**STREAM HARMONY**

**Capstone Project Proposal**

**Submitted by:**

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**BE Third Year-**

**CPG No. 150**

Under the Mentorship of

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Designation



**Computer Science and Engineering Department**

**Thapar Institute of Engineering and Technology, Patiala**

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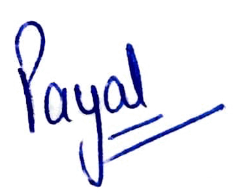
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**Mentor Consent Form**

I hereby agree to be the mentor of the following Capstone Project Team

|  |  |  |
| --- | --- | --- |
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**Project Overview:**

**Stream Harmony Empowering streamers to curate positive live chats**

"Stream Harmony": A Revolutionary AI-Driven Comment-Scoring System

• Utilizes advanced technologies like sentiment analysis and machine learning to assign numerical scores based on user comments.

• Scores serve as a metric for user engagement, ranging from positive to negative.

• Streamers can set precise thresholds for comment scores during live streams.

• The system aims to foster a positive community ambiance during live broadcasts.

• Stream Harmony combines technological innovation and social enhancement, reshaping digital streaming engagement.

**Problem Statement**

**Challenges:**

• **Resource-intensive**: Manual moderation requires significant time and effort from streamers.

• **Inconsistent application:** Human subjectivity can lead to inconsistent moderation, fostering perceived bias.

**• Limited scalability:** Manual moderation becomes infeasible as viewer and comment count increases.

**Consequences:**

**• Negative user experiences:** Viewers may encounter harmful content, impacting viewership.

• **Streamer burnout:** Moderation burden can cause stress and burnout.

• **Hindered community growth:** Unmoderated negativity discourages positive interaction.  
  
**Opportunity:**

**• Novel system:** Leverages Natural Language Processing and machine learning to automate comment analysis, mitigate bias, and enable flexible moderation.

**Need Analysis**

**1. Community Well-being:**

* **Challenge:** Toxic and inappropriate comments harm community well-being.
* **Solution:** Stream Harmony filters negativity for a healthier environment.

**2. Content Moderation Burden:**

* **Challenge:** Manual comment moderation is overwhelming and time-consuming.
* **Solution:** Stream Harmony automates scoring, allowing setting thresholds for streamlined moderation.

**3. Enhanced Viewer Experience:**

* **Challenge:** Disruptive comments detract from viewer experience.
* **Solution:** Stream Harmony curates the chat for a more engaging experience.

**4. Personalized Streamer Control:**

* **Challenge:** Lack of personalized control over user interactions based on past behaviour.
* **Solution:** Stream Harmony offers individual thresholds for comment scoring, granting streamers more control over chat participation.

**5. Mitigation of Online Harassment:**

* **Challenge:** Online harassment and negativity pose risks to all.
* **Solution:** Stream Harmony enables proactive moderation for a safer space.

**6. Encouragement of Positive Engagement:**

* **Challenge:** Positive comments get overshadowed by negativity.
* **Solution:** Stream Harmony promotes positive engagement by highlighting users with good scores.

**Literature Survey**

**Novelty**

**Real-Time Engagement Enhancement:**

* System dynamically evaluates live stream comments.

**Efficient Automated Moderation:**

* Comment filtering uses sentiment scoring.
* Eliminates the need for manual intervention.

**Customizable Moderation Control:**

* Empowers streamers with personalized threshold settings.
* Streamers will have manual power to review and change the decision of ML Model.

**Seamless Platform Integration:**

* Integrates with live-streaming platforms' APIs.

**Continuous Iterative Enhancement:**

* Involves regular feedback gathering and model retraining.

**Objectives**

**Real-Time Comment Scoring System:**

* **Design and implement a system for live comment analysis using NLP techniques.**
* **Train a machine learning model to classify comments based on criteria like sentiment, relevance, and toxicity.**
* **Generate scores for each comment in real time.**

**Streamer Control:**

* **Enable streamers to set a minimum score threshold for comment participation.**
* **Integrate the scoring system into the streaming platform to automatically restrict commenting privileges for users below the threshold.**

**Fair and Unbiased Moderation:**

* **Implement robust data collection and training methods to mitigate potential biases.**
* **Monitor and address bias drift over time through regular re-evaluation and adjustments.**

**Transparency and User Control:**

* **Inform users about the system's purpose, data collection practices, and consequences of low scores.**
* **Provide users with mechanisms to appeal scores and request manual review by human moderators.**

**Methodology**

**Phase 1: Data Acquisition and Model Training**

1. **Data Collection:**
   * Secure a diverse and substantial dataset of labeled comments. This can involve:
2. **Data Preprocessing:**
   * Implement data cleaning techniques to remove irrelevant information (e
   * Leverage NLP techniques like tokenization, stemming, and lemmatization for improved text analysis.
   * Extract relevant features from the comments using feature engineering
3. **Model Selection and Training:**
   * Choose a suitable machine learning model for text classification tasks, potentially considering options like:
     + Naive Bayes
     + Support Vector Machines (SVM)
     + Recurrent Neural Networks (RNNs)
   * Train the chosen model on the prepared data, aiming for high accuracy in classifying comments based on our defined criteria.

