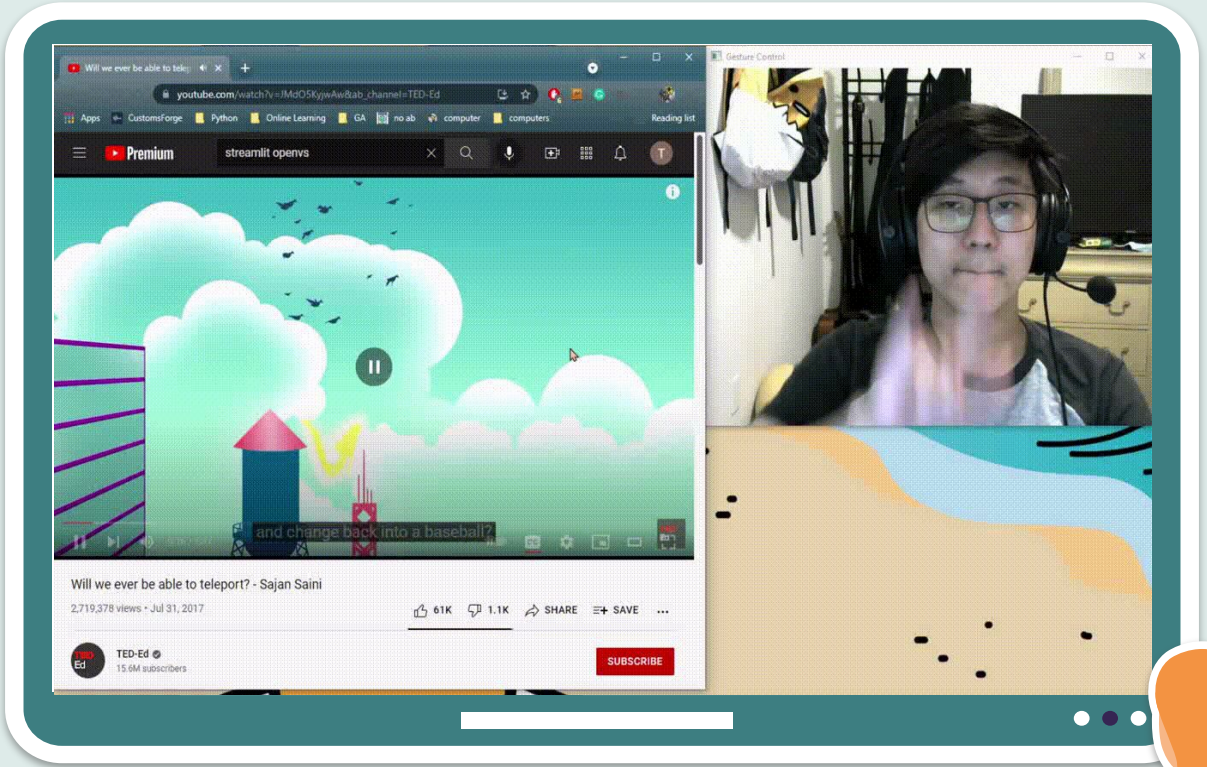
Pre-Trained Model Comparisons

Model	Size	Avg Speed	Accuracy
MobileNet	37.2 MB	0.067 seconds	100%
MobileNetV2	26.3 MB	0.057 seconds	80%
InceptionV3	623.9 MB	1.02 seconds	100%
InceptionResNetv2	623.9 MB	0.82 seconds	100%



