

Mi(ha)nd Map

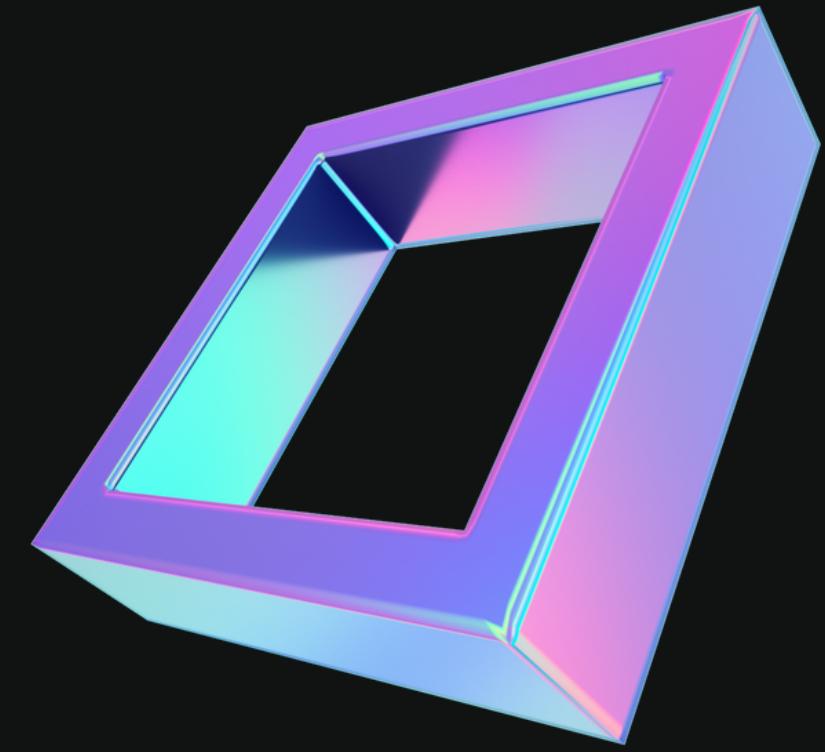
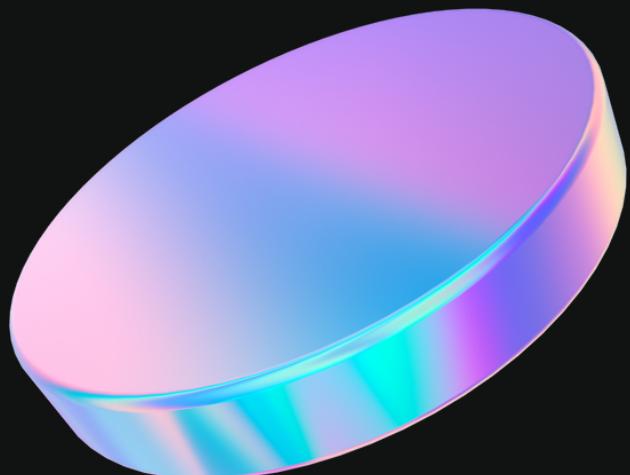
1916945 ARAGONA DARIO
1875387 MAUTONE LUIS
1895419 PODO LUCA

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Goal

The purpose of Mi(ha)nd Map is to allow the user to create a concept map by exploiting multimodal interactions: speech interaction, gesture interaction

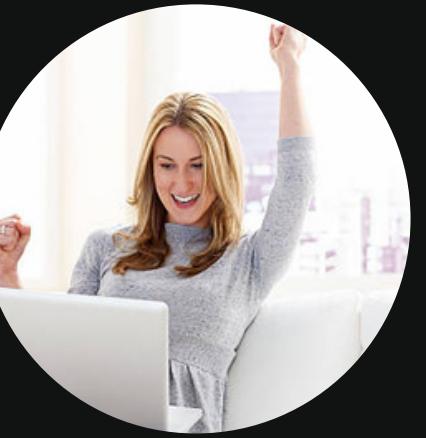


SYSTEM REQUIREMENTS



NO ADDITIONAL SENSORS

No need to add other sensors beyond computer ones (webcam and microphone)



EASY TO USE

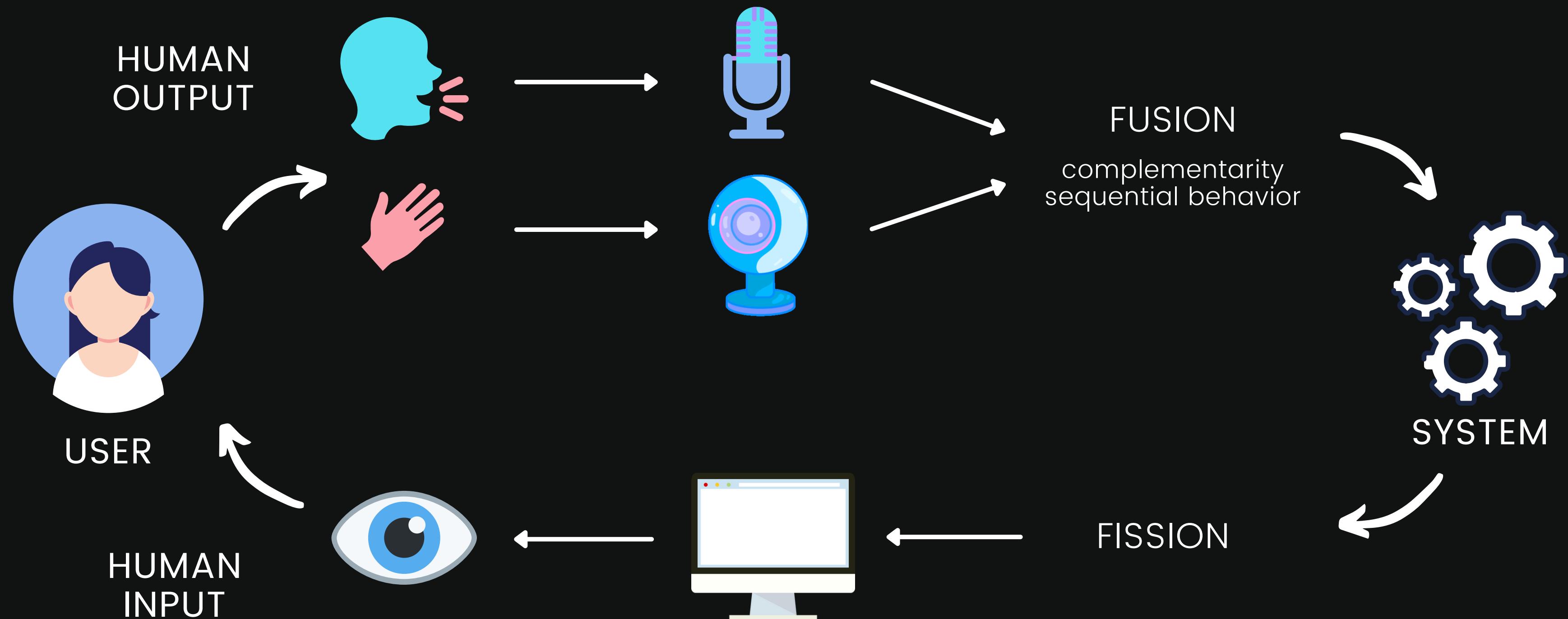
Intuitive interaction
No need for user training



PORTABILITY

Using the browser to improve portability over all platforms

System architecture



Technology used



The word "used" is followed by three technology icons: a yellow square with "JS" in black, a red square with "HTML5" in white, and a blue square with "CSS3" in white.