**Phase 2: Real-time Integration and User Scoring**

1. **Real-time Comment Processing:**
   * Design and implement a system that continuously ingests live comments from the streaming platform's API or other relevant source.
   * Utilize NLP techniques to analyze each incoming comment in real-time, extracting necessary features for scoring.
2. **Dynamic User Scoring:**
   * Feed the extracted features from the processed comment into the trained model to obtain a corresponding score.
   * Develop a scoring system that dynamically updates a user's overall score by:
     + Considering past comments and their scores.
     + Implementing a weighting system where recent comments hold greater influence on the overall score.
3. **Threshold Setting and Action:**
   * Allow streamers to define a minimum score threshold for commenters to participate in the chat.
   * Implement automated actions based on the user's score and the streamer's chosen threshold:
     + Issue warnings for users approaching the threshold.
     + Restrict commenting privileges for users falling below the threshold.

**Phase 3: Monitoring and System Improvement**

1. **Continuous Monitoring and Evaluation:**
   * Regularly monitor the system's performance metrics, including accuracy, fairness, and latency.
   * Analyse user feedback and streamer experiences to identify areas for improvement.
2. **Bias Mitigation and Fairness:**
   * Proactively assess and address potential biases within the model's predictions. This may involve:
     + Regularly re-training the model with diverse data to minimize bias drift over time.
3. **Iterative Refinement:**
   * Based on the evaluation results, refine the model, scoring system, and user interface as needed. This iterative process ensures the system remains effective and aligned with evolving needs.

**Ethical Considerations:**

* **Transparency and User Consent:** Inform users about the system's purpose, data collection practices, and potential consequences (e.g., comment restriction).
* **Right to Appeal and Human Oversight:** Provide users with a mechanism to appeal their scores and involve human moderators in reviewing borderline cases.

**Project Outcomes**

**Positive Streamer Experience:**

* **Improved Stream Management:**
  + Reduced time spent moderating negativity.
  + Focus on content creation and interaction with positive viewers. Exclamation
* **Enhanced Chat Environment:**
  + Respectful and engaging chat atmosphere. Exclamation
  + Attract and retain viewers, contributing to streamer growth.
* **Data-driven Insights:**
  + Analyse user scores and feedback.
  + Refine content and audience engagement strategies. Exclamation

**Enhanced Viewer Experience:**

* **Promoted Civility:**
  + Discourage negativity and promote respectful dialogue.
  + More enjoyable experience for all viewers.
* **Increased Inclusivity:**
  + Mitigate bias and ensure fair application.
  + Promote a more inclusive and welcoming environment. Exclamation
* **Transparency and Control:**
  + Streamers can adjust the minimum score threshold.
  + Flexibility in managing their chat communities.

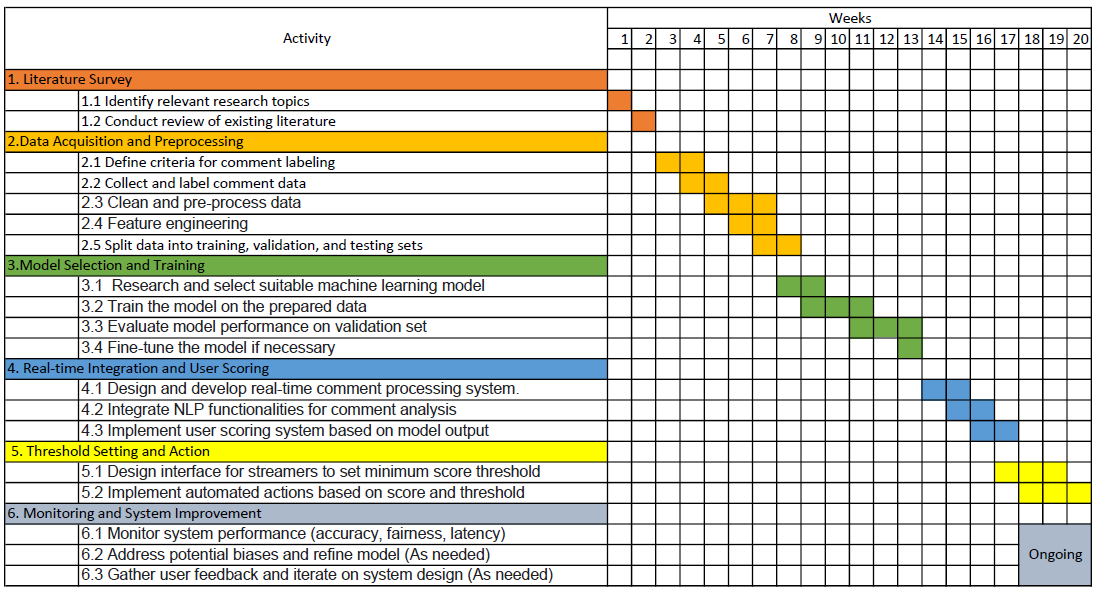
**Ethical Considerations:**

* **Continuous Monitoring and Bias Mitigation:**
  + Ensure the system operates fairly and avoids perpetuating bias.
* **Transparency and User Consent:**
  + Inform streamers and viewers about the system's purpose, data usage, and potential consequences. Exclamation
* **Right to Appeal and Human Oversight:**
  + Users can appeal their scores.
  + Human moderators review borderline cases.

**Course Subjects**

The knowledge gained from the following courses has contributed to this project:

1. Software Engineering
2. Data Science Applications
3. Artificial Intelligence
4. Machine Learning

**Work Plan**

**References**

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