



The perception on the future of Virtual and Augmented Reality:

**A predictive sentiment analysis on
Apple's Vision Pro technology**

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Smart wearable devices completely shaped and changed the way humans interact with technology and revolutionized individuals' behavior.

In recent years, there has been a rise of "*Augmented Reality Glasses*", simply called Smart Glasses.

The main goal of these devices is to create a whole new experience for the users, creating a new vision combining the physical environment and augments it with virtual elements.

All of these elements combined together should be presented in real time.

Famous and well-known examples of ARSGs (Augmented Reality Smart Glasses) are Google's Google Glass and Microsoft's Hololens.

Up until now, none of the major players were able to make an impact on the mainstream market.



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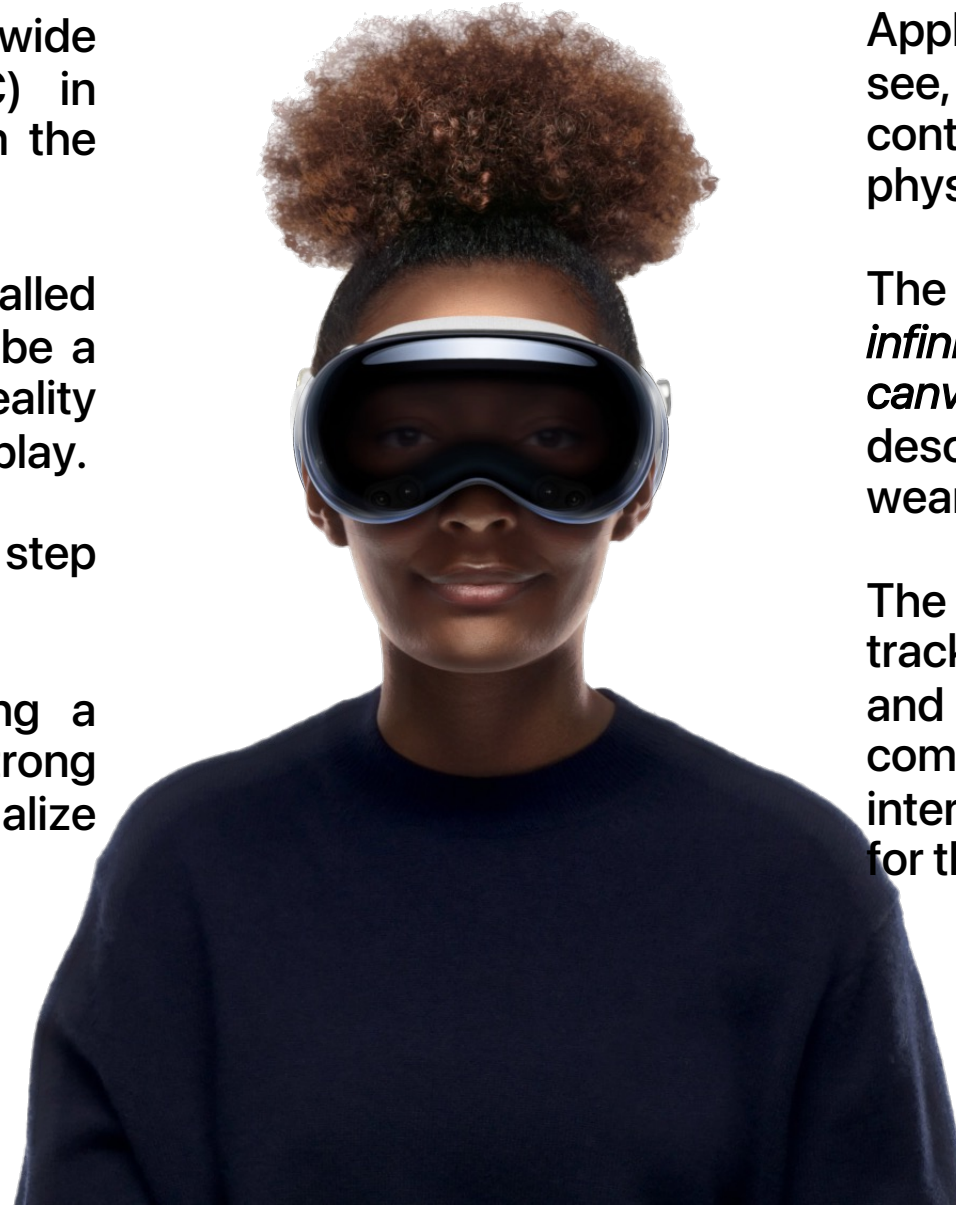
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Apple launched at the Worldwide Developers Conference (WWDC) in June of 2023 a newly product in the field of augmented reality.