SPEECH RECOGNITION
speech-to-text.js

GESTURE RECOGNITION
handtrack.js

CANVAS SUPERVISOR
fabric.js

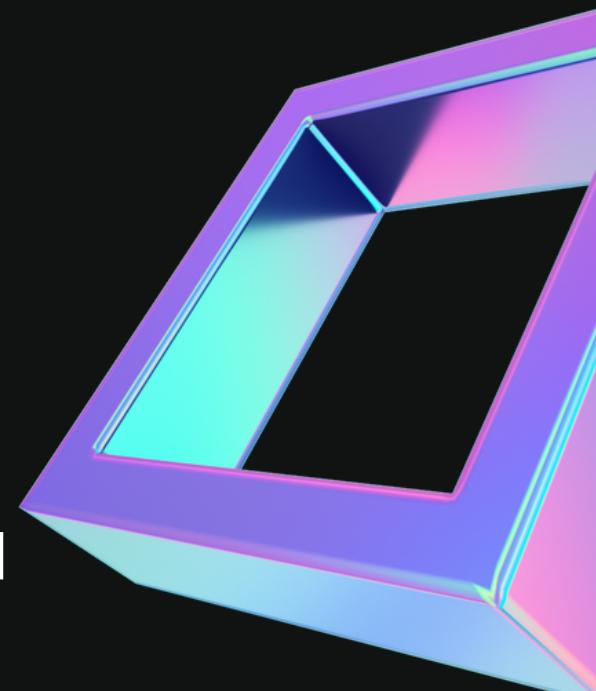


handtrack.js

Handtrack.js is a library for prototyping realtime hand detection. It frames handtracking as an object detection problem, using a trained convolutional neural network.

Recognized positions:

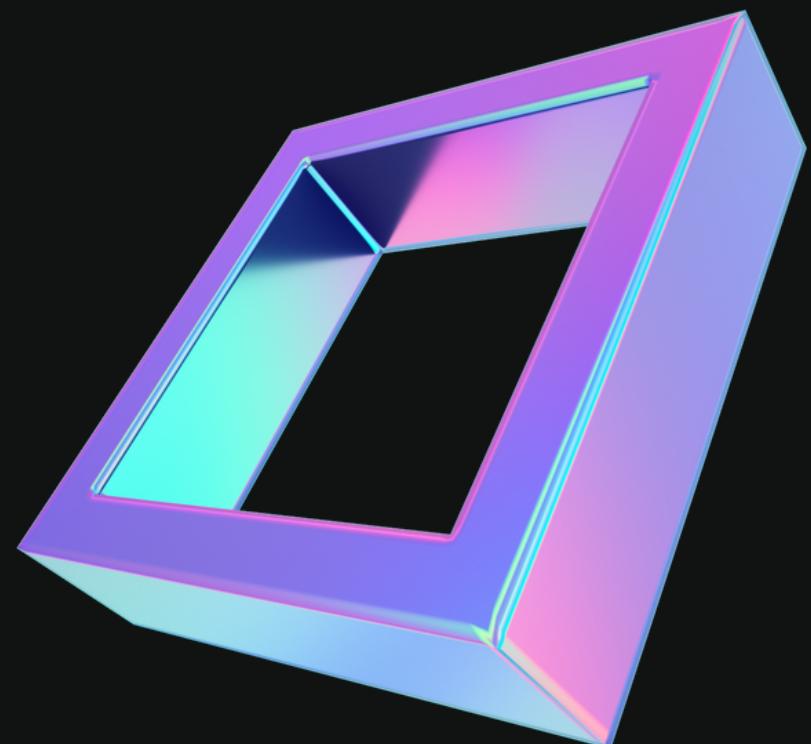
- Open
- Closed
- Pinch
- Point
- Face

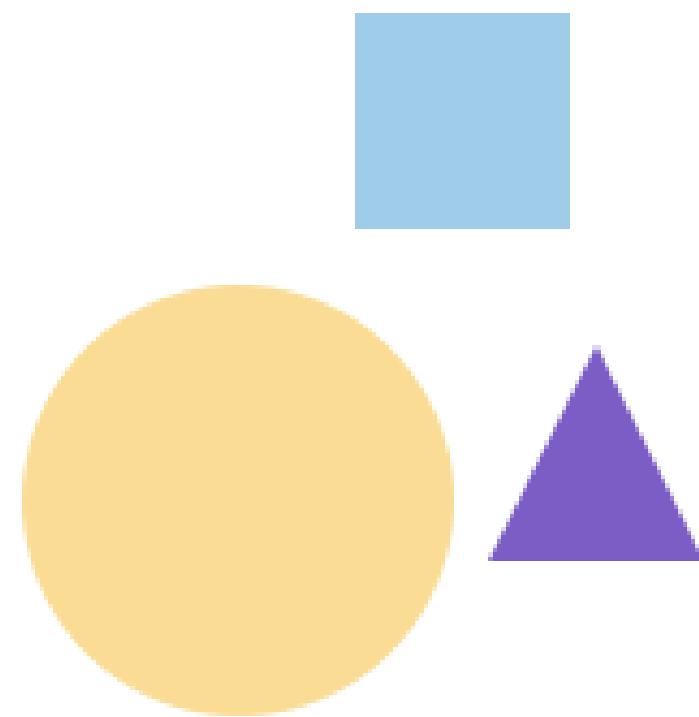
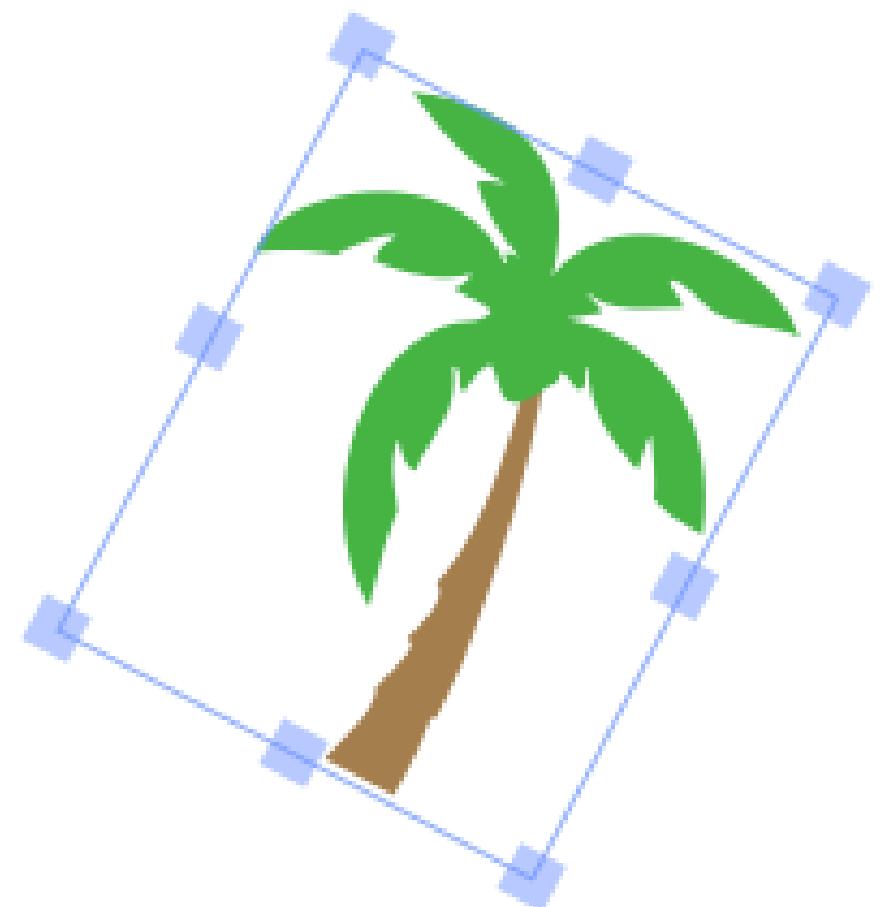




