Building Autonomous Agents to Create Analysis Reports

```
import os

cohere_api_key = os.environ.get("COHERE_API_KEY")
ACTIVELOOP_TOKEN = os.environ.get("ACTIVELOOP_TOKEN")

# We scrape several Artificial Intelligence news

import requests
from newspaper import Article
import time

headers ={
    'User-Agent': 'Mozilla/5.0 (Windows NT 10.0; Win64; x64)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/89.0.4389.82
Safari/537.36'
}

article_urls = [
    "https://www.artificialintelligence-news.com/2023/05/23/meta-open-
source-speech-ai-models-support-over-1100-languages/",
    "https://www.artificialintelligence-news.com/2023/05/18/beijing-
launches-campaign-against-ai-generated-misinformation/",
    "https://www.artificialintelligence-news.com/2023/05/16/openai-
ceo-ai-regulation-is-essential/",
    "https://www.artificialintelligence-news.com/2023/05/15/jay-
migliaccio-ibm-watson-on-leveraging-ai-to-improve-productivity/",
    "https://www.artificialintelligence-news.com/2023/05/15/iurii-
milovanov-softserve-how-ai-ml-is-helping-boost-innovation-and-
personalisation/",
    "https://www.artificialintelligence-news.com/2023/05/11/ai-and-
big-data-expo-north-america-begins-in-less-than-one-week/",
    "https://www.artificialintelligence-news.com/2023/05/11/eu-
committees-green-light-ai-act/",
    "https://www.artificialintelligence-news.com/2023/05/09/wozniak-
warns-ai-will-power-next-gen-scams/",
    "https://www.artificialintelligence-news.com/2023/05/09/infocepts-
ceo-shashank-garg-on-the-da-market-shifts-and-impact-of-ai-on-data-
analytics/",
    "https://www.artificialintelligence-news.com/2023/05/02/ai-
godfather-warns-dangers-and-quits-google/",
    "https://www.artificialintelligence-news.com/2023/04/28/palantir-
demos-how-ai-can-used-military/",
    "https://www.artificialintelligence-news.com/2023/04/26/ftc-
chairwoman-no-ai-exemption-to-existing-laws/",
```

```
    "https://www.artificialintelligence-news.com/2023/04/24/bill-
gates-ai-teaching-kids-literacy-within-18-months/",
    "https://www.artificialintelligence-news.com/2023/04/21/google-
creates-new-ai-division-to-challenge-openai/"
]

session = requests.session()
pages_content =[]

for url in article_urls:
    try:
        time.sleep(2) # sleep 2 seconds for gentle scrapping
        response = session.get(url,headers=headers, timeout=10)

        if response.status_code == 200:
            article = Article(url)
            article.download()
            article.parse()
            pages_content.append({"url":url, "text":article.text})

        else:
            print(f"Failed to fetch article at {url}")
    except Exception as e:
        print(f"Error occured while fetching article at {url}:{e}")

# use an embedding model to compute our document's embeddings
from langchain_cohere import CohereEmbeddings

# store documents and their embeddings in the deep lake vector store
from langchain.vectorstores import DeepLake

# Setup DeepLake
embeddings = CohereEmbeddings(model = "embed-multilingual-v3.0")

# Create deep lake dataset
my_activeloop_org_id = "ankur82garg"
my_activeloop_dataset_name = "langchain_course_analysis_outline"
dataset_path =
f"hub://{my_activeloop_org_id}/{my_activeloop_dataset_name}"
db = DeepLake(dataset_path=dataset_path,
embedding_function=embeddings)
```

```
Using embedding function is deprecated and will be removed in the
future. Please use embedding instead.

Deep Lake Dataset in
hub://ankur82garg/langchain_course_analysis_outline already exists,
loading from the storage
```

```
# Split the article texts into small chunks
from langchain.text_splitter import RecursiveCharacterTextSplitter
```

```
text_splitter = RecursiveCharacterTextSplitter(chunk_size=1000,
chunk_overlap=100)

all_texts = []
for d in pages_content:
    chunks = text_splitter.split_text(d["text"])
    for chunk in chunks:
        all_texts.append(chunk)

# add all chunks to the deep lake
db.add_texts
(all_texts)
```

```
Creating 99 embeddings in 1 batches of size 99::   0%|          | 0/1
[00:00<?, ?it/s]
```

```
Creating 99 embeddings in 1 batches of size 99:: 100%|██████████| 1/1
[00:51<00:00, 51.74s/it]
```

```
Dataset(path='hub://ankur82garg/langchain_course_analysis_outline',
tensors=['embedding', 'id', 'metadata', 'text'])
```

