北京邮电大学 本科毕业设计（论文）任务书

Project Specification Form

Part 2 - Student

学院 **School**	International School	专业 **Programme**	**e-Commerce Engineering with Law**		
姓 **Family name**	Guan	名 **First Name**	Xin		
BUPT 学号 **BUPT number**	2021213030	QM 学号 **QM number**	210981128	班级 **Class**	2021215116
论文题目 **Project Title**	AI-Enhanced Student Skills Development Tracker				
论文概述 **Project outline** **Write about 500-800 words** **Please refer to Project Student Handbook section 3.2**	**1. Introduction** The AI-Enhanced Student Skills Development Tracker is designed to monitor and improve key skills in students, such as critical thinking, problem-solving, and collaboration. This project aims to create an AI-driven system that tracks the development of these skills over time. By analysing data from assignments, assessments, and classroom activities, the system will provide insights into each student's progress in specific skill areas. Educators will receive detailed reports that highlight strengths and areas for improvement, while students will benefit from personalised recommendations that guide their skill development. The system will be designed to adapt to each student's unique learning journey, offering targeted resources and activities to help them grow. The goal is to support educators in fostering well-rounded skill development and to empower students to take control of their learning. **2. User Requirements** Students Students will interact with the system mainly by uploading or linking their performance data, such as assignment scores, class participation records, and self-assessments. The system will analyse this data to measure skill levels in areas like critical thinking, problem-solving, and collaboration. Based on these analyses, the system will generate detailed reports and offer personalized feedback. Students will receive tailored recommendations and notifications about areas that need improvement, along with suggested resources or activities to enhance their skills [1]. Educators Educators will have the option to view summaries of student skill assessments. They can also provide additional qualitative input, which the system will integrate into the analysis, offering a more holistic view of student progress. Educators can then review these insights and use them to adjust their teaching strategies. **3. Experiment and research** AI Model Performance Testing To ensure the skill tracker is both accurate and efficient, the AI models will undergo rigorous testing:				

Model Comparison: Different AI algorithms will be compared to find the most effective model for skill assessment. Performance will be measured in terms of accuracy, speed, and robustness.
Skill Categorization: Validate the system's ability to categorize and evaluate different types of skills correctly. This will involve testing the model with a diverse set of input data and refining algorithms based on results.

Accuracy Testing:
Validate the accuracy of the AI models in evaluating student skills and generating appropriate recommendations.
This module focuses on assessing the consistency between the AI's analysis and human evaluations. By comparing AI-generated insights with teacher assessments, we can identify areas where model adjustments may be required [2].

Usability Testing:
Ensure that the system is intuitive and easy for both educators and students to use.
This module gathers user feedback on system usability. Through regular feedback loops, insights will be collected on interface clarity, ease of navigation, and understanding of feedback, which will be used to improve the user experience [3].

4. Data Collections
Data will be gathered from:
Assignments and Tests: Used to evaluate critical thinking and problem-solving.
Class Participation: Includes classroom activities like group work, discussions, and presentations to assess collaboration and communication skills.
Feedback: Peer and teacher feedback on teamwork, communication, and other skills.
Self-Assessment: Students will periodically evaluate their own skills.

5. Tools and Technologies
Programming Languages: Python for AI and backend development. JavaScript (React.js) for the frontend interface.
AI Technologies: Use machine learning frameworks like TensorFlow or PyTorch to build and train models.
Hardware:
Cloud-Based Infrastructure: Services like AWS or Google Cloud to support scalable data processing and storage.
GPU Service: Utilizing cloud-based GPU resources to accelerate AI model training and inference, making the system efficient and capable of handling large datasets.

6. Expected Outcomes
Comprehensive Skill Tracking: The system will offer real-time monitoring and analysis of student skill development, giving both students and educators valuable insights.
Personalized Learning: Students will receive specific recommendations, making their learning experience more effective and focused.

	Support for Educators: Teachers will have a powerful tool to monitor and enhance student performance through data-driven insights.
	7. Conclusion The AI-Enhanced Student Skills Development Tracker is designed to provide a personalized and data-driven approach to education. By leveraging AI to measure and analyse student skills, the system will offer valuable insights to enhance the learning experience. The project will be executed in clear, structured phases, with opportunities for feedback and improvement at each stage to ensure it is practical, user-friendly, and impactful. [1] Zheng, H. Z. (2024). *Research and application of a learning resource recommendation model based on feedback information* (Master's thesis, Yunnan Normal University). Master's Thesis. https://link.cnki.net/doi/10.27459/d.cnki.gynfc.2024.001092 [2] Zhang, H. C. (2024). Case analysis of AI-assisted autonomous learning in courses. Electronic Technology, 06, 302-303. [3] Zhang, H. Y., Huang, R., Li, Y., & He, J. G. (2024). Evaluation of AI-assisted English learning tools. Computer-Assisted Foreign Language Education, 02, 18-24, 103. https://doi.org/10.20139/j.issn.1001-5795.20240203
道德规范 **Ethics**	Please confirm by checking the box: ☒ I confirm that I have discussed ethical issues with my supervisor.

