**Plugin Use Case Document**

Smart Proctor

**Overview**

Smart Proctor is a proctoring-as-a-service plugin developed for Moodle, aimed at ensuring fairness and integrity in online examinations. With the growing rise of AI-powered tools like InterviewCoder and Parakeet AI, which provide undetectable assistance to students during tests, traditional proctoring solutions are becoming insufficient. Smart Proctor introduces a new approach by analyzing keystroke data and behavior patterns during exams to identify suspicious activity.

The plugin integrates seamlessly into Moodle, using a Flask-based backend API, PostgreSQL for data storage, and Docker for containerized deployment. Leveraging **Cortex Analyst from Snowflake**, Smart Proctor analyzes behavioral patterns in real-time and alerts examiners of potential misconduct.

**Problem Statement**

The integrity of online assessments is under serious threat due to the increasing sophistication of cheating methods. While camera monitoring and screen recording detect visible forms of malpractice, they fail against hidden helpers like AI-based code assistants and remote human support.

* **Challenge 1**: Existing proctoring systems cannot detect subtle, behavior-driven cheating.
* **Challenge 2**: Students are increasingly using AI tools that blend seamlessly with genuine test-taking.
* **Challenge 3**: Institutions and non-profits conducting online assessments face reputational and operational risks if exam integrity cannot be ensured.

Thus, there is a pressing need for an intelligent, non-intrusive, and behavior-aware solution to tackle modern exam malpractice.

**Proposed Solution**

Smart Proctor introduces a **keystroke and behavior analysis system** integrated into Moodle:

1. **Data Collection**:
   * Records keystrokes (including normal inputs and special key combinations).
   * Tracks frequency, patterns, and anomalies in typing behavior.
2. **Analysis**:
   * Data is sent securely to **Cortex Analyst on Snowflake**.
   * AI models analyze keystroke dynamics to detect unusual activity (e.g., inconsistent typing speeds, overuse of shortcuts, reliance on copy-paste).
3. **Flagging Suspicious Behavior**:
   * Alerts examiners about suspicious patterns.
   * Provides insights rather than raw logs, making it easy to interpret.
4. **Seamless Integration**:
   * Built as a **PHP plugin for Moodle** with a **Flask API** backend.
   * Uses **PostgreSQL** for storing keystroke data.
   * Containerized via **Docker** for smooth deployment.
   * Hosted and analyzed using **Snowflake services**.

**Benefits**

* **Enhanced Security**: Goes beyond traditional webcam monitoring by analyzing behavior.
* **AI-Resistant Proctoring**: Detects hidden AI helpers that conventional tools miss.
* **Non-Intrusive**: Students are monitored through natural interactions (keystrokes), not just cameras.
* **Scalable & Flexible**: Dockerized deployment allows easy integration with existing Moodle systems.
* **Actionable Insights**: Provides examiners with clear evidence of potential cheating, saving time and effort.

**Impact on Non-Profits**

Non-profits and educational institutions often conduct large-scale, low-cost online training and certification programs. Smart Proctor empowers them by:

* Maintaining **exam credibility**, ensuring certificates hold value in the market.
* Reducing the need for **expensive human proctors** or intrusive camera-based systems.
* Supporting **equal opportunity** by preventing dishonest practices from giving unfair advantages.
* Allowing non-profits to scale online learning programs with confidence.

**Competitive Advantage**

* **Unique Approach**: Unlike traditional proctoring tools that rely on visual/audio monitoring, Smart Proctor uses **keystroke dynamics**, making it resistant to hidden AI helpers.
* **Integration with Snowflake Cortex Analyst**: Provides advanced, real-time behavioural analysis that is difficult for competitors to replicate.
* **Seamless LMS Integration**: Designed as a Moodle plugin, it integrates smoothly into widely used education platforms.
* **Lightweight & Scalable**: Dockerized deployment ensures scalability without high infrastructure costs.
* **Privacy Respecting**: Focuses on keystroke patterns instead of video/audio monitoring, reducing privacy concerns.

**Conclusion**

Smart Proctor represents a next-generation approach to online exam security by focusing on **behavioural analysis rather than visual surveillance**. By integrating with Moodle and leveraging Snowflake’s Cortex Analyst, it delivers a scalable, AI-resistant, and non-intrusive proctoring solution.

This innovation not only enhances exam fairness but also strengthens the credibility of educational institutions and non-profits, enabling them to conduct online assessments confidently in the age of AI-driven cheating tools.