tensor	htype	shape	dtype	compression
embedding	embedding	(289, 1024)	float32	None
id	text	(289, 1)	str	None
metadata	json	(289, 1)	str	None
text	text	(289, 1)	str	None

```
['a5098de4-c8c9-11ef-80a9-d66dbc6b493b',
 'a5098de5-c8c9-11ef-ad8e-d66dbc6b493b',
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 'a5098de7-c8c9-11ef-8434-d66dbc6b493b',
 'a5098de8-c8c9-11ef-8bea-d66dbc6b493b',
 'a5098de9-c8c9-11ef-adb7-d66dbc6b493b',
 'a5098dea-c8c9-11ef-aec3-d66dbc6b493b',
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 'a5098ded-c8c9-11ef-92aa-d66dbc6b493b',
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 'a5098df1-c8c9-11ef-ac6d-d66dbc6b493b',
 'a5098df2-c8c9-11ef-9517-d66dbc6b493b',
 'a5098df3-c8c9-11ef-b6c2-d66dbc6b493b',
 'a5098df4-c8c9-11ef-8396-d66dbc6b493b',
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```

```
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'a5098dff-c8c9-11ef-aa49-d66dbc6b493b',
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'a5098e08-c8c9-11ef-8310-d66dbc6b493b',
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'a5098e1f-c8c9-11ef-82d0-d66dbc6b493b',
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```

```
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 'a5098e2a-c8c9-11ef-93ea-d66dbc6b493b',
 'a5098e2b-c8c9-11ef-92b1-d66dbc6b493b',
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 'a5098e2d-c8c9-11ef-8583-d66dbc6b493b',
 'a5098e2e-c8c9-11ef-8a53-d66dbc6b493b',
 'a5098e2f-c8c9-11ef-842e-d66dbc6b493b',
 'a5098e30-c8c9-11ef-94eb-d66dbc6b493b',
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 'a5098e3b-c8c9-11ef-9ae3-d66dbc6b493b',
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 'a5098e3d-c8c9-11ef-b2b8-d66dbc6b493b',
 'a5098e3e-c8c9-11ef-93c3-d66dbc6b493b',
 'a5098e3f-c8c9-11ef-b6b5-d66dbc6b493b',
 'a5098e40-c8c9-11ef-91ec-d66dbc6b493b',
 'a5098e41-c8c9-11ef-8a92-d66dbc6b493b',
 'a5098e42-c8c9-11ef-aaa7-d66dbc6b493b',
 'a5098e43-c8c9-11ef-aad3-d66dbc6b493b',
 'a5098e44-c8c9-11ef-b72d-d66dbc6b493b',
 'a5098e45-c8c9-11ef-a6ac-d66dbc6b493b',
 'a5098e46-c8c9-11ef-a2f0-d66dbc6b493b']
```

set up our Plan and Execute agent

```
# Get the retriever object from deep lake
retriever = db.as_retriever()
retriever.search_kwargs['k'] = 3

# define some variables that will be used inside our custom tool
CUSTOM_TOOL_DOCS_SEPARATOR ="\n---------------\n" # how to join
together the retrieved docs to form a single string

# defines our custom tool that retrieves relevant docs from Deep Lake
def retrieve_n_docs_tool(query:str)-> str:
    """Searches for relevant documents that may contain the answer to
the query."""
    docs = retriever.get_relevant_documents(query)
    if not docs:
```

```
        return "No relevant document found"
    texts = [doc.page_content for doc in docs]
    texts_merged = "---------------\n" +
CUSTOM_TOOL_DOCS_SEPARATOR.join(texts) + "\n---------------"
    return texts_merged
```

defined a custom tool function called retrieve_n_docs_tool that takes a query as input and uses the retriever to search for relevant documents containing the answer to the query

```
from langchain.agents import Tool

# Cration of tool that uses "retrieve_n_docs_tool" function

tools =[
    Tool(
        name = "Search Private Docs",
        func = retrieve_n_docs_tool,
        description="useful for when you need to answer questions
about current events about Artificial Intelligence"
    )
]
```

