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AI the future of ocean exploration

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Abstract

We currently used Sonar system for oceans exploration. Sonar is an old technology, first invented in the 1910. It uses sound waves to detect what is under water and what the ocean floor looks like. With this technology, we can roughly scan the map of the deepest points of the ocean. It is slow and time-consuming. Fully sonar technology loaded ships need to sail across the ocean and use their sonar to scan the ocean floor.

That is the reason AI can be the future of oceans exploration. Autonomous vessel, such as submersibles, that operate autonomously which will reduce a lot of the manpower needed to explore the large ocean bed.

Autonomous, AI-powered submersibles would minimize the risks to human lives from deep-sea exploration and would allow faster mapping of ocean floors.

Keywords

Ocean exploration, AI, Artificial Intelligence

Introduction

Ocean covers more than 70% of the earth's surface, and somewhat about 75% of ocean is still undiscoverable. We knows more about the surface of other planets like moon, mars, sun but we yet known more about our planet earth's oceans. The deepest point of ocean is about 11,000 meters which is more than height of world's tallest mountain i.e. Mount Everest.

The light even does not reach to that much depth. Several under water research perform in ocean exploration by many government and private organizations and millions of dollars are spends on it still we have not received as much as information compare to the money and time we spends on it.

Also it is risky for the people who are involved in it as we all aware of "Titan submersible" incident where 5 peoples have lose their life because of not having any adequate information for this oceans.

That is the reason AI can be the future of oceans exploration. We can used autonomous submersible, automated robots to perform deep sea scan and to find out more information about sea shore. Also with the AI-powered machinery's we can perform ocean exploration with extended amount of time as compare to now.

Importance of ocean exploration

Oceans plays important role in regulating our climate, absorbing carbon dioxide, and providing a habitat for

countless species. Still we are yet known more about the sea surface.

Apart from the getting the benefits like oil and gas from oceans, there are possibilities of finding new medicines for so many disease. Also, exploring the deep-sea could help humans extract energy resources, understand the seabed and monitor natural disasters like earthquakes and tsunamis.

As mentioned above, we are currently using Sonar system for oceans exploration. Sonar is an old technology, it uses sound waves to determine what is under water and what the seabed looks like. What is drawback of this process is that it is slow and time-consuming.

This is the reason why many researches and ocean exploration organizations wants a solution which will provide them a new hope in ocean exploration and AI is somewhat looks like new hope for them.

In order to study the impacts from climate change and other threats, researchers urgently wants to learn more about the ocean's inhabitants, ecosystems, and processes.

AI will help in ocean exploration. Where remotely operated vehicles controlled by human pilots are suitable for only specific tasks, such as inspecting offshore wind turbines, AI-powered submersibles are the future for extensive seafloor exploration. These vehicles have the potential to operate nearly 24/7, reducing the need for human presence.

AI: The Key to the Future

AI holds so much power to help in oceans exploration. With AI-powered submersibles we can scan the whole seafloor exploration. These vehicles have the potential to operate nearly 24/7, reducing the need for human presence.

Let's see how AI can help in ocean exploration:

1) **Mapping:**

Mapping the sea floor is one of the most important aspect in ocean exploration. Also mapping may reveals many historical pages of our planet earth's history as we yet known about it. Accurate maps of the ocean floor can help us in predicting the impacts of climate change. Using AI-powered submersible we can record data for mapping.

2) **Identifying new marine species:**

With the help of AI-powered technologies we can find out new marine species which are yet to be discovered. There could be many such kind of marine creature at the bottom of sea floor we may cannot even imagine.

3) **Collect large computational data:**

With the AI-powered technologies researchers may gather a lot of variety of computational data which can be helpful for studying the ocean floor. It can be used in Carbon consumption, pH level and also for the fish stock.

4) **Reduce plastic pollution:**

According to the marine life researches, 1 million marine animals lost their lives every year due to the plastic pollution. With data collected from AI-powered technologies we may build a model which will help in reducing the plastic pollution of ocean.

5) **Save marine life:**

Due to pollution, climate change many marine species are on the verge of extinction. To save them from all this calamities we can used AI. With the help of AI we can study the marine life and monitor and protect them.

