**Capstone Project Concept Note and Implementation Plan**

**Project Title: [World Happiness]**

**Team Members**

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**Concept Note**

**1. Project Overview**

* This project, which is about world happiness, can be used to display the percentage of happiness in European countries, forecast or display the happiness of various individuals from various countries in the future, and demonstrate the consequences and solutions to the issues these individuals may face in their lifetime, this project will help people to face the problems of their life and change or remove all the obstacle which they face in their life.

**2. Objectives**

* Provide a thorough process for measuring and evaluating happiness levels worldwide.
* Examine and determine what makes people and communities happy and well-adjusted.
* Examine how socioeconomic, cultural, environmental, and individual factors affect happiness.
* Update and improve techniques frequently in response to evaluation findings and feedback.
* Make an effort to promote mental health and lessen the stigma attached to mental health problems.
* Research should be done constantly to update and improve our knowledge of happiness and well-being.

**3. Background**

* Offer a comprehensive background that contextualizes the problem your project seeks to solve.
* Compile and evaluate information from various demographics in order to calculate and prioritize nations according to happiness standards
* Create a forum where nations can share success stories and best practices for fostering happiness.
* Make use of sophisticated data analytics to extract knowledge from big databases pertaining to happiness around the world.
* Using machine learning models and algorithms we can easily predict the future issues and find the ways to solve this problem for making human life better than the past.

**4. Methodology**

I will use Decision tree and SVM algorithms from machine learning to solve and predict world happiness project issues and I will use python, Orange and Weka tools to predict and implement this project in a better way with better result.

**5.** **Architecture Design Diagram**

* Provide a high-level overview of the architecture of your project.
  + Use a diagram to illustrate the key components and their interactions.
* Briefly describe each component shown in the diagram
  + Highlighting their roles and functionalities within the overall system.

**6. Data Sources**

I will use the World Happiness Dataset for my project because it is ready and data are collected previously based on true scenarios so it will be hard or impossible for us to collect new data for working on it. World Happiness Dataset is a complete dataset which is collected in Europe countries and it is a real world Dataset which is used by many other data analysts and they accepted working in this dataset to solve the future issues

**7. Literature Review**

The World Happiness Project is an extensive research project with the goal of identifying and quantifying the elements that affect happiness on a worldwide scale. In this proposal for data research, we will examine the significance of the research questions the project aims to answer and stress the need for a careful examination of the data that has been gathered.

**Implementation Plan**

**1. Technology Stack**

I will use different tools and different libraries or frameworks in order to complete my project more efficient and clear.

Below are some tools, frameworks and programming language that I want to use in this project.

* + Pandas, Numpy, Matplotlib, Scipy, SKLEARN etc…
  + Programming language I will use only Python
  + Tools I will use WEKA and ORANGE tools which are used for MACHINE LEARNING
  + I will use Agile for my project management

**2. Timeline**

My project will be complete in one month or 6 weeks.

* + Data collection and preprocessing will take 1 week.
  + Model development will be completed in 2 weeks or less.
  + Training, and evaluation of dataset will complete in 2 weeks
  + Deployment will finish in 1 weeks

| Task | Duration | Start Date | End Date |
| --- | --- | --- | --- |
| Data Preprocessing | 1 week | 2023-09-10 | 2023-09-17 |
| Model Development | 2 weeks | 2023-09-18 | 2023-10-02 |
| Data Training and Evaluation | 10 Days | 2023-10-02 | 2023-10-12 |
| Deployment | 1 week | 2023-10-12 | 2023-10-19 |

**3. Milestones**

This are the key milestones of my project that I want to work on it:

**Data Preprocessing Phase:**

1. **Data Collection Completed:**

Ensure that all relevant data sources have been identified and collected for the World Happiness project.

1. **Data Cleaning and Imputation:**

Completion of data cleaning and imputation processes to handle missing values and ensure the dataset is ready for analysis.

1. **Feature Engineering:**

Identify and create relevant features that contribute to the analysis of global happiness.

1. **Data Preprocessing Completed:**

Confirm the completion of all data preprocessing tasks, making the dataset ready for model development.

**Model Development Phase:**

1. **Model Architecture Defined:**

Finalize the architecture of the Generative Adversarial Network (GAN) that will be used for the World Happiness project.

1. **Model Coding Completed:**

Finish coding the GAN model based on the defined architecture.

1. **Initial Model Testing:**

Conduct initial testing to ensure that the GAN model is functioning as expected.

1. **Model Validation:**

Validate the model's effectiveness in generating data that aligns with global happiness indicators.

**Data Training and Evaluation Phase:**

1. **Model Training Completed:**

Successfully train the GAN model using the preprocessed dataset.

1. **Evaluation Metrics Defined:**

Establish the metrics to be used for evaluating the performance of the GAN model.

1. **Model Evaluation Completed:**

Evaluate the model's performance against predefined metrics and make any necessary adjustments.

1. **Finalized GAN Model:**

Confirm the final version of the GAN model ready for deployment.

**Deployment Phase:**

1. **Integration with User Interface:**

Integrate the GAN model with any user interface or system through which it will be accessed.

1. **End-to-End Testing:**

Conduct end-to-end testing to ensure the model performs well in a real-world environment.

1. **Deployment Completed:**

Successfully deploy the World Happiness model for public access or further analysis.