Ready to Create Agent

```
from langchain_cohere import ChatCohere
from langchain_experimental.plan_and_execute import
PlanAndExecute,load_agent_executor, load_chat_planner

# Plan and Execute agent
model = ChatCohere(model = "command-r7b-12-2024", temperature=0)
planner = load_chat_planner(model)
executor = load_agent_executor(model, tools, verbose =True)
agent = PlanAndExecute(planner = planner, executor = executor, verbose
= True)
```

The agent consists of two components: a planner and an executor. The planner is responsible for generating a plan based on the given input, and the executor executes the plan by interacting with the tools and external systems

```
# we test the agent
response = agent.run("How is AI being utilized to improve business
operations and decision-making?")
```

```
> Entering new PlanAndExecute chain...
steps=[Step(value='**Automation and Efficiency**: AI-powered
automation is revolutionizing business processes by handling
repetitive and time-consuming tasks. For example, robotic process
```

automation (RPA) can automate data entry, invoice processing, and customer support, leading to increased efficiency and reduced operational costs.'), Step(value='**Data Analysis and Insights**: Advanced AI algorithms can process vast amounts of data quickly and accurately. Businesses use AI for predictive analytics, identifying patterns, and generating valuable insights. This enables companies to make data-driven decisions, forecast trends, and personalize customer experiences.'), Step(value='**Customer Service and Support**: AI chatbots and virtual assistants are being employed to provide 24/7 customer support. These AI systems can handle customer inquiries, resolve simple issues, and route complex cases to human agents, improving response times and customer satisfaction. Natural Language Processing (NLP) enables these chatbots to understand and respond to customer queries in a human-like manner.'), Step(value='**Personalization and Recommendations**: AI algorithms can analyze customer behavior and preferences to deliver personalized recommendations. This is widely used in e-commerce, media streaming, and advertising. By understanding individual customer needs, businesses can enhance customer engagement and increase sales.'), Step(value='**Fraud Detection and Security**: AI techniques, such as machine learning, are employed to detect fraudulent activities and enhance security. These systems can identify anomalies, patterns, and suspicious behavior, helping businesses prevent financial losses and protect sensitive data.'), Step(value='**Supply Chain Optimization**: AI is transforming supply chain management by optimizing inventory levels, predicting demand, and improving logistics. AI-powered systems can analyze historical data, market trends, and external factors to make accurate forecasts, ensuring efficient resource allocation and reducing costs.'), Step(value='**Healthcare and Pharmaceuticals**: AI has significant applications in healthcare, including medical diagnosis, drug discovery, and personalized treatment plans. AI algorithms can analyze medical records, assist in image analysis (e.g., medical imaging), and support clinical decision-making, potentially improving patient outcomes.'), Step(value='**Financial Services**: In the financial industry, AI is used for algorithmic trading, risk assessment, and fraud detection. AI models can analyze market data, predict stock prices, and make investment recommendations, aiding financial institutions in making strategic decisions.'), Step(value='**Human Resources (HR)**: AI is transforming HR processes by automating recruitment, employee screening, and performance evaluation. AI-powered systems can analyze resumes, conduct initial interviews, and provide data-driven insights to improve hiring decisions and employee retention.'), Step(value='**Business Strategy and Planning**: AI-driven business intelligence tools provide real-time data visualization and analytics, enabling executives to make informed strategic decisions. These tools help identify market trends, assess competitors, and optimize business strategies.\n\nBy leveraging AI technologies, businesses can gain a competitive edge, improve operational efficiency, enhance customer

```
satisfaction, and make more strategic decisions. The ability of AI to
process and interpret vast amounts of data quickly is transforming the
way companies operate and interact with their customers.')]

> Entering new AgentExecutor chain...
**Automation and Efficiency**: AI-powered automation is
revolutionizing business processes by handling repetitive and time-
consuming tasks. For example, robotic process automation (RPA) can
automate data entry, invoice processing, and customer support, leading
to increased efficiency and reduced operational costs. This technology
is transforming industries by streamlining operations and allowing
employees to focus on more complex and creative work.

> Finished chain.
*****

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vast amounts of data quickly and accurately. Businesses use AI for
predictive analytics, identifying patterns, and generating valuable
insights. This enables companies to make data-driven decisions,
forecast trends, and personalize customer experiences.

AI's ability to analyze large datasets has revolutionized data
analysis, offering several key benefits:

- **Speed and Accuracy:** AI algorithms can process and analyze data
at unprecedented speeds, often surpassing human capabilities. This
rapid analysis allows for quick identification of patterns, trends,
and anomalies, leading to more timely and accurate insights.

- **Predictive Analytics:** AI excels at predictive modeling, using
historical data to forecast future outcomes. This is invaluable for
businesses, enabling them to make informed decisions about inventory
management, sales strategies, and resource allocation.
```