6) **Saving coral reefs:**

Coral reefs are a diverse ecosystem that provides habitat to over 25% of marine life and are also beneficial to humans in many ways. Due to pollution and other human activities, the

health of coral reefs is degrading continuously. Researchers need to utilize artificial intelligence for saving coral reefs.

7) **Illegal fishing:**

The world's fish stocks are decreasing and illegal seafood trade is increasing at a rapid rate. To overcome this problem, researchers are taking help of AI to ensure efficient aquaculture and fisheries management.

AI Technologies used in ocean exploration:

To discover the vast amount of ocean floor we need advanced AI-powered tool.

1) **AI-powered submersible:**

The deepest point of ocean is about 11,000 meters which is more than height of world's tallest mountain i.e. Mount Everest. It is too dangerous to explorer this depths by humans or human carrying submersibles. To overcome the risk factor AI-powered submersibles are the best way out. It also makes ocean exploration safer and faster as it can work by 24/7.

2) **AI-powered marine robots:**

AI-powered submersibles might look like is changing its regular architecture as scientist are now looking at how some sea animals, such as shrimp and krill are living at such depths, and it will help them design a completely new architecture for AI-powered submersibles which will go to the extreme point of sea floor.

Challenges and future directions

Building deep sea submersibles capable of withstanding the ocean's harsh conditions is no small feat. Corrosion-resistant materials like titanium steel are necessary for the saltwater's corrosiveness. Deeper depths means greater pressure, and navigation system becomes challenging without GPS-like satellite systems. Position estimation algorithms are crucial but prone to error over time.

One of the critical challenges is sourcing energy for submersibles. Underwater gliders can operate for months by using buoyancy to move, but battery life eventually limits them. Potential solutions for this deep underwater ocean exploration can be include periodic resurfacing for solar recharging, floating charging stations, or harnessing ocean currents and hydrothermal vents. These methods, while promising, require significant investment and technological development.

The future of ocean exploration is an exciting frontier. Through the convergence of AI, advanced engineering, and inspiration from nature, we are on the cusp of a new era of understanding our planet's oceans. The mysteries of the deep are waiting to be explored, offering insights into climate change, new marine life, and valuable resources. It's a journey that requires innovation, investment, and a commitment to safeguarding the ocean's fragile ecosystems. As we embark on this exploration, we may discover not only the hidden wonders of the deep blue but also the keys to preserving the health of our planet for generations to come.

Public Survey

We first conducted a poll of people through Google form creator and data collection service to acquire information regarding people's awareness.

Questionnaire

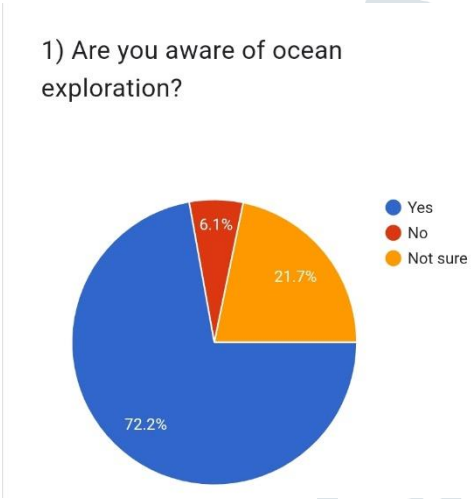
- Are you aware of ocean exploration?
- Have you ever read about ocean exploration?
- Can AI help us in ocean exploration?
- Can AI-powered technologies such as, AI-powered submersibles can be used in ocean exploration?
- What are some ways AI can be used in ocean exploration?
- Can AI completely eliminate all the risk factors of deep ocean exploration?

- Can AI help us in reducing water pollution?
- Can AI help us fishing stocks data?
- Can AI help us in understanding climate change?
- Can AI help in life below water?

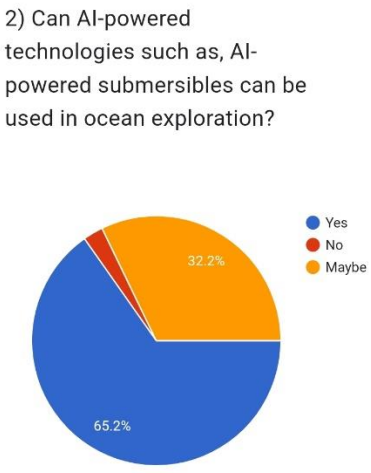
Result

Following are the results of poll conducted online through Google form.