Please discuss ethical issues with your supervisor. **Please refer to Project Student Handbook section 4.1**	Summary of ethical issues: 1. Data Privacy and Security: The system will use sensitive student data, including performance records, feedback, and possibly personal information. Ensuring the privacy and security of this data is crucial. 2. Consent and Transparency: Students and educators should be fully informed about the data being collected and how it will be used. Obtaining informed consent from students and educators before data collection. 3. Bias and Fairness: AI models can unintentionally reflect or amplify biases present in the training data, leading to unfair or unequal outcomes. Ensuring that recommendations and assessments do not unfairly disadvantage any student group. 4. Impact on Learning: The system's feedback and recommendations should enhance learning without causing undue stress or negatively impacting students' self-esteem. Ensuring that the recommendations support a positive learning experience and encourage skill development constructively.
中期目标 **Mid-term target.** **It must be tangible outcomes, E.g. software, hardware or simulation.** **It will be assessed at the mid-term oral.**	1. Basic Software Prototype A simple version of the software that allows data input and generates basic skill assessment reports using sample data. Integration of a pre-trained large model (e.g., GPT or Llama) to demonstrate initial natural language processing capabilities for analyzing text-based assignments or feedback. 2. Cloud and GPU Configuration Enabling GPU support to optimize the performance of the large model during training and analysis. 3. Data Processing and AI Model Setup Fine-tuning a pre-trained large model on sample educational data to provide early insights into skill development. 4. Simulation Demo A basic simulation to show how the system uses the large model to process and analyse data, then outputs assessment reports.

Work Plan (Gantt Chart)

Fill in the sub-tasks and insert a letter X in the cells to show the extent of each task

	Nov 1-15	Nov 16-30	Dec 1-15	Dec 16-31	Jan 1-15	Jan 16-31	Feb 1-15	Feb 16-28	Mar 1-15	Mar 16-31	Apr 1-15	Apr 16-30
Task 1 Skill Identification: Identify key skills to be tracked and develop metrics for assessing student progress in each area.												
Conduct research to identify essential skills, such as critical thinking, problem-solving, and collaboration, relevant to student success.	X	X	X									
Define clear, measurable metrics for assessing each identified skill, ensuring they are easy to track and understand.		X	X									
Develop a framework to categorize skills and associate them with specific data types.		X	X									
Task 2 AI Integration: Integrate AI algorithms to analyse student performance data and track skill development over time.												
Select the appropriate pre-trained AI model (e.g. GPT, BERT), set up the environment, and conduct preliminary functional testing.			X	X								
Find and use existing open source sample education data to fine-tune the model. Clean and preprocess the sample data, such as removing irrelevant information, normalizing text, and structuring data to be compatible with the AI models.					X	X	X					
Implement and test initial AI algorithms for analyzing student performance data, focusing on accuracy and reliability.					X	X	X	X				
Test the model to evaluate its accuracy and efficiency. Optimize the model based on specific performance metrics.						X	X	X	X	X		
Task 3 Recommendation Engine: Build a recommendation engine that suggests activities and resources to enhance specific skills.												
The ability to store information about learning resources and users.						X	X	X	X	X		
Implement a simple rule-based recommendation engine that suggests resources based on identified skill gaps.							X	X	X	X	X	
In the process of interacting with users, improve the suggestions provided by the system based on user feedback							X	X	X	X	X	
Task 4 Reporting System: Design a reporting system that provides detailed feedback to students and educators on skill progression.												

Task												
Develop the structure of the reports, outlining key metrics such as skill progression, strengths, and areas for improvement. Design a simple and user-friendly report.						X	X	X	X	X		
Implement simple data visualization features to make progress reports intuitive and easy to interpret.										X	X	X
Implement the function of allowing users to browse reports anytime and anywhere.								X	X	X	X	X
The system should be able to automatically compile the generated results into downloadable tables.								X	X	X	X	X