speech-to-text.js

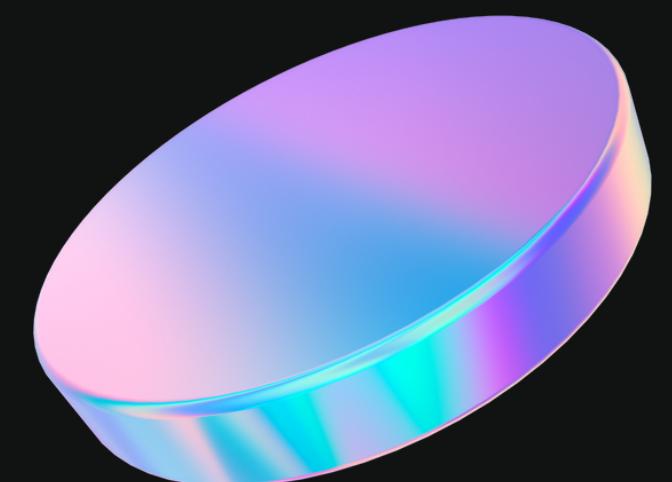
Web Speech API makes web apps able to handle voice data. Speech recognition is accessed via the SpeechRecognition interface, which provides the ability to recognize voice context from an audio input.





fabric.js

Fabric.js is a framework that makes it easy to work with HTML5 canvas element. It is an interactive object model on top of canvas element



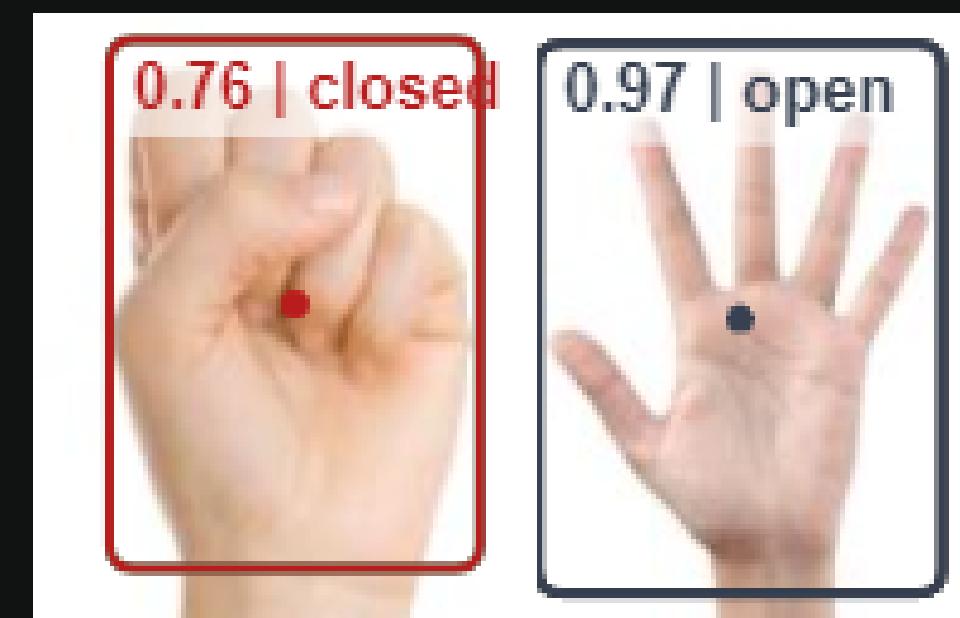
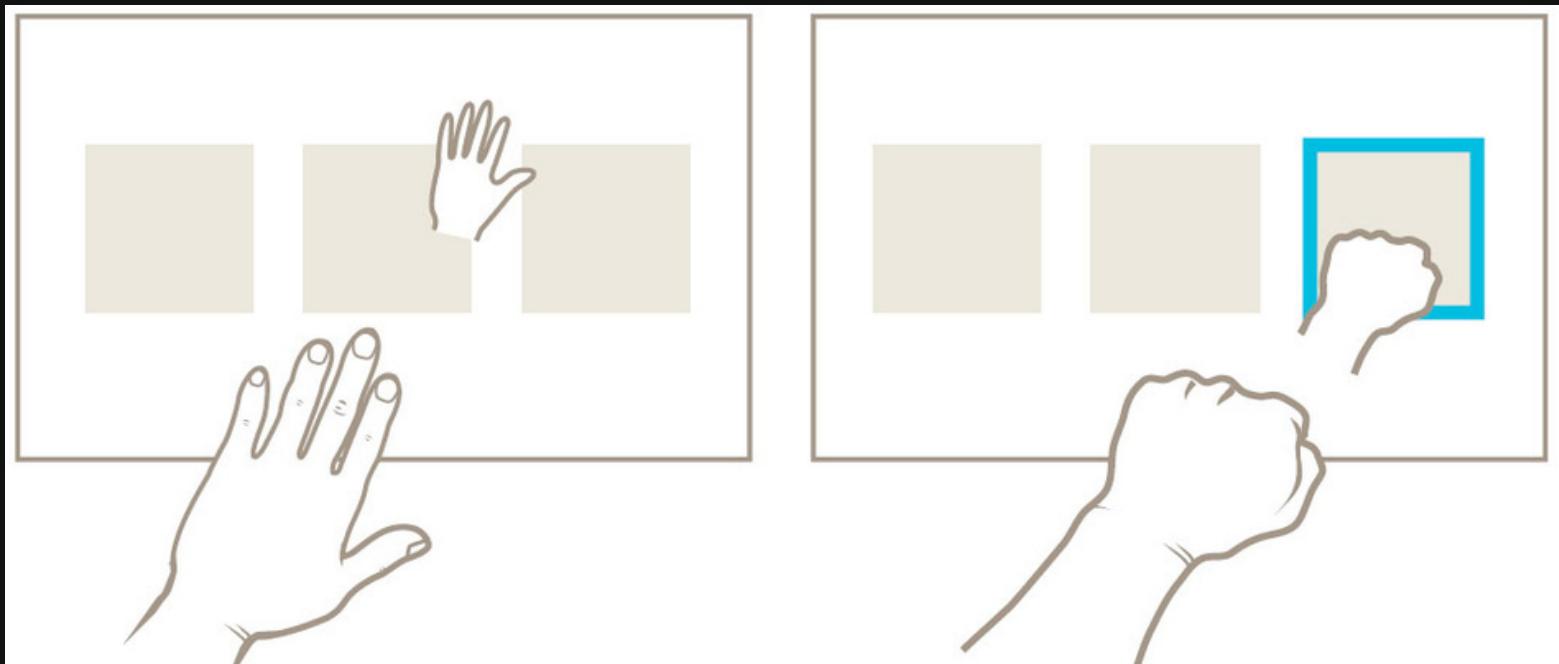
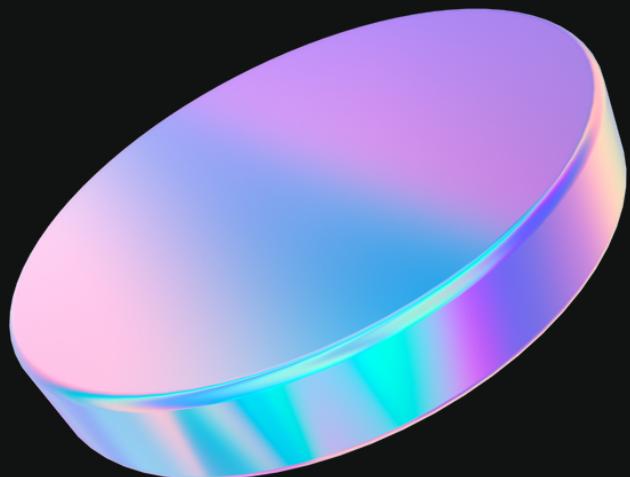
Gesture interaction