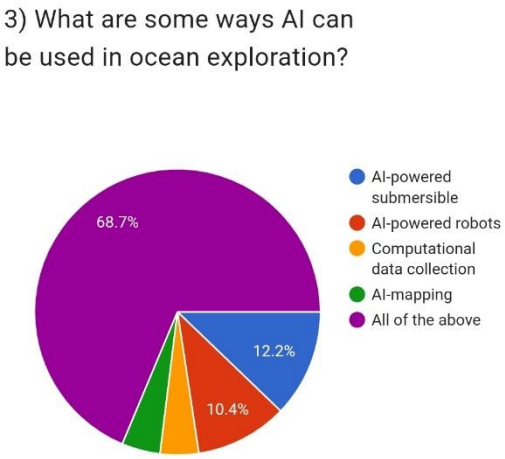
1. Are you aware of ocean exploration?



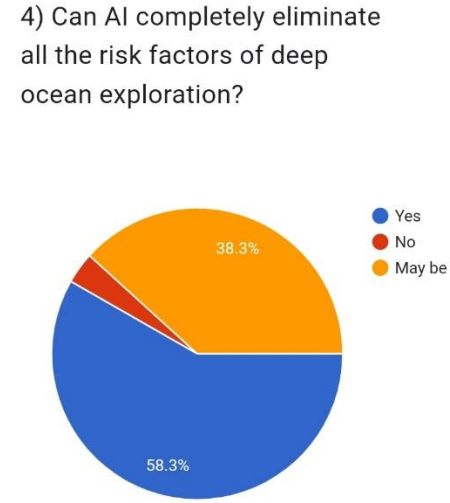
2. Have you ever read about ocean exploration?



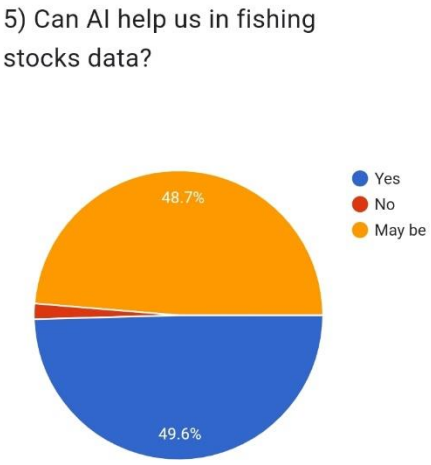
3. Can AI help us in ocean exploration?



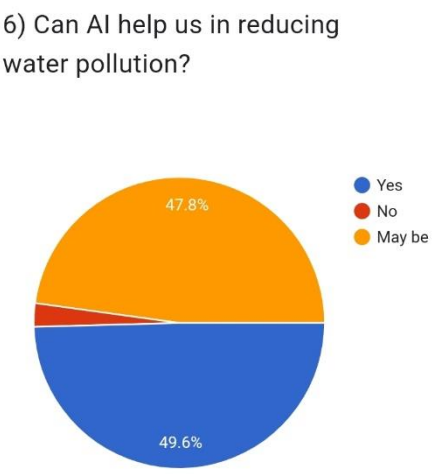
4. Can AI-powered technologies such as, AI-powered submersibles can be used in ocean exploration?



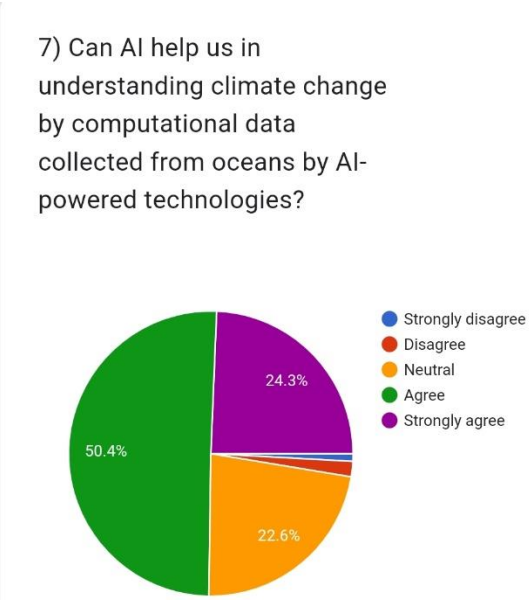
5. What are some ways AI can be used in ocean exploration?



