

FinHack Challenge Case 2024

Topic 1: Predictive Carbon Pricing Tool

Objective: Develop a tool that predicts future carbon prices within a specified market or sector, leveraging historical data and market trends. This solution requires a collaborative approach, with team members focusing on data collection and analysis, model development, and interface design to ensure the project's feasibility within the given timeframe.

Expected outcome: The project encompasses data collection, predictive model development, and a user-friendly application interface. A functional tool providing accurate carbon pricing predictions to assist businesses and investors in making informed decision.

Topic 2: Algorithmic trading using advanced quantitative strategy.

Objective: The primary objective of the topic is to develop and implement algorithmic trading strategies that maximize returns while mitigating risk. Participants will leverage advanced quantitative techniques and technology platforms to design robust, innovative, optimized, and profitable trading algorithms and strategies.

Expected outcomes:

- Participants can utilize Yahoo Finance, Quant Connect, Bloomberg Terminal, or any other source for data extraction, back-testing, and optimization of trading algorithms.
- Participants can implement trading algorithms in Python, R or C.
- Teams must provide clear and comprehensive documentation detailing the trading strategy, code implementation, and performance analysis.
- Participants deliver a professional presentation summarizing the trading strategy, code implementation, performance analysis, and key insights.
- Participants can develop trading strategies for a wide range of financial instruments and derivatives, including equities, debt instruments, forex, and interest rates.

Topic 3: Personal Financial Management

Objective: Personal Finance Management is important for consumers. Financial Independence is an ideal lifestyle living a life free of financial stress. The Millennials (Gen Y) face lots of challenges from wage stagnation, increasing wealth gap, large education debt and credit card debt. Participants will build a tool/application which focus on personal saving, expense monitoring, debt management, and personal investment advisory. The tool will help millennials to achieve the goal of Financial Independence, Retire Early (FIRE).

Expected Outcome: An application, interface, or dashboards for consumers to understand personal financial status and assistant on investment decision making.

Topic 4: Leveraging Sentiment Analysis for Strategic Investment Decisions

Objective: The primary goal is to create a sophisticated and reliable platform/algorithm that leverages sentiment analysis for making informed investment decisions. By accurately assessing market sentiment and its potential impacts on market trends, the system/algorithm will serve as an invaluable resource for investors, traders, financial analysts, and policymakers.

By addressing this challenge, participants will contribute to the evolving field of financial technology, offering tools that can significantly enhance investment strategies through the strategic application of sentiment analysis.

Background: The investment landscape is complex and multifaceted, influenced by countless variables that can affect the valuation and performance of assets. Among these variables, market sentiment stands out as a critical, albeit challenging, element to quantify and analyze. Investor sentiment, public opinion, and the overall mood surrounding specific sectors or companies generate momentum and consequently impact stock prices and market trends in a significant way. With the advent of big data and advanced analytical tools, there's a growing opportunity to systematically analyze sentiment and use these insights to guide investment decisions.

Expected Outcomes: To develop a comprehensive system/algorithm that employs sentiment analysis, powered by advanced NLP techniques, to inform and guide investment decisions. This system/algorithm should aggregate and analyze data from diverse sources, including news articles, social media platforms, financial reports, and other relevant data streams, to gauge market sentiment towards specific financial security portfolio/stock. Utilizing sentiment analysis and ML, the system aims to identify patterns, trends, and potential market movements, providing a robust algo for investors to make more informed decisions.

Topic 5: Customer Churn prediction using AI

Problem statement: By definition, Customer churn is measured using customer churn rate. That's the number of people who stopped being customers during a set period of time. In the subscription-based businesses like Netflix, customer churn poses a significant challenge. Identifying customers at risk of churn and implementing proactive strategies to retain them is crucial for sustainable growth and profitability. Your task is to develop an AI-driven solution that predicts customer churn and recommends personalized interventions to reduce churn rates.

Expected Outcomes: The participants will develop a machine learning model that accurately predicts customer churn based on historical data and user behavior while also incorporating revenue metrics. The aim is to leverage AI techniques to identify key factors influencing churn and recommend targeted actions to mitigate churn risk, ultimately leading to increased customer retention and revenue generation. The project will explore the effectiveness of different intervention strategies in terms of revenue impact.

Topic 6: Open Topic

Objectives: AI has been developed significantly in last decade. Scientists focus on to build algorithms so machines can identify objects of images and recognize speech. The models were built to discover the patterns of big data. The technology advancement facilitates innovations in the fields of data center (big data), specialized computer chips, Deep Learning, and Internet of Things. Furthermore, the launch of LLM (ChatGPT) and human like text was expected to bring profound impact on the world. The project is to address the opportunities and challenges in financial industry in the next wave of AI.

Expected Outcomes: The participants will pitch an idea about the application and deployment of AGI in different financial areas such as financial advising, credit accessibility, banking operations and services, risk assessment and management, decentralization in finance, compliance and reporting, and etc. Be creative and redefine the traditional job roles and skill sets in financial sector.

General Guideline

- **Define the deliverable product:** Decide what products are suitable for the project results. You can develop interface solution (API), an application, a program in Python/R/C, a storybook or data story in Tableau / PowerBI, Pitched ideas on PPT, or a strategy on QuantConnect platform.
- **Innovation in Data Usage:** Innovative use of data from varieties of resources like government bureaus, Federal Reserve, 10K/10Q on SEC, social media platforms, financial platforms like Bloomberg / Capital IQ / LSEG Workspace, ESG data, and customer data and demographic information.
- **Data Clean-up and Preprocessing:** Clean, preprocess, and integrate data to handle missing values, encode categorical variables, and prepare for analysis.
- **Exploratory Data Analysis (EDA):** Perform EDA to gain insights of the hack topics. Visualize data to uncover patterns and trends.
- **Algorithm and Technology:** The application of advanced machine learning, AI tools, other algorithms. The participant may be asked to test the performance of algorithm by a specified time of period.
- **Quality and Clarity of Code/Documentation:** The organization and thoroughness of the technical documentation.
- **Practical Implementation and Scalability:** The system's applicability and scalability in real-world decision-making process.