

Integration of Artificial Intelligence in Education and Software Development

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Introduction

- **Presenter:** Luna Schätzle – Project Lead (AI evaluation, backend & website)
- **Objective:** Open-source AI platform for education
- **Focus:** Evaluate various AI models for multiple use cases
- **Platform:** Enable students to access and experiment with AI
- **Motivation:** Overcome high resource requirements of current Open Source AI models



Project Team and Management

- Team members: Luna Schätzle, Florian Prandstetter
- Project management: We had several meetings to discuss the project and to plan the next steps.
- Tools used:
 - GitHub for version control
 - Discord for communication
 - Google Sheets for Time tracking
 - LaTeX for documentation



Theoretical Background

- Technologies used: Python, Flask, Vue.js
- Use of Large Language Models (LLMs)
- Interfacing methods: API, local models (Ollama), OpenAI
- Testing and evaluation of the open source models

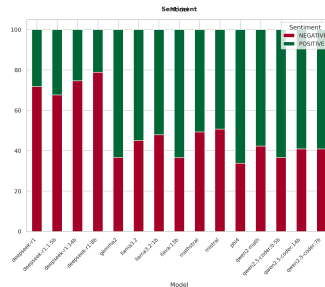
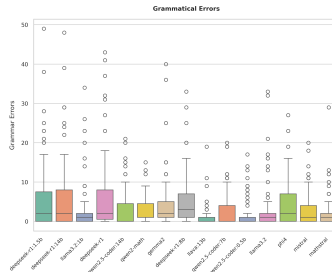
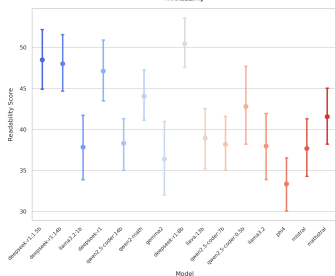
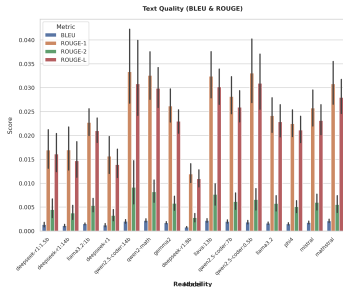


Testing and Evaluation

- Evaluation of models: Llama3.2, Deepseek-r1, gemma2, qwen, ...
- Testing methods: Different prompts and tasks where asked the models (automated via Python script)
- Evaluation criteria:
 - response time
 - accuracy
 - resource usage
 - BLEU score
 - readability
 - Textquality



Evaluation Results: Quantitative metrics



Evaluation Results: Qualitative metrics

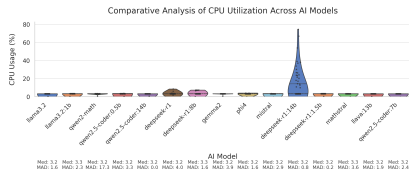


Figure: CPU Usage Comparison

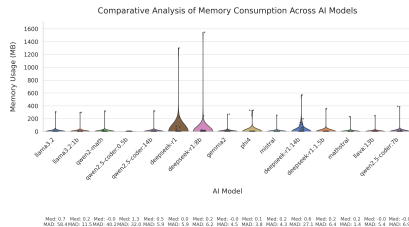


Figure: Memory Usage Comparison



Website Platform

- To realise the vision of the project, we created a website platform.
- The website was realised thru the use of Vue.js and Flask (Backend API) and Firebase (Database).
- The website has the following features (as of the presentation date):
 - User registration, login and profile management
 - Chatbot interface a various AI models (thru API general local models, Programming Assistant, Chat with chat GPT, image regocnition via LLaVA and Llama3.2-vision)
 - Image generation with Dalle
 - OCR (Optical Character Recognition) with Tesseract and enhanced via Llama3.2



AI in Economics and Ethics

- **Applications:**

- Customer service support
- Supply chain management
- Predictive analytics
- Data analysis
- Process automation

- **Ethical Social Concerns:**

- Bias in training data
- Transparency & accountability
- Privacy and data protection
- Impact on employment

- **Regulatory Challenges:**

- Inconsistent global regulations
- EU AI Act considerations
- Need for international cooperation
- Data security standards



Open Source in an Economic Context

- **Definition:** Collaborative, transparent software development with publicly available source code.
- **Advantages:** Cost-efficiency, flexibility, enhanced security via peer review, and compatibility.
- **Challenges:** Fragmentation, limited official support, licensing complexities, and security risks.
- **Economic Impact:**
 - Drives innovation and cross-industry collaboration.
 - Empowers startups and reduces entry barriers.
- **Revenue Models:** Open core, managed services, support contracts, donations, and dual licensing.
- **Our Application:** Leveraged open source tools (e.g., Python, Flask, Vue.js) and adopted GNU GPL-3.0 to foster collaboration and transparency.



Conclusion

- Summary of achievements
- Insights gained during the development
- Future potential of the system
- Final thoughts and acknowledgments