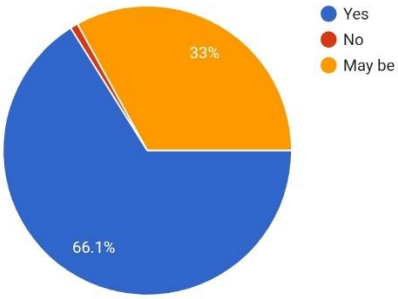
6. Can AI eliminate all the risk factors of deep ocean exploration?



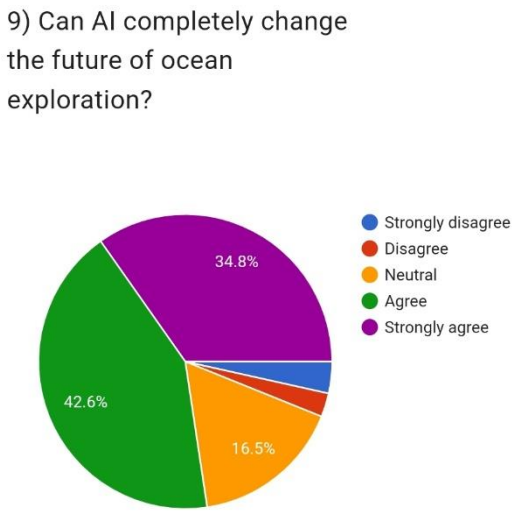
7. Can AI help us in reducing water pollution?



8. Can AI help us in reducing water pollution?



9. Can AI help in life below water?



Descriptive statistic

Descriptive statistic is means of describing features of a data set by generating summaries about data samples.

Here are some results which will helps us in finding the actual response of people.

1) Are you aware of ocean exploration?	
Mean	57.5
Standard Error	25.10478042
Median	54
Standard Deviation	50.20956084
Sample Variance	2521
Kurtosis	-3.54865634
Skewness	0.229502208
Range	108
Minimum	7
Maximum	115
Sum	230
Count	4
Confidence Level(95.0%)	79.8946157

4) Can AI completely eliminate all the risk factors of deep ocean exploration?	
Mean	57.5
Standard Error	23.16786568
Median	55.5
Standard Deviation	46.33573135
Sample Variance	2147
Kurtosis	0.358821323
Skewness	0.23706607
Range	111
Minimum	4
Maximum	115
Sum	230
Count	4
Confidence Level(95.0%)	73.73048852

7) Can AI help us in understanding climate change by computational data collected from oceans by AI-powered technologies?	
Mean	38.33333333
Standard Error	17.54739613
Median	27
Standard Deviation	42.98216684
Sample Variance	1847.466667
Kurtosis	1.629095769
Skewness	1.342149048
Range	114
Minimum	1
Maximum	115
Sum	230
Count	6
Confidence Level(95.0%)	45.10701777

9) Can AI completely change the future of ocean exploration?	
Mean	38.33333
Standard Error	17.12243
Median	29.5
Standard Deviation	41.94123
Sample Variance	1759.067
Kurtosis	2.267019
Skewness	1.464019
Range	112
Minimum	3
Maximum	115
Sum	230
Count	6
Confidence Level(95.0%)	44.01462

Findings

- Overall, AI has the potential to significantly improve our ability to explore the deep oceans.

- By analyzing large amounts of data, identifying patterns, AI can help us in exploring ocean and finding many new things deep under water which we are unaware of till the date.
- As compare to traditional ocean exploration techniques, AI is far faster, cheaper and has no risk of life.
- AI can be help us is reducing the water pollution which will save many under water lives.
- With the help of AI we will completely open the new pages of our undiscoverable oceans diary.

Conclusion

AI can be become an important support for ocean exploration, from AI-powered underwater vehicles to real-time data analysis and environment conservation efforts. AI will provide us more efficient data collection, mapping, and new species identification. AI has a power to understand the deep seafloor. With the help of AI Ocean exploration can be limitless and discover a long lasting data which help in finding more about the oceans. As we look to the future, it is clear that AI will completely change the field of ocean exploration.

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