SakhaSonke: Student Performance Predictor

Deliverable Report: SDG Alignment & Ethical Considerations
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1. Introduction

SakhaSonke is an AI-powered web application that predicts student academic performance based on behavioural and socio-educational factors. It provides tailored advice and recommends subject-specific mentors, enabling early intervention for learners at risk of underperforming.

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2. Alignment with the UN Sustainable Development Goals (SDGs)

Primary SDG Targeted:
SDG 4: Quality Education – *"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all."*

How SakhaSonke addresses SDG 4:

- **Equity in Education**: Learners from underserved areas often lack access to academic feedback and mentoring. SakhaSonke bridges this gap by offering automated performance predictions and guidance.
- **Personalised Support**: By mapping predicted academic performance to CAPS-aligned levels (Levels 1–7), learners receive insights that match their school environment.
- **Data-Driven Intervention**: The app helps identify at-risk learners early, enabling targeted support and reducing dropout rates.

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3. Ethical Considerations

We have taken the following **ethical principles** into account during development:

Fairness & Bias Mitigation

- **Training Data Audit**: Our dataset (student-mat.csv) includes behavioural and educational features only. It does **not** use racial, gender, or socioeconomic data, reducing risk of bias.
- **Mentor Recommendations**: All learners are treated equally—advice is triggered based on performance data, not demographic background.

Privacy & Consent

- No personal or identifiable learner data is stored or required. The tool is intended for **anonymous input use**, meaning privacy is inherently preserved.

Transparency & Explainability

- The system explains performance levels using familiar CAPS descriptors (e.g., Level 4 – Moderate Achievement).
- Predictions are accompanied by reasons (e.g., "Low study time" or "High absences"), making the model more understandable for students and educators.

Accessibility & Inclusiveness

- Built using Flask (lightweight and mobile-friendly), making it accessible even in **low-bandwidth** environments typical of many South African schools.
- Subject options and advice are tailored to the South African curriculum to support relevance and contextualisation.

Environmental Sustainability

- Our model (Random Forest Regressor) is **computationally light**. It can be deployed on low-resource systems, reducing energy usage and supporting sustainable AI practices.

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4. Future Ethical Enhancements

- **Add feedback loop** to monitor unintended outcomes or biases.
- **User testing with real learners** to ensure advice is helpful and motivating.
- **Add model drift monitoring** if deployed at scale.

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5. Conclusion

SakhaSonke is a practical AI solution directly aligned with SDG 4. It supports educational equity, fosters ethical AI use, and demonstrates how software engineering principles—such as modular design, testing, and scalability—can address real-world challenges in under-resourced communities. With further refinement and deployment, SakhaSonke could empower thousands of learners to take control of their educational journeys.