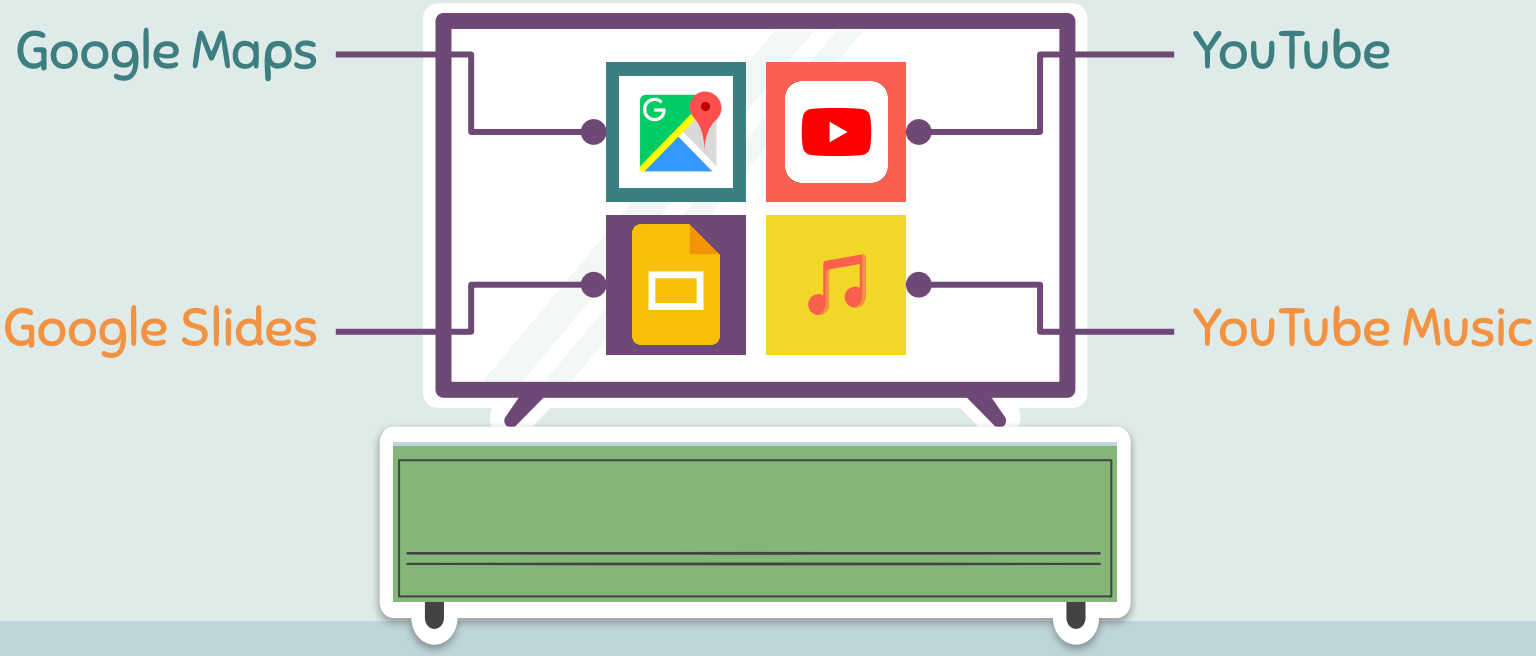

MobileNet Accuracy and Loss Per Epoch
loss
accuracy
epoch
train acc
val acc
train loss
val loss
0.0
0.1
0.2
0.3
0.4
0.5
0.825
0.850
0.875
0.900
0.925
0.950
0.975
1.000
0
2
4
6
8
10
12
14

03 (notebook 03) Final Result



04 Future Plans

Services that can implement the idea quickly



Further Down the Line

Sell a webcam that can be connected to a TV or other smart devices to be gesture controlled.

- Can add custom gestures with quick calibration
- Lose your TV remote? Not a problem
- Connect to your computer and Feel like Tony Stark

$166.354
BILLION

Big random number to make it seem like
this is an idea worth investing in

Thanks for making this a fun class Everyone!

"What feels like the end is often the beginning." – Unknown

RESOURCES

Special Thanks: Noah Christiansen

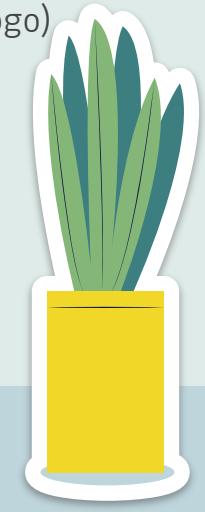
Slideshow images:

- Siblings looking at the television
- People watching the news
- People watching the news

* Most of the clipart looking images came in the template found on slidego.com.
* Also took some art from the “Calamari Game” template from slidego found here.

Added Images

- Webcam chart
- Google Developer logo
- Squidward Fuuuutuure
- Honey Webcam (I added the google logo)
- Iron Man Gesture Control
- Iron Man Augmented Reality
- Grad picture



THANK YOU!

Do you have any questions?

youremail@freepik.com
+91 620 421 838
yourcompany.com

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