Lovely Professional University

Artificial Intelligence Seminar
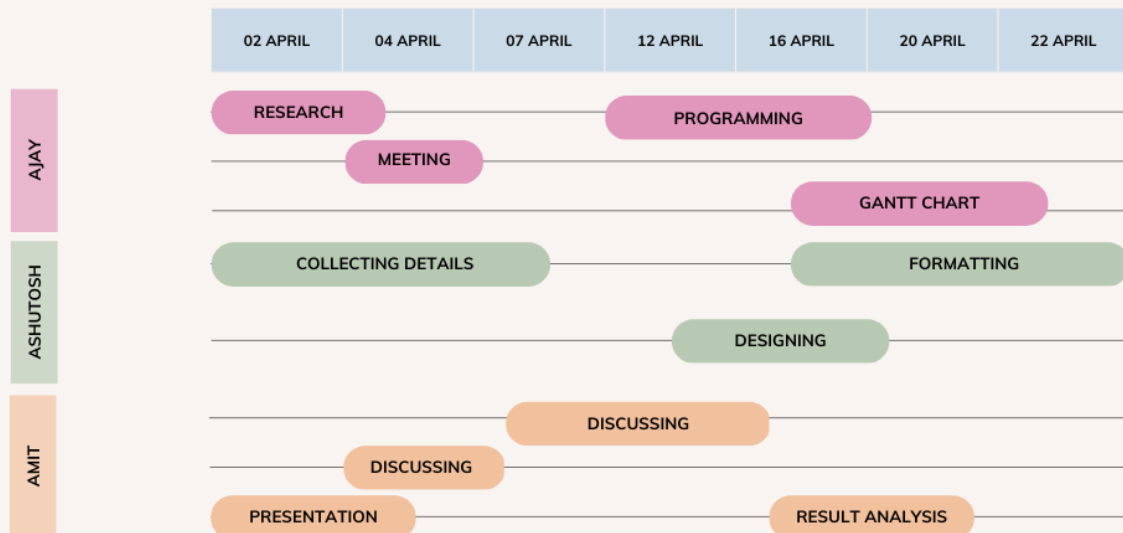
For

Prepared By - **Ajay Kumar Yadav   12107411**
                  Ashutosh Pandey   12216727
                  Amit Sahoo   12107536

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...GANTT CHART...

GANTT CHART
AEROSPACE INDUSTRY IN AI

	02 APRIL	04 APRIL	07 APRIL	12 APRIL	16 APRIL	20 APRIL	22 APRIL

AJAY
- RESEARCH
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...INTRODUCTION...

AI is likely to deliver various advancements in the aerospace sector over the next 15 years by reducing costs, reducing design process length, duplication, experimentation, augmentation, support, production, and updating things. AI advancements may be able to assist aerospace companies in improving their production processes.

In the aerospace business, artificial intelligence (AI) can assist corporations to expedite manufacturing while simultaneously addressing safety concerns. Furthermore, AI systems can examine data from a variety of sources and process large volumes of data much quicker than humans.

Aerospace businesses may conduct more efficient and effective examinations of many features this way. AI in aircraft may also aid in the development of a variety of applications that save/monitor fuel, identify areas of improvement, and assist in air traffic management. Exploring and using the applications of AI has become critical for corporate executives.

In recent years, companies including Raytheon, General Dynamics, and Northrop Grumman have announced AI-based development initiatives and product launches.

...APPLICATIONS OF AI IN THE AEROSPACE INDUSTRY...

1. Product Designing :-

Economical and robust airplane parts are usually favored in the aviation industry. Automakers can use generative structures in conjunction with AI algorithms to build such components.

Iterative design is an iterative process in which technologists or architects utilize design requirements as input, as well as restrictions and characteristics such as materials, available assets, and a defined budget, to create an ideal product development.

When combined with AI, advanced design programming may help product designers examine several design options in a short amount of time. Designers may use this breakthrough to produce new lightweight and cost-effective goods.

