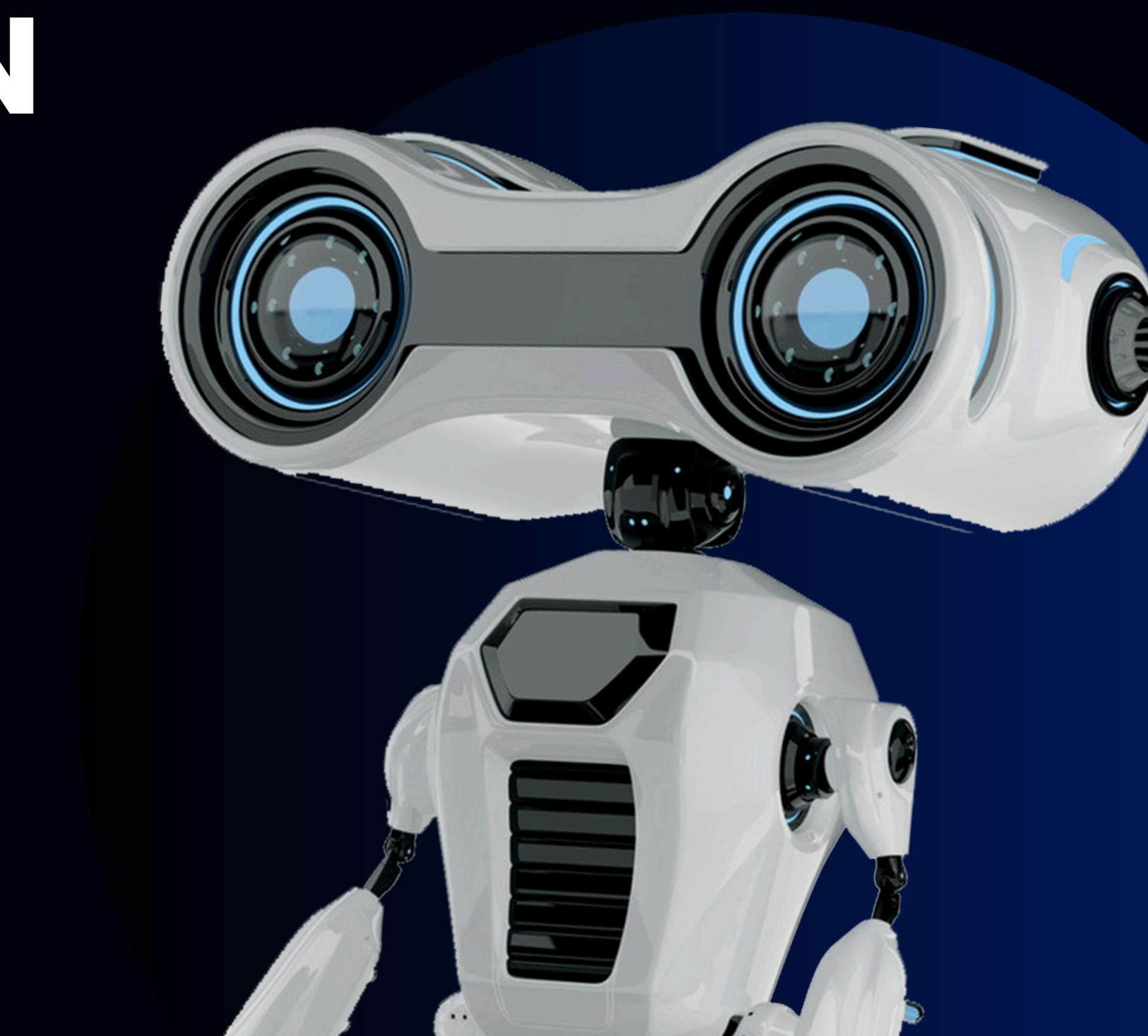


ROBOTIC VISION

For Lip and Body reading-analysis



INTRODUCTION



Robotic vision, also known as machine vision, equips smart systems with the capability to process visual data by combining cameras with intelligent software. This technology enables to perceive, detect, and interpret visual patterns in their environment, allowing them to perform tasks with greater autonomy and precision

Lip and body reading are critical components of robotic vision that enhance any smart system ability to interact with humans and the environment. Lip reading allows to understand spoken words through visual cues, which is particularly useful in noisy environments or for individuals with hearing impairments... Body reading enables to recognize and interpret human gestures and movements.



