

**Gisma University of Applied Sciences**  
**Department of Computer and Data Sciences**

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**DeVAA: A Decentralized and  
Verifiable AI Agent Marketplace**

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**Youssef Amjahdi and Abdelmounaim Sadir**

Submitted in partial fulfillment of the requirements for the degree of  
**MSc Data Science, AI, and Digital Business**

Under supervision of  
**Dr. Loui Al Sardy**

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# Appendix A

## Individual Contributions

This appendix details the individual contributions of Youssef Amjahdi and Abdelmounaim Sadir to both the technical work and thesis write-up, in accordance with the module handbook requirement that "both team members must contribute to both the technical work and the write-up."

### A.1 Overall Collaboration Approach

The project followed a collaborative development methodology with joint responsibility for key decisions and shared ownership of the final deliverable. Both team members participated in all major phases, with specialized focus areas based on individual strengths and interests.

### A.2 Detailed Contribution Breakdown

#### A.2.1 Research and Literature Review

Component	Youssef Amjahdi	Abdelmounaim Sadir
Literature Review	Blockchain technology, smart contracts, DeFi protocols, Layer-2 solutions	AI agents, LLM frameworks, zero-knowledge proofs, verifiable computation
Academic Writing	Introduction, System Design, Implementation chapters	Literature Review, Results & Evaluation, Discussion chapters
Research Methodology	Design Science Research framework, evaluation metrics design	Ethics application, data collection protocols

#### A.2.2 Technical Implementation

Component	Youssef Amjahdi	Abdelmounaim Sadir
Smart Contracts	JobBoard.sol design and implementation, deployment scripts, Hardhat configuration	AgentRegistry.sol implementation, security patterns, OpenZeppelin integration

Testing	Unit test framework design, gas consumption analysis, integration testing	Test case development, edge case coverage, performance benchmarking
ZKP Implementation	Circom circuit architecture, SnarkJS integration planning	<code>sentiment.circom</code> implementation, proof generation workflow
Frontend Development	<i>Planned:</i> React application structure, wallet integration	<i>Planned:</i> UI/UX design, contract interaction interfaces
Agent Development	<i>Planned:</i> Python architecture, web3.py integration	<i>Planned:</i> Event listening, AI processing pipeline

### A.2.3 Documentation and Analysis

Component	Youssef Amjahdi	Abdelmounaim Sadir
Technical Documentation	Code comments, README files, deployment guides	API documentation, system architecture diagrams
Performance Analysis	Gas cost analysis, economic modeling, scalability assessment	Latency measurements, throughput analysis, optimization recommendations
Academic Formatting	Citation management, figure preparation, LaTeX formatting	Statistical analysis, table design, appendix organization

## A.3 Shared Responsibilities

The following work was conducted jointly with equal contribution from both team members:

- **Conceptual Framework:** DeVAA architecture design and theoretical foundations
- **Problem Formulation:** Research questions, objectives, and success criteria
- **System Architecture:** High-level design decisions and component integration
- **Meeting Participation:** All supervisor meetings and academic consultations
- **Quality Assurance:** Peer review of all code and documentation
- **Strategic Planning:** Project timeline, milestone definition, risk management

## A.4 Development Workflow

### A.4.1 Version Control and Collaboration

- **Repository Management:** Git-based collaborative development with feature branches
- **Code Review:** All implementations reviewed and approved by both team members
- **Documentation:** Shared responsibility for maintaining comprehensive project documentation

## A.4.2 Communication and Coordination

- **Regular Meetings:** Weekly progress reviews and technical discussions
- **Task Distribution:** Collaborative task assignment based on individual expertise
- **Knowledge Sharing:** Cross-training to ensure both members understand all components

## A.5 Future Work Distribution

For the remaining implementation phases (contingent on supervisor guidance):

### A.5.1 Phase 1: Frontend Development (Days 3-12)

- **Youssef:** React application scaffolding, MetaMask integration, wallet connection logic
- **Abdelmounaim:** UI component design, job posting interface, status monitoring dashboard
- **Joint:** Contract interaction layer, error handling, user experience optimization

### A.5.2 Phase 2: Agent Implementation (Days 13-23)

- **Youssef:** Python environment setup, web3.py event listening, blockchain interaction
- **Abdelmounaim:** AI processing pipeline, job execution logic, result formatting
- **Joint:** Integration testing, performance optimization, error handling

### A.5.3 Phase 3: Integration & Evaluation (Days 24-32)

- **Youssef:** End-to-end testing, performance measurement, deployment automation
- **Abdelmounaim:** Results analysis, statistical validation, optimization implementation
- **Joint:** System demonstration, documentation updates, thesis integration

## A.6 Intellectual Property and Originality

### A.6.1 Original Contributions

- **Novel Architecture:** The DeVAA framework represents original conceptual work developed jointly
- **Implementation Approach:** Smart contract design patterns are original implementations
- **Evaluation Methodology:** Performance measurement and analysis framework is novel

## A.6.2 External Resources

- **Open Source Libraries:** OpenZeppelin contracts, Hardhat framework, standard development tools
- **Academic Literature:** Comprehensive citation of all referenced research and methodologies
- **Code Attribution:** Clear documentation of any adapted or modified external code

## A.7 Declaration of Individual Effort

### A.7.1 Youssef Amjahdi Declaration

I declare that my individual contributions to this thesis, as detailed above, represent my own original work. I acknowledge the collaborative nature of this project and confirm that all shared work was conducted with equal participation from my co-author. I have not submitted this work, or any substantial part of it, for assessment in any other academic program.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

### A.7.2 Abdelmounaim Sadir Declaration

I declare that my individual contributions to this thesis, as detailed above, represent my own original work. I acknowledge the collaborative nature of this project and confirm that all shared work was conducted with equal participation from my co-author. I have not submitted this work, or any substantial part of it, for assessment in any other academic program.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## A.8 Supervisor Acknowledgment

This contribution specification has been reviewed and approved by the thesis supervisor.

**Dr. Loui Al Sardy**

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_