- **Pattern Recognition:** AI algorithms are adept at identifying complex patterns and relationships within data. This is particularly useful in fields like healthcare, where AI can detect subtle patterns in medical images or genomic data, aiding in disease diagnosis and treatment planning.

- **Personalization:** By analyzing customer data, AI can deliver personalized experiences. This includes tailored product recommendations, targeted marketing campaigns, and customized user interfaces, enhancing customer satisfaction and loyalty.

- **Data-Driven Decision Making:** AI-powered insights provide a solid foundation for strategic decision-making. Businesses can optimize operations, identify new market opportunities, and mitigate risks by leveraging AI-generated insights.

- **Efficiency and Cost Savings:** AI automation streamlines data analysis processes, reducing the need for manual intervention. This leads to increased efficiency, lower operational costs, and improved productivity.

The impact of AI in data analysis is far-reaching, transforming industries and driving innovation. As AI continues to evolve, its role in extracting valuable insights from data will only become more prominent, shaping the future of business and technology.

> Finished chain.
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Response: **Customer Service and Support**: AI chatbots and virtual
```

```
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AI's ability to analyze vast amounts of customer data, including purchase history, browsing behavior, and preferences, allows for the creation of tailored recommendations. For example, in e-commerce, AI can suggest products based on a customer's previous purchases, browsing history, or even similar customers' buying patterns. In media streaming services, AI can recommend movies or shows based on viewing history, ratings, and preferences. This level of personalization not only improves the user experience but also increases the likelihood of conversions and customer loyalty.

Moreover, AI-driven personalization extends beyond individual recommendations. It can also be used to create dynamic pricing strategies, where prices are adjusted based on customer behavior and market trends. This ensures that customers receive the most relevant and competitive offers, further enhancing their experience and satisfaction.

In summary, AI's role in personalization and recommendations is transformative, enabling businesses to provide a more tailored and engaging experience for their customers, ultimately driving sales and fostering long-term relationships.

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> Entering new AgentExecutor chain...
```
{
  "action": "Final Answer",
  "action_input": "AI is revolutionizing supply chain management by
```

```
optimizing inventory levels, predicting demand, and improving
logistics. AI-powered systems can analyze historical data, market
trends, and external factors to make accurate forecasts, ensuring
efficient resource allocation and reducing costs."
}
```

> Finished chain.
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Step: **Supply Chain Optimization**: AI is transforming supply chain management by optimizing inventory levels, predicting demand, and improving logistics. AI-powered systems can analyze historical data, market trends, and external factors to make accurate forecasts, ensuring efficient resource allocation and reducing costs.

Response: AI is revolutionizing supply chain management by optimizing inventory levels, predicting demand, and improving logistics. AI-powered systems can analyze historical data, market trends, and external factors to make accurate forecasts, ensuring efficient resource allocation and reducing costs.

> Entering new AgentExecutor chain...
Healthcare and Pharmaceuticals: AI has significant applications in healthcare, including medical diagnosis, drug discovery, and personalized treatment plans. AI algorithms can analyze medical records, assist in image analysis (e.g., medical imaging), and support clinical decision-making, potentially improving patient outcomes.

> Finished chain.
*****

Step: **Healthcare and Pharmaceuticals**: AI has significant applications in healthcare, including medical diagnosis, drug discovery, and personalized treatment plans. AI algorithms can analyze medical records, assist in image analysis (e.g., medical imaging), and support clinical decision-making, potentially improving patient outcomes.

Response: **Healthcare and Pharmaceuticals**: AI has significant applications in healthcare, including medical diagnosis, drug discovery, and personalized treatment plans. AI algorithms can analyze medical records, assist in image analysis (e.g., medical imaging), and support clinical decision-making, potentially improving patient outcomes.