Gesture styles:

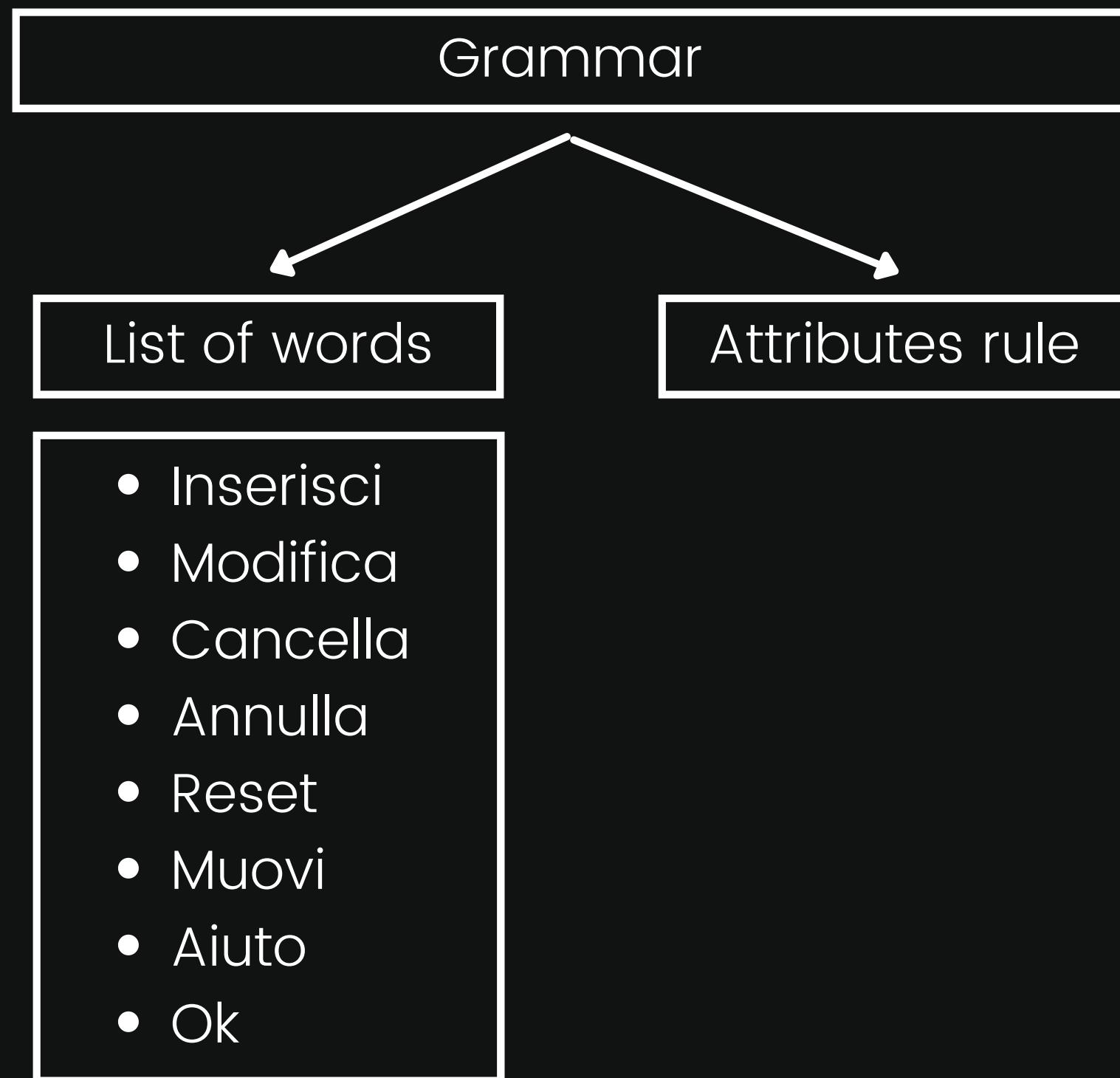
- deictic
- manipulation
- semaphoric

Enabling technologies:

- perceptual - computer vision



Speech interaction



System property:

- speaker independent
- discontinuous
- read from prepared scripts
- trigger words
- custom grammar

Speech interaction

Attributes rule →

The rule is defined as:

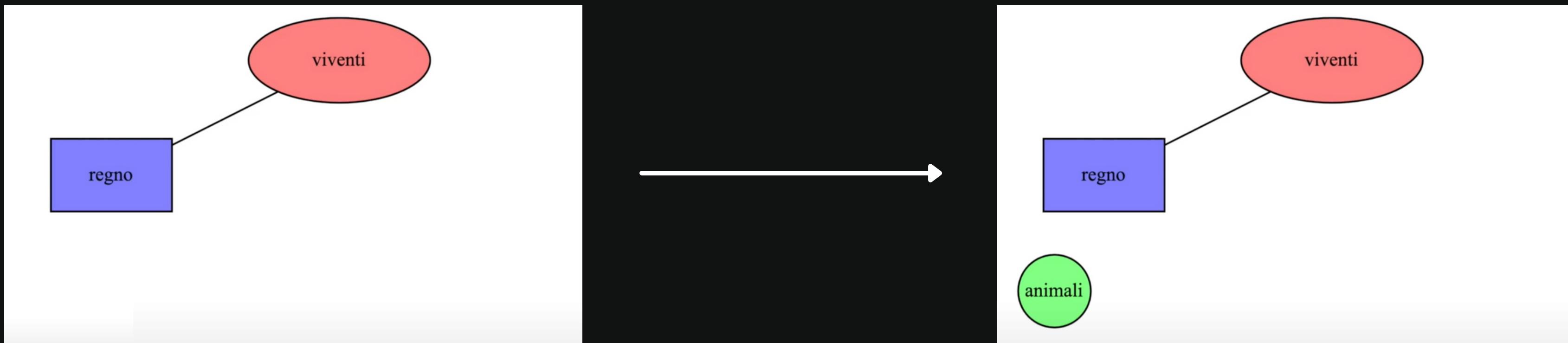
```
{ 'colore': 'rosso' | 'verde' | 'blu' | 'giallo',  
  'forma': 'rettangolo' | 'cerchio' | 'ovale',  
  'testo': spoken utterance }
```

