SANDIP UNIVERSITY (UGC Recognised)

SUNHACK-2024

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PROBLEM STATEMENT

Problem Statement: AI-Driven Smart HVAC Management for Enhanced Efficiency and Sustainability

Theme : AI/ML

Description : Develop an AI-driven climate control system for air conditioners that optimizes energy efficiency and user comfort by analyzing environmental factors, occupancy patterns, and user preferences in real-time.

Expected Features:

1. **Environmental Sensing:** Utilize sensors to collect data on temperature, humidity, air quality, and sunlight intensity inside and outside the building. [can use datasets]
2. **Weather Prediction data:** Analysis of the weather prediction data set then suggests proactive set of the temperature level.
3. **Occupancy Detection:** Incorporate occupancy sensors to detect the presence of people in different areas of the building and adjust the climate settings accordingly.
4. **AI Optimization:** Implement machine learning algorithms to analyze AC temperature and humidity data, end point monitoring sensor historical data, weather predication and learn user preferences and occupancy patterns over time. The AI model can then predict and optimize climate settings to maximize comfort while minimizing energy consumption.
5. **Dynamic Scheduling:** Automatically adjust climate settings based on the time of day, day of the week, and specific events (e.g., meetings, work hours) to ensure optimal comfort and efficiency.
6. **Proactive Notification:** Generate the proactive notification to set the AC temperature for a day depending on data analysis.

Technologies to Use:

IoT Sensors dataset: Use IoT sensors dataset which can be collecting environmental and occupancy data.(dataset parameter: timestamp,sensor name ,location, temp value, humidity value)

Machine Learning: Implement machine learning algorithms for data analysis and prediction by processing end sensors , AC temperature reading , climate changes, environmental impact .
GUI: Develop a web interface for users to interact with the climate control system.

Problem Statement: Smart Resume Collection and Filtering System

Theme : Mobile/WebApp

Description : Create an AI-powered platform that streamlines the process of collecting resumes from job applicants and automatically filters them based on their relevance to specific job descriptions.

Expected Features:

1. **Resume Collection:** Allow job applicants to submit their resumes through the platform either by uploading a file or filling out a form. Collect relevant information such as work experience, education, skills, and certifications.
2. **Job Description Analysis:** Utilize natural language processing (NLP) techniques to analyze job descriptions and extract key requirements, qualifications, and skills needed for each job opening.
3. **Resume Parsing:** Implement resume parsing algorithms to extract information from resumes and convert them into structured data that can be analyzed and compared against job descriptions.
4. **Matching Algorithm:** Develop a machine learning-based matching algorithm that compares resumes against job descriptions and assigns a relevance score based on the degree of alignment between the two.
5. **Filtering and Ranking:** Automatically filter resumes based on their relevance scores and rank them in descending order of suitability for the job. Present the top-ranked resumes to recruiters or hiring managers for further review.
6. **Job Description Matching:** Analyze job descriptions to identify key requirements, skills, and qualifications needed for each job opening. Use machine learning algorithms to match job seekers' profiles with relevant job descriptions.

Technologies to Use:

1. **Natural Language Processing (NLP):** Utilize NLP libraries and frameworks (e.g., spaCy, Word2Vec) to analyze resumes and job descriptions, extract relevant information, and identify semantic similarities between text documents.
2. **Machine Learning:** Train machine learning models using supervised learning techniques to build the recommendation and matching algorithms, leveraging features extracted from resumes and job descriptions.
3. **Database Management:** Use databases to store job seeker profiles, resumes, job openings, and matching results securely. Consider using relational databases or NoSQL databases depending on the scalability and complexity of the system.
4. **Web Development:** Develop a user-friendly web application for job seekers to create profiles, search for job openings, and receive recommendations, as well as for employers/recruiters to post jobs, search for candidates, and view resume matches.

Problem Statement: LifeBalance360: Your Personal Health and Well-being Advisor with Integrated Goal Tracking

Theme : Healthcare

Description:

Develop a platform that enables individuals to set, track, and achieve personal goals related to their health and well-being, leveraging machine learning algorithms to provide personalized recommendations and insights for success.

Expected Features:

1. **Goal Setting and Personalization:** Allow users to define personalized goals related to their health, fitness, career, education . Provide guidance and recommendations for setting realistic and achievable goals based on individual preferences, priorities, and circumstances. Whether it's losing

weight, improving fitness levels, managing stress, or enhancing sleep quality, users can track their progress over time using intuitive goal tracking tools.

2. **Data Collection and Integration:** Collect data from various sources, including wearable devices, health apps, productivity tools, and self-assessment surveys, to track progress towards goals and monitor key metrics related to physical activity, sleep, nutrition, productivity, and emotional well-being.
3. **Machine Learning Models:** Develop machine learning models to analyze user data and behavior patterns, identify trends, and predict future outcomes. Use these insights to provide personalized recommendations, interventions, and feedback to help users stay on track towards their goals.
4. **Goal Progress Tracking:** Visualize goal progress and milestones using interactive dashboards and progress trackers. Provide users with real-time feedback on their performance, achievements, and areas for improvement to motivate and empower them to succeed.
5. **Behavioral Insights:** Analyze user behavior and engagement patterns to uncover factors influencing goal attainment, such as habits, motivation levels, social support networks, and environmental factors. Use behavioral insights to tailor interventions and strategies for behavior change.