INDUSTRIES

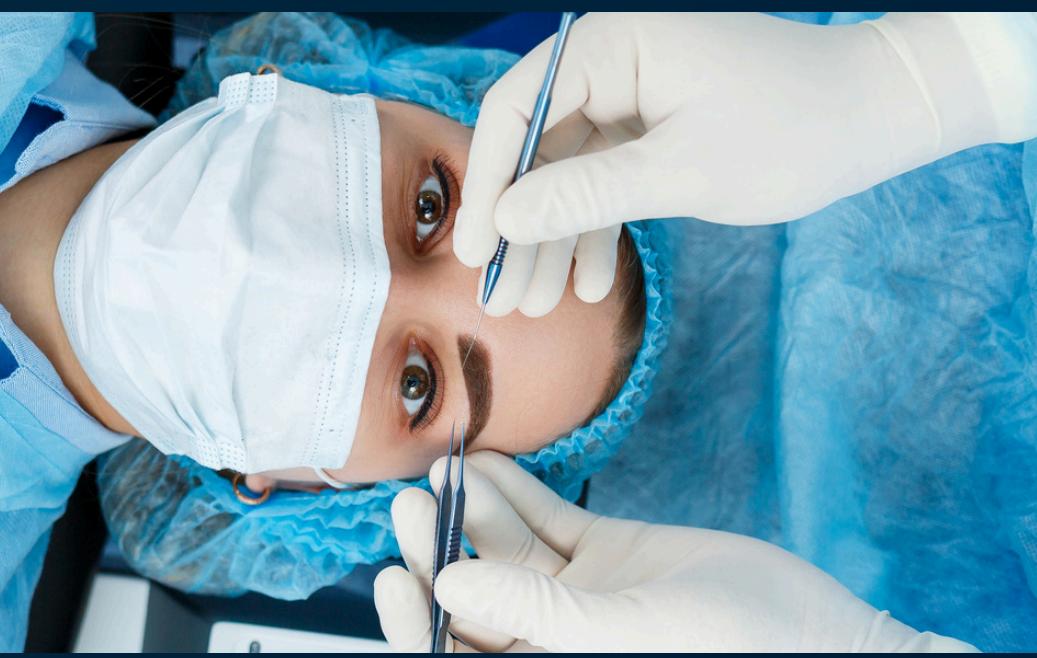


AUTOMOTIVE

EXAMPLES-FIELDS



HOME AUTOMATION



HOSPITALS

INVESTMENTS

The investment in such fields and technologies is robust, with a notable increase in funding for startups and established companies alike. Investments topped \$466 million in April 2024 alone, showcasing the strong financial backing for innovation in this field. The overall market is expected to continue its upward trajectory, with substantial investments driving advancements and adoption of vision technologies.

INDUSTRIES

Automotive :

Automotive Industry: In the automotive sector, machine vision systems are crucial for safety and manufacturing processes. They enable advanced driver assistance systems (ADAS), in-cabin monitoring, and autonomous driving capabilities. The focus is on cost-effective solutions and low-light sensing to improve night vision and pedestrian detection. The market for automotive vision systems is expected to grow, with investments in smart technologies enhancing the driving experience.



INDUSTRIES

HOME AUTOMATION :

Machine vision in home automation is transforming the way we interact with our living spaces. Smart home devices utilize vision technology for security, energy management, and convenience. Innovations in this field are making homes safer and more responsive to occupants' needs. The adoption of smart home products continues to rise, reflecting the growing investment in this sector



INDUSTRIES

HOSPITALS :

Hospitals are becoming 'smart' with the integration of robotic vision systems. These technologies assist in patient care, surgery, and hospital management. AI-powered robots and telemedicine platforms are enhancing patient experiences and operational efficiency. The smart hospital market size is estimated to be worth \$60.35 billion in 2024, indicating significant investment and growth potential



PROJECT

ABOUT PROJECT

The field of lip and body reading technology stands at the forefront of innovation in human-computer interaction, offering a myriad of opportunities.

By investing time and resources into the development of lip and body reading technologies, the community can pave the way for more accessible and efficient communication methods, ultimately enhancing the interaction between humans and the digital world. This not only enriches the learning and development landscape but also contributes to the evolution of technology that can have a profound impact on society.



ABOUT PROJECT



Developers can contribute to creating more natural user interfaces, potentially leading to groundbreaking applications and services.

Open-source contributions to such projects can enhance a developer's community and recognition.

The challenges in accurately interpreting human gestures and expressions can push data scientists to develop more sophisticated algorithms.

By analyzing gesture and lip-reading data, scientists can uncover patterns that lead to more-stronger AI systems.

Encouraging collaboration between academia and industry can accelerate advancements and practical implementations.