The new wearable device is called "*Apple Vison Pro*", it promises to be a mix of virtual and augmented reality together with a high-resolution display.

This might set the first milestone step for widespread and early adoption.

Apple designed the device using a cutting-edge technology with strong computational power and specialize chips.



Apple's Vision Pro sets a unique way to see, hear, and interact with digital content as if users are a part of their physical surroundings.

The *surroundings will become an infinite canvas* as Apple's CEO, Tim Cook, described when introducing the new wearable device to the world.

The interface will work through eye tracking, clear body language signals, and advanced AI-driven voice commands in order to make human interactions effortless and immersive for the users.

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For this type of devices there is no market yet and it is still at early stages, however it is important to address the *potential security risks and privacy concerns*.

The main questions that arise are regarding whether who the owner of the data is, how users can keep control over the information being shared and how companies will use personal data.

In this field Apple openly declared that data will be encrypted and the new headset will come with a *built-in privacy and security policy* because Apple designed their goggles with their users' privacy protection in mind, in order to let the user control their own data. An interesting fact is that the eye input won't be used or shared with anyone else outside the device, neither with Apple itself.

Apple's Vision Pro can easily connect wirelessly to any Mac device, and this seamless integration of the digital and physical worlds creates an environment which is perfect for *collaboration and shared experiences* among colleagues in the working environment.

With the current elements available, it is nearly *impossible to make* any accurate future *predictions* in the field of technology. The main purpose is to open doors for a new device which could or could not become a mass consumer device.

SENTIMENT ANALYSIS

This paper utilizes Sentiment Analysis in order to gather an articulate public opinion on Apple's Vision Pro technology.

Sentiment Analysis is a Natural Language Processing (NLP) technique used in the evaluation of opinions towards an entity in order to gauge the emotion and sentiment as a way of understanding and quantifying the expressed opinions from the selected text (Medhat et al., 2014; Kanakaraj and Guddeti, 2015; Zhang et al., 2018).

Sentiment analysis has integrated itself with the increasing prevalence of social media, with the likes of tweets, blogs, and forums, in order to grasp a coherent and data-driven idea of general views about certain topics.

We gathered comments from technical forums, specifically MAC Rumors and AVS Forum, in order to gain a practical view of Apple's Vision Pro goggles from knowledgeable people without making the whole ordeal overly influenced by emotion. As mentioned by Kontopoulos et al. (2013), through the use of Graded Sentiment Analysis, the aim is to determine whether the polarity of the text, in our case comments from forum threads, tends towards a negative, neutral, or positive sentiment.