The rules characteristics:

- no order required
- not all the attributes have to be specified, at least one

Speech interaction

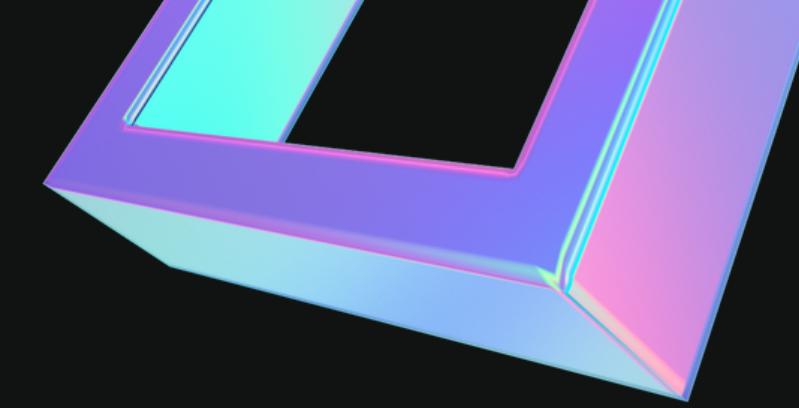
User says 'Inserisci' → The system waits for the attributes → User says:
"Colore: verde,
testo: animali,
forma: cerchio"



List of actions

Methods	Expression
Inserisci elemento Goal: L'utente desidera creare un nuovo elemento ed inserirlo all'interno del foglio di lavoro	pronuncia 'OK' + pronuncia ' <i>Inserisci</i> ' + pronuncia attributi e valori
Modifica elemento Goal: L'utente desidera modificare le proprietà di un elemento già esistente (forma, colore, testo)	pronuncia 'OK' + pronuncia ' <i>Modifica</i> ' + sposta puntatore con mano aperta + seleziona elemento con mano chiusa + pronuncia attributi e valori





List of actions

Methods	Expression
Muovi elemento Goal: L'utente desidera modificare la posizione di un elemento già esistente	pronuncia 'OK' + pronuncia 'Muovi' + sposta puntatore con mano aperta + seleziona elemento con mano chiusa + trascina elemento con mano chiusa + conferma posizione con mano aperta
Collega due elementi Goal: L'utente desidera creare un collegamento tra due elementi	pronuncia 'OK' + pronuncia 'Collega' + sposta puntatore con mano aperta + seleziona primo elemento con mano chiusa + sposta puntatore con mano aperta + seleziona secondo elemento con mano chiusa
Cancella elemento Goal: L'utente desidera eliminare un elemento già	pronuncia 'OK' + pronuncia 'Cancella' + sposta puntatore con mano aperta + seleziona elemento con mano chiusa

List of actions

Methods	Expression
Annulla operazione Goal: L'utente desidera annullare l'ultima operazione eseguita	pronuncia 'Annulla'



UI and UX

The image displays a composite interface. On the left, there is a video feed window showing a person's face with two blue bounding boxes labeled "0.89 | Guida" and "0.96 | open". Below the video feed is a "Lista azioni" (List of actions) menu with the following items:

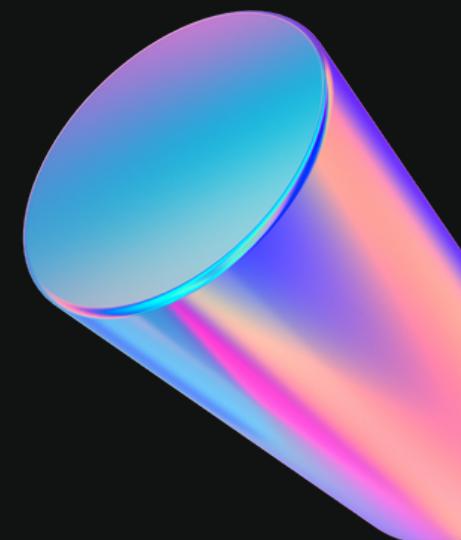
- Inserisci
- Modifica
- Cancella
- Annulla
- Sposta
- Collega
- Reset
- Aiuto

Below the menu is a "Struttura attributi:" (Attribute structure) section with the text "Forma *, Colore *, Testo *".

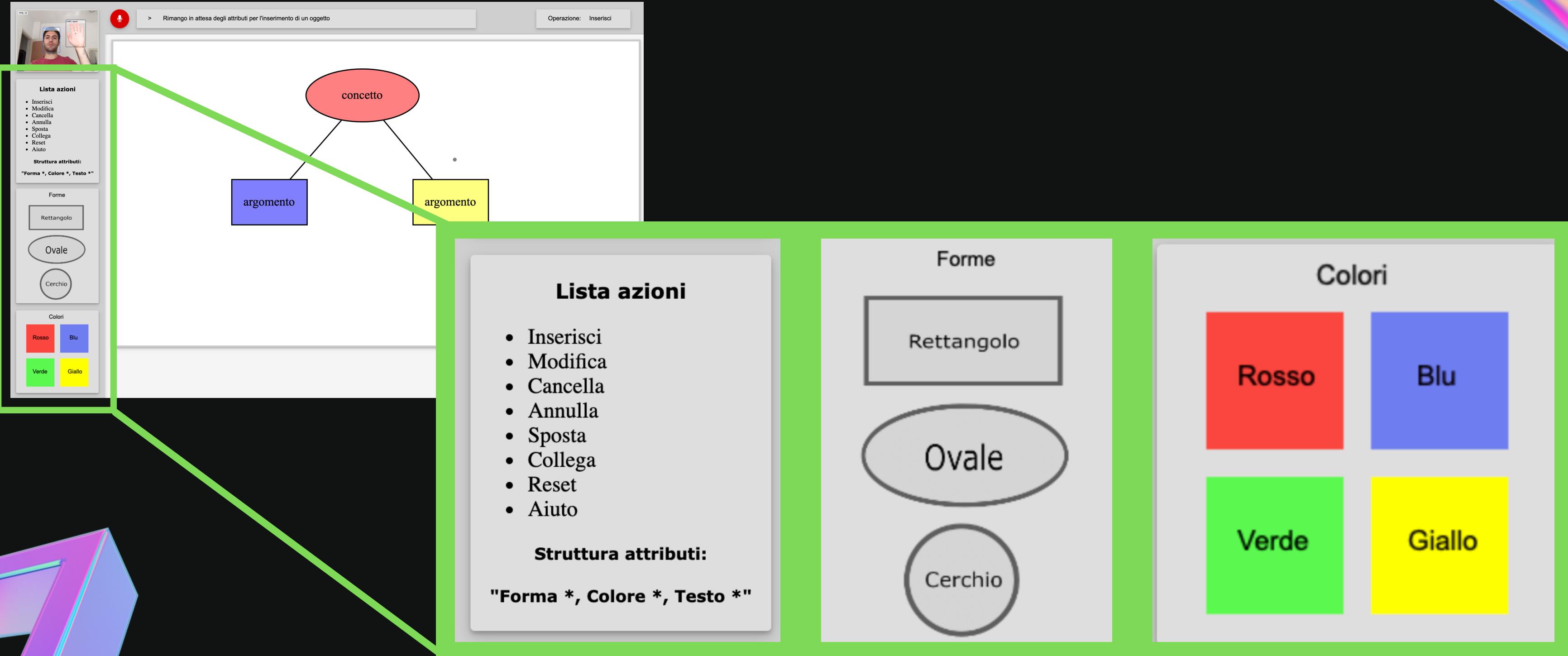
On the left side, there are three sections: "Forme" (Shapes) with "Rettangolo" (Rectangle), "Ovale" (Oval), and "Cerchio" (Circle); "Colori" (Colors) with "Rosso" (Red), "Blu" (Blue), "Verde" (Green), and "Giallo" (Yellow); and a camera icon with "FPS: 13" and a microphone icon.