Propellers and wings, for example, may be delivered utilizing ai - powered dynamic design combined with 3D printing. As a result, AI may be able to assist aerospace industries in optimizing their architecture and manufacturing processes.

2. Better Fuel Efficiency :-

Fuel quality is important to aerospace industries, and even a little reduction in aircraft fuel usage may have a significant influence on a company's bottom line and sustainability.

A typical commercial flight uses around 4 liters per second, 240 liters per minute, and 14,400 liters per hour of fuel. With the help of AI technology, we can reduce fuel usage by 5 to 7%.

Fuel usage may be reduced with the use of AI-powered technologies. For example, a machine learning programme developed by Safety Line, a French company, can improve climbing trajectories for pilots before each trip. Because the climbing process consumes the most gasoline, improving this stage saves a lot of money.

3. Effective Supply Chain Management :-

As AI is incorporated into the distribution network, the aeronautics business is becoming progressively streamlined. Enhanced supply chain competence makes maintaining equipment and doing routine repairs easier than doing it manually.

It also saves money and reduces downtime because it is known ahead of time when to perform the repairs. Supply chain management competency may be improved quickly thanks to automated data collecting.

4. Air Traffic Management :-

One of the most important responsibilities of airports and airlines is air traffic control. However, with billions of passengers choosing to travel by plane, air traffic control may become extremely complex. As a result, utilizing AI for air traffic management might be a viable option.

Pilots may use weather data from sensors and flight data to make educated judgments with the support of AI-powered smart assistants. AI-based assistants can use this data to offer different routes to pilots, making air transportation safer and faster.

AI and smart cameras may also be used to recognize airplanes as they left the runway and alert flight attendants. Air traffic controllers can use this information to clear the touchdown runway for the following plane.

In low-visibility situations, such as fog, this technology can be quite useful. In this way, AI in aerospace can aid in the management of air traffic and the reduction of blockages at terminals.

5. Better Customer Experience :-

Customer happiness and service quality are very important in commercial aviation. AI is one of the techniques airlines can boost consumer engagement and provide outstanding customer service.

Chatbots are AI-powered automated systems that can answer customer questions on a real-time basis and in a human-like manner. Online chatbots may save companies time and effort by automating customer care. This can be done in a number of different ways, including:

- Suggestions on Customer Purchase Decisions that are Accurate and Personalized
- Chatbots using AI provide quick and polite assistance.
- Automatic Assistance is available 24x7.
- Customer contacts should be more efficient.

6. Passenger Identification :-

Commercial airlines place a significant priority on security, and AI can provide efficient measures to safeguard passenger safety. At an airport, AI-enabled smart cameras may utilize facial recognition to identify questionable individuals.

Images of people with criminal histories can be used to train AI systems for this purpose. In an airport, AI-powered smart cameras may potentially be used to identify criminal behavior.

...IMPACT OF AI IN AEROSPACE...

Artificial Intelligence (AI) has had a significant impact on the aerospace industry in recent years. Here are some of the ways that AI is currently being used in aerospace:

1. Autonomous Aircraft: AI is used to develop autonomous aircraft that can operate without human intervention. Autonomous aircraft can fly themselves and can make decisions based on the data they receive from sensors and other inputs.

2. Predictive Maintenance: AI is used to predict when components in aircraft will need maintenance. This can save time and money by allowing maintenance crews to address problems before they become critical.

3. Flight Optimization: AI is used to optimize flight paths and reduce fuel consumption. This can reduce costs and minimize the environmental impact of air travel.

4. Weather Prediction: AI is used to predict weather patterns and turbulence, which can help pilots avoid dangerous conditions.

5. Air Traffic Control: AI is used to help air traffic controllers manage flights more efficiently. This can reduce delays and improve safety.

6. Space Exploration: AI is used to analyze data from space probes and other spacecraft. This can help scientists better understand the universe and develop new technologies.

Overall, AI is helping to make aerospace safer, more efficient, and more environmentally friendly. As AI continues to evolve, we can expect to see even more innovation in the aerospace industry.