6. **Integrated Advisor Modules:**
    1. **Nutrition Advisor:** Access personalized meal plans, dietary recommendations, and recipe suggestions based on individual preferences, dietary restrictions, and health goals. Track food intake and receive feedback on nutritional balance to make informed dietary choices.
    2. **Fitness Advisor:** Receive customized workout plans, exercise routines, and activity recommendations aligned with fitness objectives and personal capabilities. Monitor workout performance, track fitness metrics, and adjust plans as needed to achieve optimal results.
    3. **Mindfulness & Stress Management Advisor:** Learn mindfulness techniques, stress reduction strategies, and relaxation exercises to cultivate mental well-being and resilience. Receive guidance on managing stress effectively and enhancing overall emotional health.

4. **Sleep Optimization Advisor:** Explore sleep hygiene practices, sleep improvement strategies, and relaxation techniques to enhance sleep quality and establish healthy sleep patterns. Track sleep duration, analyze sleep patterns, and receive insights for optimizing sleep health.

Technologies to Use:

1. **Machine Learning:** Utilize machine learning algorithms such as regression, classification, clustering, and reinforcement learning to build predictive models, personalized recommendation engines, and behavior change interventions.
2. **Data Integration:** Integrate with APIs and data sources from wearable devices, health trackers, fitness apps, productivity tools, and electronic health records (EHRs) to collect and aggregate user data securely.
3. **Natural Language Processing (NLP):** Implement NLP techniques to analyze unstructured data, such as user-generated text, feedback, and journal entries, to extract insights and sentiment related to goal progress and well-being.
4. **Data Visualization:** Develop interactive data visualization tools and dashboards using libraries like Matplotlib, Plotly, or D3.js to present goal progress, trends, and insights in a visually appealing and user-friendly format.
5. **Web/Mobile Development:** Build a user-friendly web or mobile application for users to set goals, track progress, receive recommendations, and interact with the AI-powered system seamlessly from any device.

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Problem Statement: AgroTrade: Enabling Farmers with Analytics-Powered Selling Practices by Providing Strategic Selling Intelligence

Theme : FinTech

Description:

AgroTrade is a platform designed to empower farmers with data-driven insights and strategic selling intelligence to optimize their selling practices and maximize their profits in agricultural markets. By leveraging analytics and market data, AgroTrade aims to provide farmers with actionable recommendations and decision support tools to improve their selling strategies and enhance market competitiveness.

Expected Features:

1. **Market Analytics Dashboard:** Provide farmers with access to a comprehensive market analytics dashboard that aggregates real-time data on market prices, demand trends, and competitor activities across various agricultural commodities.
2. **Price Prediction Models:** Develop machine learning models to forecast future market prices for different agricultural commodities based on historical pricing data, weather patterns, seasonal trends, and supply-demand dynamics. Provide farmers with price prediction tools and alerts to anticipate market fluctuations and optimize the timing of their sales to maximize profitability.
3. **Competitor Analysis:** Conduct competitor analysis to track the pricing strategies, product offerings, and market positioning of competitors in the agricultural marketplace. Provide farmers with comparative insights and benchmarking data to evaluate their competitiveness and adjust their selling practices accordingly.
4. **Selling Strategy Optimization:** Offer personalized recommendations and insights to farmers on optimal selling strategies, including pricing tactics, product differentiation, packaging options, and marketing approaches. Utilize data-driven insights to help farmers identify niche markets, target customer segments, and tailor their selling practices to meet consumer preferences and market demands.

5. **Supply Chain Visibility:** Improve supply chain visibility by integrating with logistics and distribution channels to track the movement of agricultural products from farm to market. Provide farmers with real-time updates on inventory levels, shipping schedules, and delivery status to streamline the selling process and minimize supply chain disruptions.
6. **Decision Support Tools:**Develop decision support tools and calculators to help farmers assess the financial impact of different selling scenarios, evaluate trade-offs, and optimize their selling decisions.Offer scenario analysis, sensitivity analysis, and risk assessment tools to help farmers mitigate risks and uncertainties in the agricultural marketplace.

Technologies to Use:

1. **Data Analytics:** Utilize data analytics techniques and tools to analyze market data, pricing trends, and competitor activities, and derive actionable insights for farmers.
2. **Machine Learning:** Develop machine learning models for price prediction, demand forecasting, and competitor analysis to provide predictive analytics and decision support capabilities.
3. **Data Integration:** Integrate with external data sources, such as agricultural market databases, weather APIs, and supply chain systems, to access real-time data and enhance the platform's analytics capabilities.
4. **Web/Mobile Development:** Build a user-friendly web or mobile application for farmers to access the AgroTrade platform, view market insights, receive recommendations, and make selling decisions on the go.
5. **Geospatial Analysis:** Incorporate geospatial analysis tools and geographic information systems (GIS) to visualize regional market dynamics, identify localized trends, and target specific market segments.