# INTERACT-NET: AN INTERACTIVE INTERFACE FOR MULTIMEDIA MACHINE LEARNING


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# INTERACT-NET: AGENDA

1. INTRODUCTION
2. REQUISITES
3. TOOLS
4. RELATED WORK
5. USE CASES
6. EXPERIMENTS
7. CONCLUSION

# INTERACT-NET: SCHEDULE

9:00 – 10:00 INTRODUCTION + REQUISITES + TOOLS

10:00 – 10:30 PLAYGROUND I

10:30 – 11:00 Break

11:00 – 12:00 RELATED WORK + USE CASES + EXPERIMENTS

12:00 – 12:30 PLAYGROUND II

# INTERACT-NET: MAIN IDEA

INTERACT-NET is a study of interactive man-machine interfaces for use in pipelines of multimedia using machine learning, image processing, and computer graphics.

- Main idea: build an interactive framework that's useful to Visgraf's projects.

- Requisites: INTERACTIVITY, WEB (SERVERLESS), 2D/3D, MOBILE, FAST OPEN-SOURCE

1) Tools (web interfaces, JavaScript language, and libraries) available to interact with the images in a machine-learning pipeline;

2) Related work with interactive techniques: modification of images (e.g., clicks, scribble, or area of interest selection, for 2D and 3D) either to guide generative machine learning or to correct stages of this learning;

3) Use cases related to face morphing, one of Visgraf's projects selected to add interaction.

# INTERACT-NET: TOOLS Web Interfaces

1) Tools (web interfaces, JavaScript language, and libraries) available to interact with images in a machine-learning pipeline;

a. Gradio
b. Flutter
c. Dash
d. Streamlit
e. Django
f. Taipy

# INTERACT-NET: TOOLS JavaScript

1) Tools (web interfaces, JavaScript language, and libraries) available to interact with images in a machine-learning pipeline;

- JavaScript for 2D/3D Graphics
- JavaScript for Machine Learning and Computer Vision

# INTERACT-NET: TOOLS JavaScript

- JavaScript for 2D/3D Graphics
  a. React
  b. Next.js
  c. Three.js
  d. D3.js
  e. P5.js
  f. Luma AI's Three.js and R3F Gaussian Splatting Library
  g. Luma AI's  WebGL Library
  h. React Three Fiber
  i. Vue
  j. Svelte
  k. AngularJS
  l. Node.js
  m. Babylon.js
  n. Playcanvas

# INTERACT-NET: TOOLS JavaScript

- JavaScript for Machine Learning and Computer Vision
  a. TensorFlow.js
  b. Transformers.js
  c. ml5.js
  d. Keras.js
  e. OpenCV.js
  f. Synaptic.js
  g. ConvNet.js
  h. Neuro.js
  i. Brain.js
  j. Face-api.js
  k. Tracking.js
  l. clmtrackr

# INTERACT-NET: Libraries

1) Tools (web interfaces, JavaScript language, and libraries) available to interact with images in a machine-learning pipeline;

a. DLIB
b. Mediapipe
c. Tkinter
d. PyQt
e. WebGL
f. WebGPU Example
g. WebXR
h. Open3D

# INTERACT-NET: Exercises (PART 1)

1) Gradio Playground
2) Babylon.js
3) face-api.js
4) Remove Background WebGPU

# INTERACT-NET: Interval (30 minutes)

LET’S TAKE A BREAK!

BE BACK IN THIRTY MINUTES! OK?