...FUTURE SCOPE...

The future of aerospace in AI is very promising. Here are some potential areas where we can expect to see further development and innovation in the aerospace industry:

1. Autonomous Aircraft: The development of fully autonomous aircraft is likely to continue, with AI playing a key role in their design and operation. Autonomous aircraft have the potential to improve safety, reduce costs, and make air travel more efficient.

2. Advanced Analytics: AI can enable advanced analytics in aerospace, allowing for real-time monitoring of aircraft systems and more accurate prediction of maintenance needs. This can help reduce downtime and improve the overall reliability of aircraft.

3. Robotics: The use of robotics is also expected to increase in aerospace, with AI enabling more advanced and sophisticated control systems for robots. This can be useful in areas such as space exploration and maintenance tasks.

4. Enhanced Navigation: AI can improve navigation by enabling more accurate and reliable positioning, which can improve safety and efficiency in air travel.

5. Green Aviation: AI can help reduce the environmental impact of aviation by optimizing flight paths, reducing fuel consumption, and developing new technologies that are more eco-friendly.

Overall, the future scope of aerospace in AI is very promising. As AI continues to advance, we can expect to see even more innovative applications of this technology in the aerospace industry, leading to safer, more efficient, and more environmentally friendly air travel.

...CONCLUSION...

In conclusion, the impact of AI in aerospace has been significant and will continue to shape the future of the industry. The adoption of AI technologies has enabled aircraft to become more autonomous, reducing human error and increasing safety. Furthermore, AI has allowed for predictive maintenance, allowing airlines to address issues before they become critical and avoid costly downtime. The optimization of flight paths and reduction in fuel consumption has led to more efficient and cost-effective air travel, while AI's ability to predict weather patterns and turbulence has made air travel safer.

Looking towards the future, AI will play an increasingly important role in the aerospace industry. With the development of fully autonomous aircraft, enhanced navigation systems, and more sophisticated robotics, AI has the potential to revolutionize air travel. Additionally, AI can help address environmental concerns by reducing fuel consumption, optimizing flight paths, and developing eco-friendly technologies.

Overall, the aerospace industry will continue to benefit from AI's ability to improve safety, increase efficiency, and reduce costs. With AI evolving rapidly, we can expect to see even more innovative and game-changing applications in the aerospace industry in the years to come.

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3. DXC...

4. Indian Aviation...

5. International Civil Aviation Organization...

…CODE…

This Code Is Made For "Reducing Fuel Consumption Through Advanced Route"

```python
import geopy.distance
from geopy.geocoders import Nominatim

geolocator = Nominatim(user_agent="my-app")

start_point = input('Enter Source : ')
end_point = input('Enter Destination : ')

destinations = []

n = int(input('How much intermediate destinations : '))

for i in range(0, n):
    dest = input(f"Enter destination number {i+1} : ")
    destinations.append(dest)

start_location = geolocator.geocode(start_point)
end_location = geolocator.geocode(end_point)

start_coord = (start_location.latitude, start_location.longitude) # type:
ignore
end_coord = (end_location.latitude, end_location.longitude)# type: ignore

distance = geopy.distance.distance(start_coord, end_coord).km

distances_to_end = []
for destination in destinations:
    location = geolocator.geocode(destination)
    coord = (location.latitude, location.longitude)# type: ignore
    distance_to_end = geopy.distance.distance(coord, end_coord).km
    distances_to_end.append(distance_to_end)

best_destination = None
best_distance = distance
```

```python
for i, distance_to_end in enumerate(distances_to_end):
    total_distance = geopy.distance.distance(start_coord, (location.latitude,
location.longitude)).km + distance_to_end # type: ignore
    if total_distance < best_distance:
        best_destination = destinations[i]
        best_distance = total_distance

if best_destination is not None:
    print("Optimized route: {} -> {} -> {} -> {} -> {}".format(start_point,
best_destination, end_point, best_destination, start_point))
else:
    print("No intermediate destination found that reduces fuel consumption.")
```