The main area of the interface shows a conceptual diagram. At the top, a red oval labeled "concetto" (concept) is connected by lines to two rectangular boxes below it. The left box is blue and labeled "argomento" (topic). The right box is yellow and labeled "argomento".

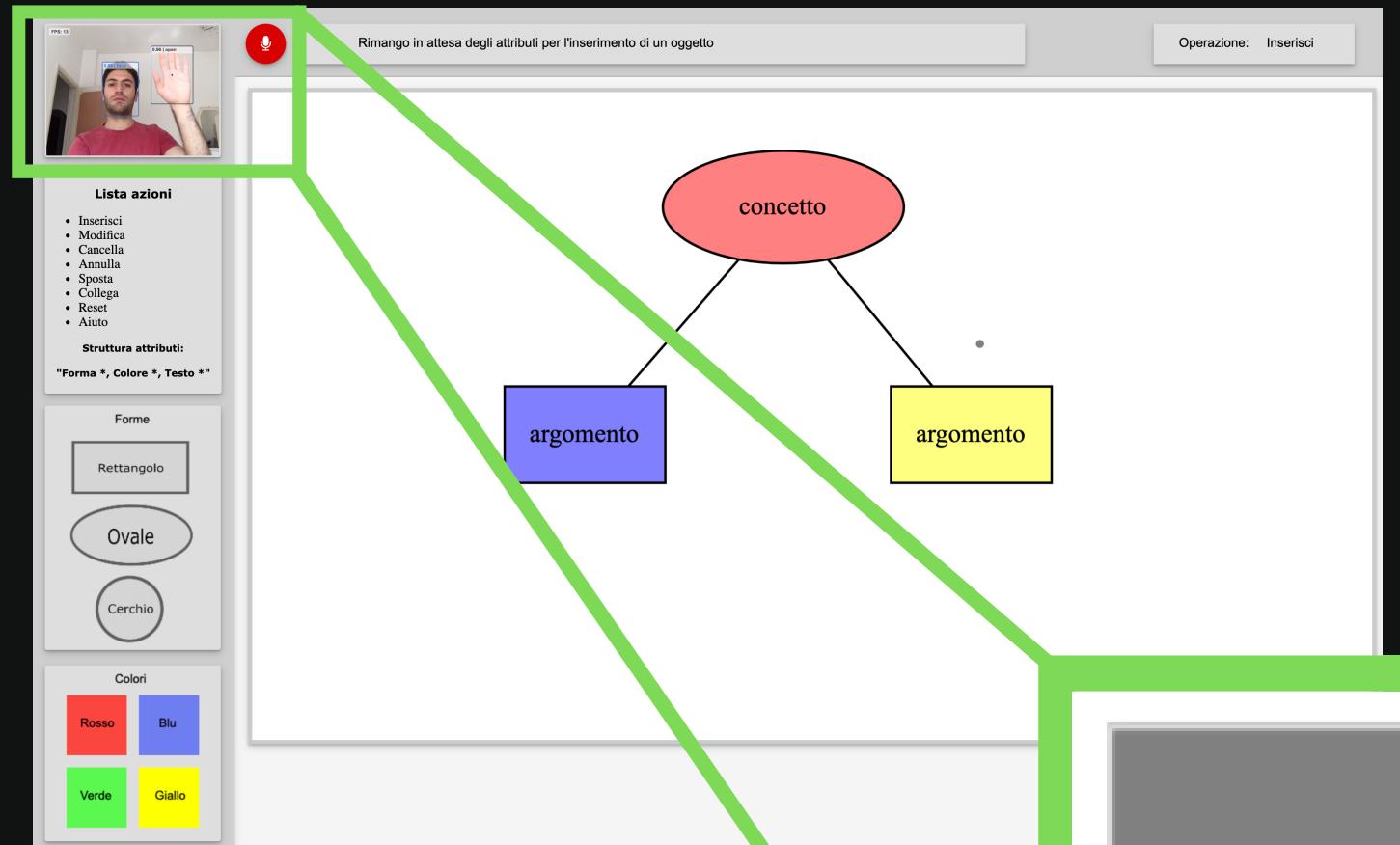
At the top of the main area, there is a status bar with the text "Rimango in attesa degli attributi per l'inserimento di un oggetto" (I remain waiting for the attributes to insert an object) and "Operazione: Inserisci" (Operation: Insert).



UI and UX



UI and UX

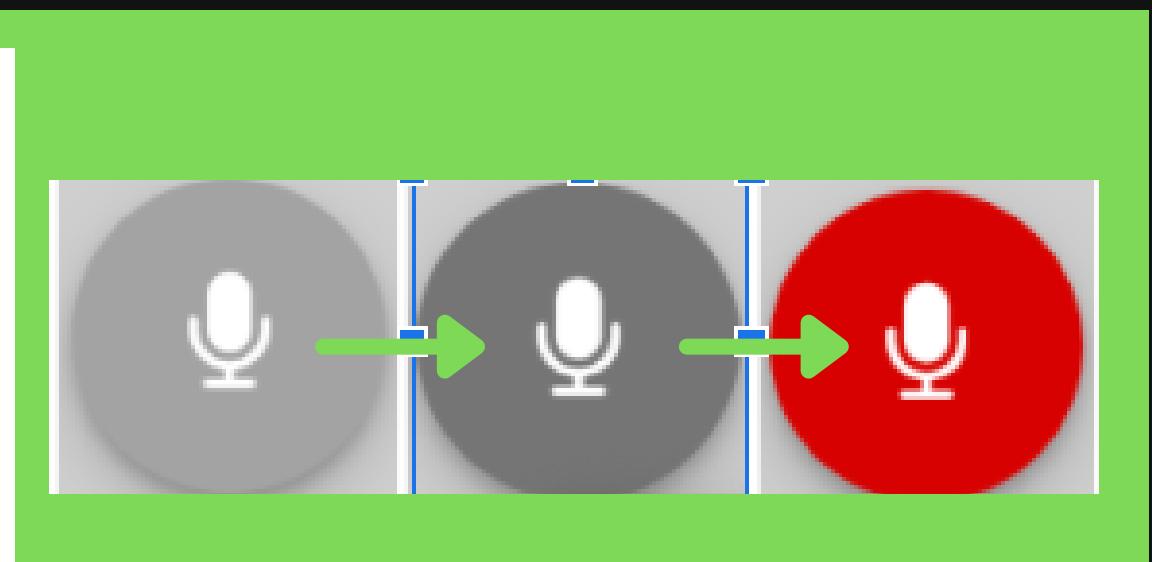
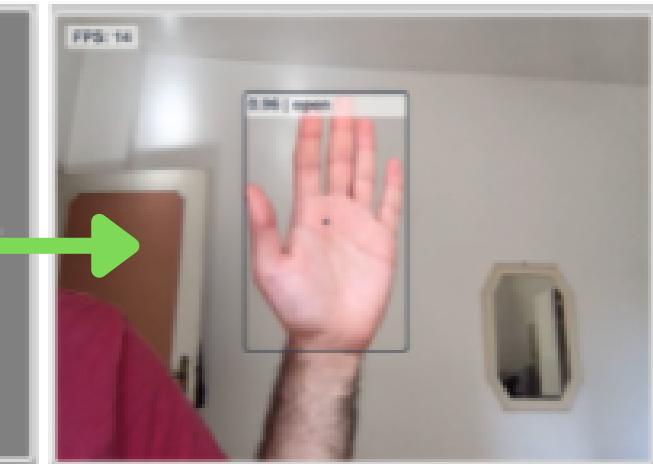


