**Position 3: AI Code Generation Platform Development**

**Project: Intelligent Code Generation and Developer Assistant Platform**

**Project Description:** The intern will develop an AI-powered code generation platform that assists developers in writing, reviewing, and optimizing code across multiple programming languages. The project involves fine-tuning large language models for code generation, implementing context-aware code completion, building intelligent debugging assistants, and creating secure code analysis tools. The platform will integrate with popular IDEs and development workflows while maintaining code privacy and security. This project will be performed by 2-3 students.

**Why It Matters / Global Impact:** Developer productivity is crucial for innovation across all industries. AI code generation platforms can accelerate software development, reduce bugs, improve code quality, and democratize programming by making it more accessible to non-experts. This project demonstrates how AI can augment human developers, enabling faster prototyping, better code documentation, and more efficient debugging processes. The impact spans across software engineering, education, and digital transformation initiatives globally.

**Objectives:**

* Fine-tune and deploy code generation models (CodeT5, CodeGen, StarCoder) for multiple programming languages
* Implement context-aware code completion with repository-level understanding
* Develop intelligent code review and bug detection systems
* Create natural language to code translation capabilities
* Build secure code analysis tools with vulnerability detection
* Integrate with popular IDEs (VS Code, IntelliJ, PyCharm) and version control systems

**Deliverables:**

* Functional AI code generation platform with multi-language support
* IDE plugins and extensions for seamless developer integration
* Code review assistant with automated suggestions and security scanning
* Natural language interface for code generation and explanation
* Performance benchmarks comparing generated vs. human-written code
* Developer productivity metrics and user experience analysis

**Milestones (6 months):**

* **Weeks 1-2:** Platform architecture design, model selection, and development environment setup
* **Weeks 3-6:** Code generation model fine-tuning and basic completion functionality
* **Weeks 7-10:** Context-aware features implementation and IDE integration development
* **Weeks 11-14:** Code review assistant, security analysis, and natural language interface
* **Weeks 15+:** User testing, performance optimization, documentation, and final presentation

**Intern Background:**

* Strong programming skills in Python, JavaScript, and at least one other language (Java, C++, Go)
* Experience with transformer models, fine-tuning, and NLP frameworks
* Familiarity with software development tools, IDEs, and version control systems
* Knowledge of code analysis, parsing, and abstract syntax trees (AST)
* Understanding of software engineering practices and code quality metrics
* Interest in developer tools, programming languages, and AI-assisted development

**Supervisors:**

* Mahbubul Alam (LinkedIn)
* Dr. Neeli Prasad (LinkedIn)
* Dr. Albena Mihovska (LinkedIn)