1. **Documentation and Knowledge Transfer:**

Document the model, its deployment process, and transfer knowledge to relevant stakeholders.

**4. Challenges and Mitigations**

1. **Data Quality and Availability:**
   * **Challenge:** Incomplete or inaccurate data, as well as a lack of comprehensive global happiness data.
   * **Mitigation:** Conduct thorough data validation and cleaning. Explore alternative data sources and consider employing imputation techniques. Collaborate with organizations or entities that specialize in collecting happiness-related data.
2. **Model Complexity:**
   * **Challenge:** Designing and implementing a complex Generative Adversarial Network (GAN) model can be challenging.
   * **Mitigation:** Break down the model development into manageable phases. Start with a simpler model and gradually introduce complexity. Regularly test and validate each iteration to ensure it aligns with project objectives.
3. **Ethical Considerations:**
   * **Challenge:** Ensuring that the project respects privacy, cultural sensitivities, and ethical guidelines.
   * **Mitigation:** Prioritize ethical considerations from the outset. Implement anonymization techniques when working with sensitive data. Stay informed about and adhere to relevant ethical guidelines and standards. Engage with stakeholders and obtain consent where necessary.
4. **Interpreting Happiness:**
   * **Challenge:** Defining and interpreting happiness can be subjective and culturally dependent.
   * **Mitigation:** Clearly define the indicators and metrics used to measure happiness. Consider cultural nuances and conduct thorough literature reviews to understand different perspectives on happiness. Involve experts in psychology or sociology in project discussions.
5. **Model Evaluation Metrics:**
   * **Challenge:** Determining appropriate metrics for evaluating the performance of the GAN model.
   * **Mitigation:** Choose evaluation metrics that align with the project's goals. Consider both quantitative and qualitative metrics. Regularly review and update evaluation metrics based on the evolving understanding of project requirements.
6. **Resource Constraints:**
   * **Challenge:** Limited budget, computing resources, or expertise.
   * **Mitigation:** Prioritize tasks based on their impact and feasibility. Seek partnerships or collaborations with organizations or individuals who can provide additional resources or expertise. Explore cloud-based solutions to scale computing resources as needed.
7. **Deployment Challenges:**
   * **Challenge:** Integrating the model into a real-world setting and ensuring its seamless deployment.
   * **Mitigation:** Conduct thorough testing before deployment. Develop a comprehensive deployment plan that includes monitoring, error handling, and rollback procedures. Provide documentation and training to users.
8. **User Adoption and Interpretability:**
   * **Challenge:** Ensuring that end-users understand and trust the model's outputs.
   * **Mitigation:** Create user-friendly interfaces and documentation. Communicate clearly about the limitations of the model and provide guidance on interpreting results. Solicit user feedback for continuous improvement.
9. **Ethical Considerations**
10. **Informed Consent:**
    1. **Consideration:** Ensure that individuals participating in surveys or providing data for the project give informed consent. Clearly communicate the purpose of the project, how their data will be used, and any potential risks involved.
11. **Privacy Protection:**
    1. **Consideration:** Safeguard the privacy of individuals contributing to the project. Follow data protection regulations and standards. Implement anonymization techniques to de-identify sensitive information.
12. **Cultural Sensitivity:**
    1. **Consideration:** Be mindful of cultural differences in the perception of happiness. Avoid imposing a specific cultural perspective on happiness and consider diverse viewpoints. Respect cultural nuances when interpreting and presenting findings.
13. **Bias and Fairness:**
    1. **Consideration:** Address potential biases in data collection, preprocessing, and modeling. Be transparent about potential biases and take steps to mitigate them. Ensure that the project's outcomes are fair and do not perpetuate discrimination.
14. **Transparency and Accountability:**
    1. **Consideration:** Maintain transparency throughout the project. Clearly communicate the methodologies, assumptions, and limitations of the model. Establish accountability for the project's outcomes and decisions.
15. **Benefit and Harm Assessment:**
    1. **Consideration:** Assess the potential benefits and harms of the project on individuals and communities. Strive to maximize positive impact while minimizing any negative consequences. Consider the broader societal implications of the project.
16. **User Empowerment:**
    1. **Consideration:** Empower users by providing them with understandable and actionable information. Avoid creating a sense of helplessness or dependency on the model's outputs. Encourage critical thinking and informed decision-making.
17. **Data Ownership and Stewardship:**
    1. **Consideration:** Clearly define data ownership and stewardship responsibilities. Respect the rights of data contributors and ensure that their data is handled responsibly. Establish data governance practices to ensure ethical data management.
18. **Openness and Collaboration:**
    1. **Consideration:** Foster openness and collaboration with stakeholders, including the public, researchers, and policymakers. Encourage dialogue and participation to ensure a diversity of perspectives is considered in the project.
19. **Long-Term Impact:**
    1. **Consideration:** Assess the long-term impact of the World Happiness Project on individuals and society. Consider potential unintended consequences and take steps to mitigate any negative effects that may arise over time.
20. **Continuous Ethical Review:**
    1. **Consideration:** Implement a continuous ethical review process throughout the project lifecycle. Regularly reassess ethical considerations in light of evolving circumstances, new information, and changing ethical standards.

**6. References**

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4. Lyubomirsky, Sonja, Laura King, and Ed Diener. 2005. “The Benefits of Frequent Positive Affect: Does Happiness Lead to Success?” *Psychological Bulletin* 131(6): 803–55.
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