concetto

argomento

argomento

Caricamento Riconoscimento Gesture...



UI and UX

The image displays a composite interface. On the left is a screenshot of a user interface titled "Rimango in attesa degli attributi per l'inserimento di un oggetto". It shows a video feed of a person's hand, a microphone icon, and a list of operations: Inserisci, Modifica, Cancella, Annulla, Spezie, Collega, Reset, Auto. Below this is a "Lista azioni" section with items: Inserisci, Modifica, Cancella, Annulla, Spezie, Collega, Reset, Auto. A "Struttura attributi" section indicates "Forma * , Colore * , Testo *". On the right is a conceptual diagram with a red oval labeled "concetto" connected to two blue rectangles labeled "argomento". A green arrow points from the UI screenshot to a large green box containing the text "Operazione: Inserisci" and "Rimango in attesa degli attributi per l'inserimento di un oggetto".

Operazione: Inserisci

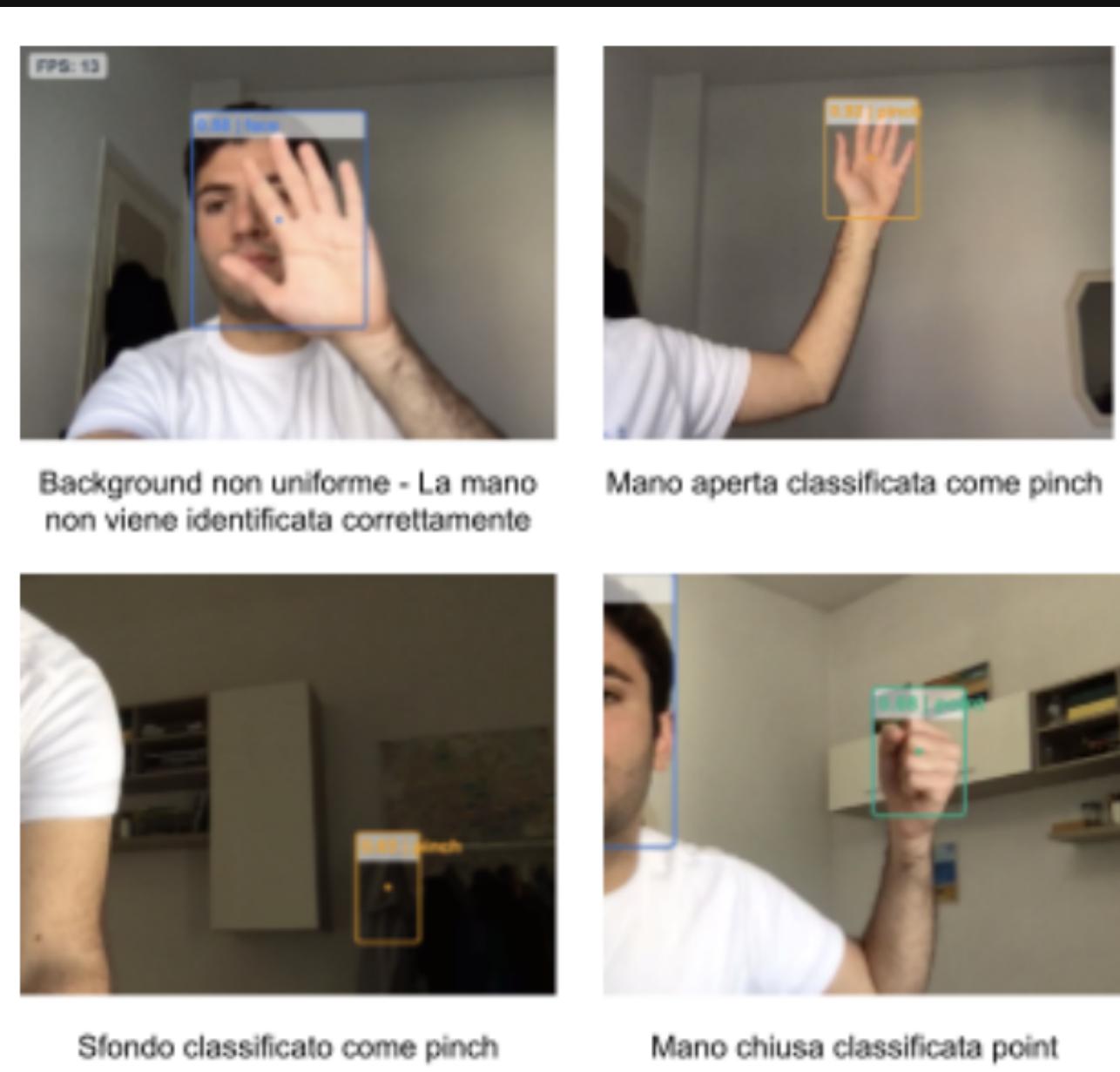
> Rimango in attesa degli attributi per l'inserimento di un oggetto