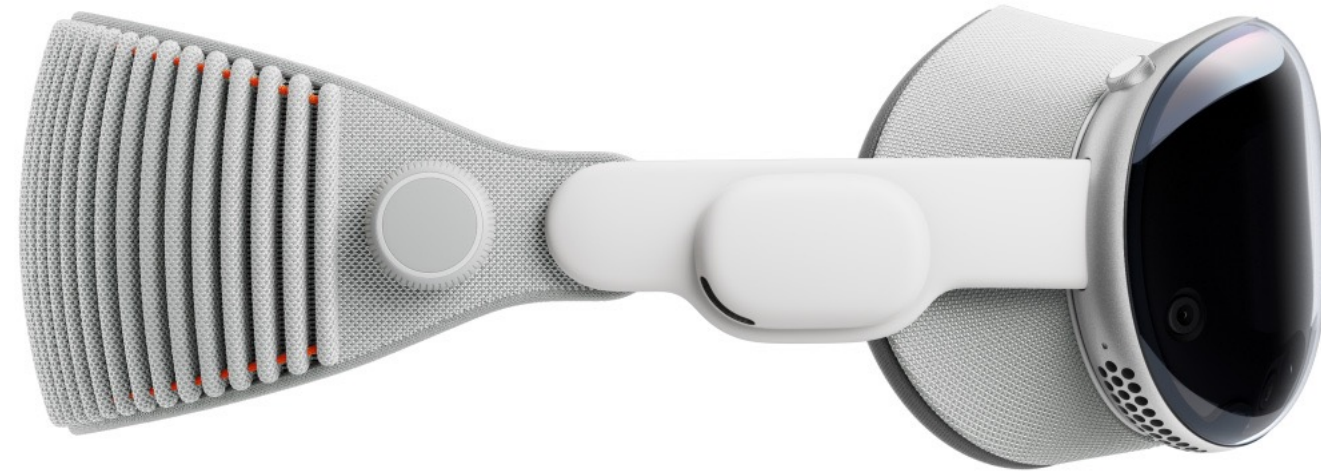


RoBERTa MODEL

RoBERTa-base model is adopted as the model used in applying sentiment analysis.

RoBERTa, which stands for Robustly Optimized BERT Pretraining, is an enhanced version of BERT (Bidirectional Encoder Representations from Transformers) pretraining which involves training the model for longer, employing a larger dataset, eliminating any next-sentence prediction objectives, and using dynamically changing masking patterns to the training data (Liu et al., 2019).

The specific model used is pre-trained in the context of tweets and is further applied to comments from technical forums in order to get a more specialized public opinion compared to less substantial, emotionally-biased, and generic texts.



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SOURCE CODE

```
from transformers import AutoTokenizer, AutoModelForSequenceClassification
from scipy.special import softmax

#comment
comment = ""

#load model and tokenizer
roberta = "cardiffnlp/twitter-roberta-base-sentiment-latest"

model = AutoModelForSequenceClassification.from_pretrained(roberta)
tokenizer = AutoTokenizer.from_pretrained(roberta)

labels = ['Negative', 'Neutral', 'Positive']

#sentiment analysis
encoded_comment = tokenizer(comment, return_tensors='pt')
output = model(**encoded_comment)

scores = output[0][0].detach().numpy()
scores = softmax(scores)

for i in range(len(scores)):

    l = labels[i]
    s = scores[i]
    print(l, "=", s)
```



RESULTS

	Probability
Negative	0.3126755489
Neutral	0.2955590649
Positive	0.3917653888



DISCUSSION - Sentiment Analysis

The results show that the opinion of the public in regards to Apple's Vision Pro is predominantly positive, with a prevalence of negative over neutral probability.

POSITIVE

- overall exciting news for technology enthusiasts
- represents a huge technological advancement in the field of Augmented Reality
- step towards a new paradigm of spatial computing

NEGATIVE

- concerns about the lack of practicality in comparison to already existing technology
- battery life expected to be only 2 hours long
- awkwardness of current design
- possibility of health issues
- unrealistic pricing



DISCUSSION - Potential Evolution and Application Scenarios

These technologies have great potential to enhance our abilities as humans and can be applied in several application scenarios for various fields.

Augmented Reality (AR) devices can be employed potentially for education since the combination of AR technology with educational content creates new types of automated applications which aim to enhance the effectiveness and attractiveness of teaching and learning for students in real-life scenarios.

Augmented Reality can be applied for learning, enhancing a user's perception of and interaction with the real world.

Another interesting application of AR is when used in enabling and enhancing collaborative tasks.

The vision for the future of AR and similar devices hinges on the ability to bridge the gap between novelty and usability. The key lies in developing use cases that genuinely enhance daily activities. Understanding which specific applications resonate the most with the public will be crucial in shaping the future development and success of this type of technological advancement.