# INTERACT-NET: RELATED WORK

2) Related work with interactive techniques: modification of images (e.g., clicks, scribble, or area of interest selection, for 2D and 3D) either to guide generative machine learning or to correct stages of this learning;

a. DragDiffusion
b. FreeDrag
c. Drag Your GAN Example
d. RITM
e. SAM SAM2
f. EditGan
g. UserControllableILT

# INTERACT-NET: RELATED WORK

h. ControlNet

i. SERF

j. SEAL-3D

k. Observable Notebooks

- Interactively Assessing Disentanglement in GANs
- Machine Learning in The Browser
- Drawings to Human
- Visualization in Deep Learning
- Background Position Scrubber
- Peering Inside the Black Box

# INTERACT-NET: USE CASES

3) Use cases related to face morphing, one of Visgraf's projects selected to add interaction.

a. Neural Implicit Morphing of Face Images
b. Face and Landmark Detection using face-api.js
c. Real Time AI Face Landmark Detection in 20 Minutes with Tensorflow.JS
d. Real-time 3D face mesh point cloud with Three.JS, Tensorflow.js and Typescript
e. Interactive decals using three.js
f. Click and drag to control animation

# INTERACT-NET: USE CASES

g. 56 Three JS Examples - Collection of three.js
h. AI Assistant | Three.js interactive sphere
i. MediaPipe video tutorial - Extracting Face Mesh
j. Facial Landmark Detection using OpenCV
k. Facial Landmark Detection Simplified with OpenCV and MediaPipe
l. The Top 7 Use Cases for Facial Landmark Detection

# INTERACT-NET: USE CASES

m. Virtual Reality for anatomical landmark annotation in geometric morphometrics

n. Landmark Editor Program

o. Interactive Data Editor

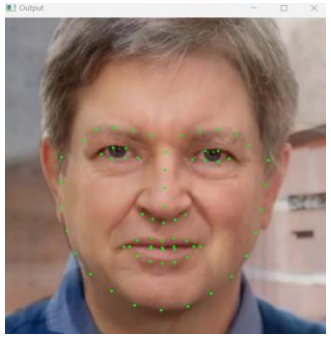
p. Simulated interactive Neural Implicit Morphing of Face Images using Gradio and hosted by HuggingFace

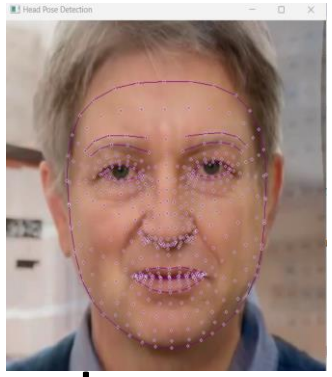
q. 68 landmarks are efficient for 3D face alignment: what about more?

# INTERACT-NET: EXPERIMENTS

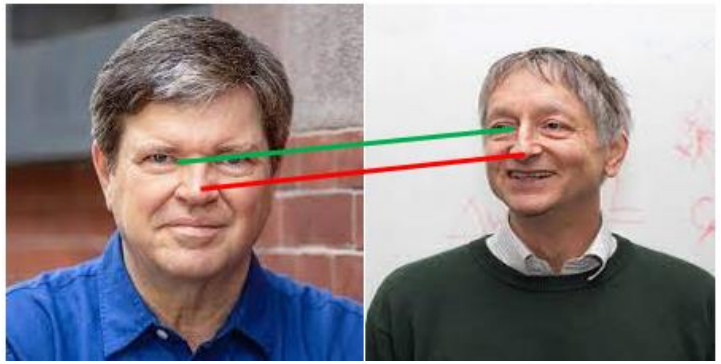
- Face Morphing

- Face LandMarks Detection and Visualization




- Face LandMarks Correspondence and Editing (Interaction)



# INTERACT-NET: Exercises (PART 2)

1) SAM SAM2
2) Drag Your GAN Example
3) 56 Three JS Examples (freefrontend.com)
4) Drawings to Human
5) Background Position Scrubber

# INTERACT-NET: CONCLUSIONS

- We showed here our objective of studying interactivity applied to Visgraf projects. But the ideas behind this study can be generalized to a larger scope.

- We established some requisites, presented some tools, related work, use cases and experiments.

- Besides Face Morphing we intend to apply INTERACT-NET in generative artificial intelligence and 2D and 3D reconstruction using Gaussian Splatting.

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THANK YOU ALL FOR WATCHING THIS TUTORIAL AT SIBGRAPI 2024!

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