This is all the machine learning model sees when making a prediction for lip reading



This is the output of the machine learning model as tokens for lip reading

```
[[ 2  9 14 39  2 12 21  5 39  1 20 39  6 39 20 23 15 39 14 15 23  0  0  0  
 0  0  0  0  0  0  0  0  0  0  0  0  0 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1  
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1  
-1 -1 -1]]
```

Decode the raw tokens into words for lip reading

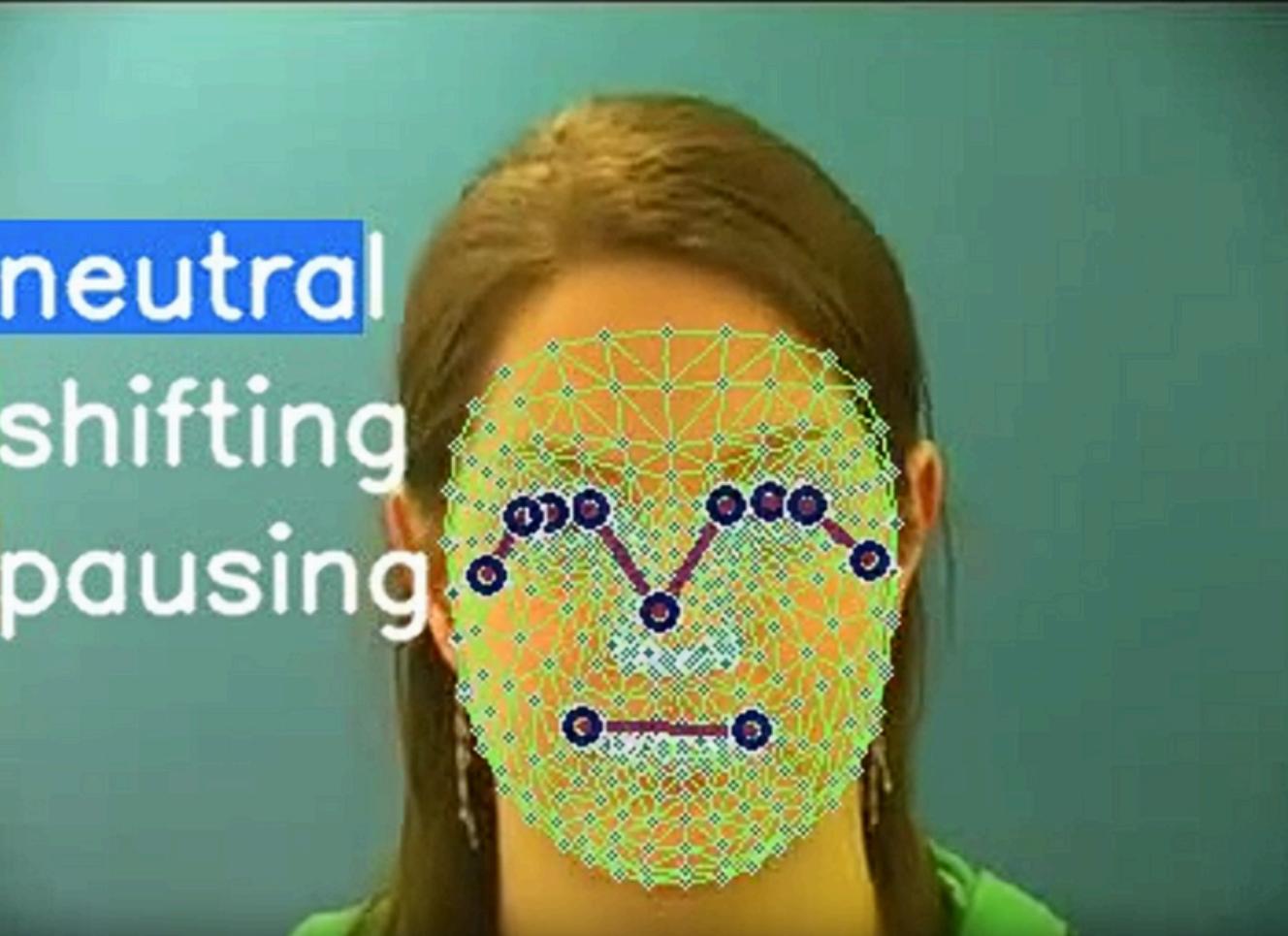
bin blue at f two now

raw output from the machine learning model. This output is typically in the form of a tensor, which is a multi-dimensional array used by TensorFlow to represent data.

decodes the raw output into a sequence of tokens. In the context of lip reading, these tokens could represent characters or phonemes that the model has recognized in the video.

By analyzing gesture and lip-reading data, scientists can uncover patterns that lead to more-stronger AI systems.

Convert to NumPy array, the `.numpy()` method is used. This conversion done by NumPy arrays performing post-processing or analysis tasks. Allowing range of operations, including mathematical computations, logical operations, and statistical analysis.



Body segmentation is a deep learning task that segments and highlights the boundaries between different sections of the body, such as the torso, lower arm, upper arm, thigh, and lower leg. The body-pix model provided by TensorFlow.js can detect up to 23 different segments of the human body.

The project can indicate the face like u see in picture above ,and we considered three cases.

NOTE: Like any vision system calibraion is important for efficiency

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