Limitations and next steps

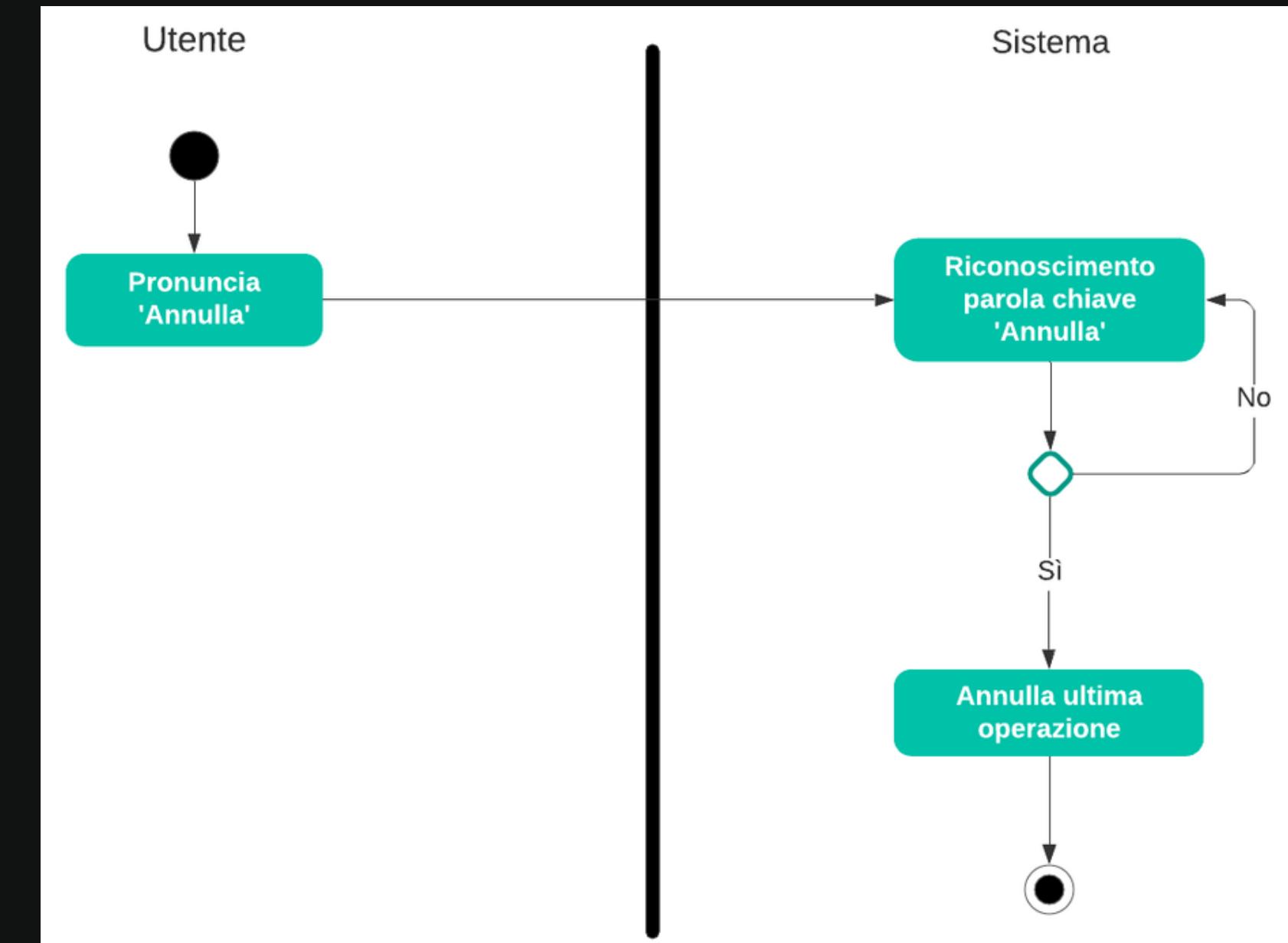


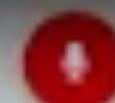
Limitations and next steps

CV issues



Rigid interaction





> Ora puoi spostare con la mano l'oggetto inserito o pronuncia 'OK' per eseguire un'altra operazione

Operazione: Muovi Watch later



Lista azioni

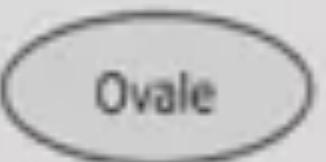
- Inserisci
- Modifica
- Cancella
- Annulla
- Sposta
- Collega
- Reset
- Aiuto

Struttura attributi:

"Forma * , Colore * , Testo **"

Forme

Rettangolo



Ovale



Cerchio

Colori

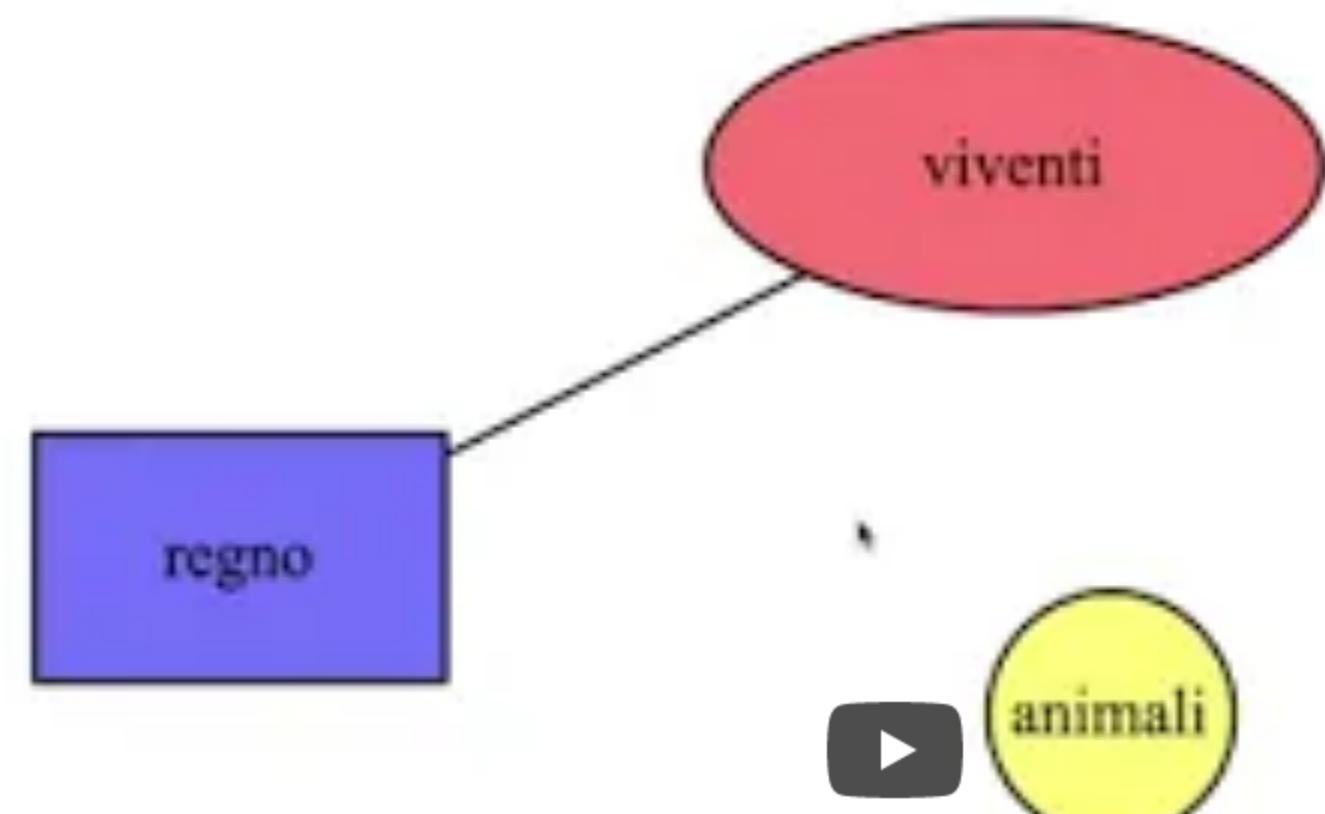


Rosso

Blu

Verde

Giallo



Thanks for your attention