> Entering new AgentExecutor chain...
The current objective, "Financial Services," highlights the application of AI in the financial industry, particularly in algorithmic trading, risk assessment, and fraud detection. Here's a

summary of the key points:

- **Algorithmic Trading:** AI models can analyze vast amounts of market data, historical trends, and real-time information to predict stock prices and make investment recommendations. This enables financial institutions to make strategic decisions and execute trades more efficiently.

- **Risk Assessment:** AI algorithms can assess and manage risks associated with investments, loans, and other financial activities. By analyzing historical data and market trends, these models can identify potential risks and help institutions make informed decisions to mitigate them.

- **Fraud Detection:** AI techniques, such as machine learning, are crucial for identifying fraudulent activities in financial transactions. These systems can detect anomalies, patterns, and suspicious behavior, helping businesses prevent financial losses and protect sensitive data.

The integration of AI in financial services is transforming the industry by improving efficiency, accuracy, and decision-making processes. As AI continues to advance, its role in financial institutions is likely to become even more prominent, shaping the future of the financial sector.

> Finished chain.
*****

Step: **Financial Services**: In the financial industry, AI is used for algorithmic trading, risk assessment, and fraud detection. AI models can analyze market data, predict stock prices, and make investment recommendations, aiding financial institutions in making strategic decisions.

Response: The current objective, "Financial Services," highlights the application of AI in the financial industry, particularly in algorithmic trading, risk assessment, and fraud detection. Here's a summary of the key points:

- **Algorithmic Trading:** AI models can analyze vast amounts of market data, historical trends, and real-time information to predict stock prices and make investment recommendations. This enables financial institutions to make strategic decisions and execute trades more efficiently.

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**Human Resources (HR)**: AI is transforming HR processes by automating recruitment, employee screening, and performance evaluation. AI-powered systems can analyze resumes, conduct initial interviews, and provide data-driven insights to improve hiring decisions and employee retention.

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> Entering new AgentExecutor chain...
The current objective, "Business Strategy and Planning," highlights the application of AI in enhancing business operations and decision-making. Here's a summary of the key points:

- **Real-Time Data Visualization and Analytics:** AI-driven business intelligence tools provide real-time data visualization and analytics, enabling executives to make informed strategic decisions. These tools help identify market trends, assess competitors, and optimize business strategies.
- **Competitive Advantage:** By leveraging AI technologies, businesses can gain a competitive edge. AI's ability to process and interpret vast amounts of data quickly allows companies to stay ahead of market trends, adapt to changes, and make strategic decisions faster than
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their competitors.
- **Operational Efficiency:** AI-powered automation streamlines business processes, handling repetitive and time-consuming tasks. This leads to increased efficiency, reduced operational costs, and improved productivity. For example, robotic process automation (RPA) can automate data entry, invoice processing, and customer support.
- **Customer Satisfaction:** AI enhances customer satisfaction through personalized experiences. AI algorithms can analyze customer behavior and preferences to deliver tailored recommendations, improving engagement and increasing sales. This is widely used in e-commerce, media streaming, and advertising.
- **Strategic Decision-Making:** AI provides valuable insights and data-driven recommendations, enabling businesses to make informed strategic decisions. By analyzing market trends, customer behavior, and competitor activities, AI helps companies identify new opportunities, optimize pricing strategies, and improve overall business performance.
- **Market Analysis and Competitor Assessment:** AI-driven tools can analyze vast amounts of data to identify market trends, assess competitors, and understand customer preferences. This information is crucial for businesses to make strategic decisions, such as product development, marketing strategies, and market expansion.

In summary, AI-driven business intelligence and automation are transforming the way companies operate and interact with their customers. By leveraging AI technologies, businesses can gain a competitive edge, improve operational efficiency, enhance customer satisfaction, and make more strategic decisions. The rapid progress in AI technology continues to push the boundaries of what businesses can achieve, shaping the future of various industries.

> Finished chain.
*****

Step: **Business Strategy and Planning**: AI-driven business intelligence tools provide real-time data visualization and analytics, enabling executives to make informed strategic decisions. These tools help identify market trends, assess competitors, and optimize business strategies.

By leveraging AI technologies, businesses can gain a competitive edge, improve operational efficiency, enhance customer satisfaction, and make more strategic decisions. The ability of AI to process and interpret vast amounts of data quickly is transforming the way companies operate and interact with their customers.

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print(response)
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