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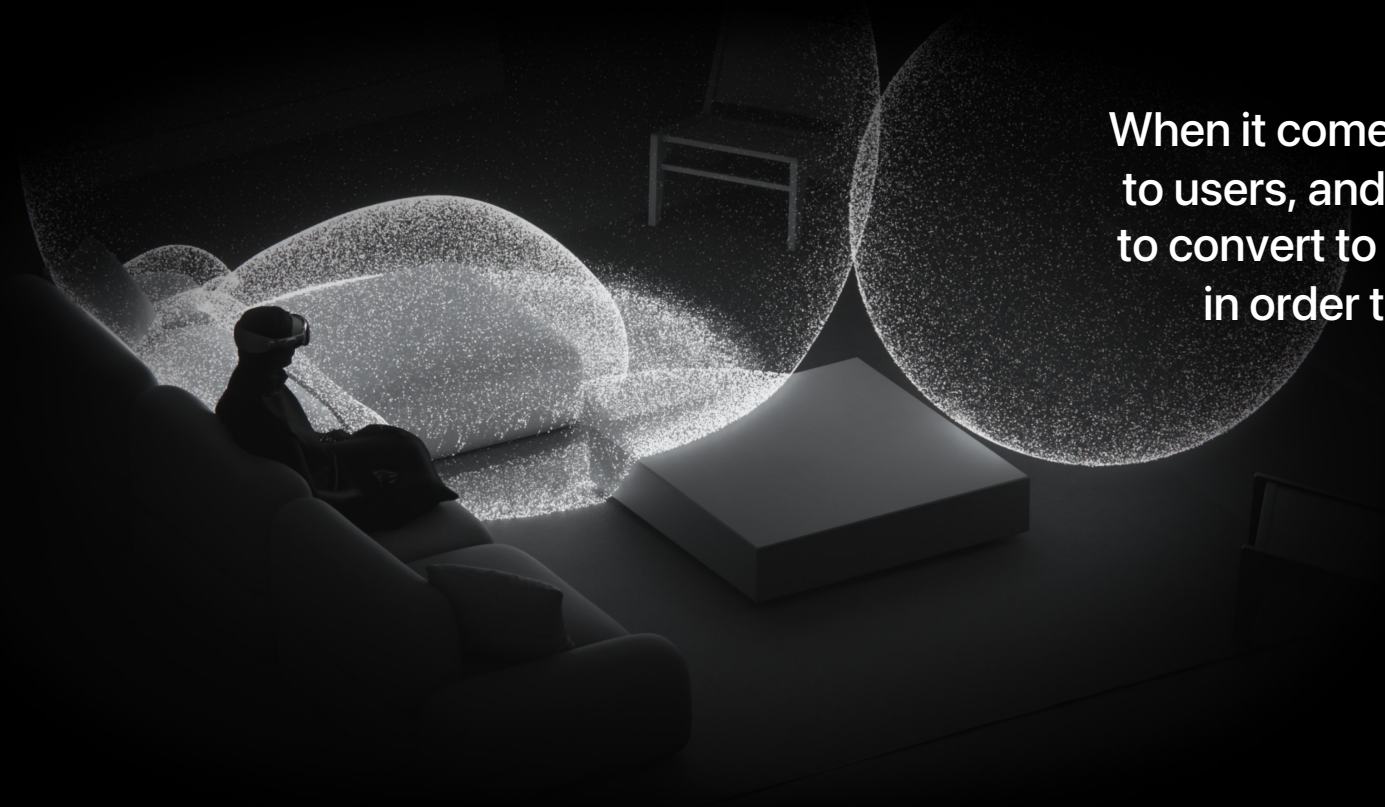
Promising to blend digital content into our physical world, Apple's Vision Pro represents an undoubtedly remarkable step forward in the field of spatial computing and augmented reality.

For every new product of any kind, the initial expectations don't necessarily end up aligning with the outcomes

Ahead of Vision Pro's launch, it's impossible to get a solid opinion from its potential buyers, as the vast majority of them still haven't had the chance to experience any of the pains and gains that they're speculating on at the moment.

When it comes to AR devices, a novel type of experience is offered to users, and only time will tell whether or not people will be willing to convert to it. Therefore, further research needs to be carried out in order to identify potential lack of proper technical coverage.

In the years to come, Apple will most likely work to build a lighter-weight device that can be more easily used in an open space environment. Moreover, the company could collaborate with high-end fashion brands to make the design even more appealing.





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