

College of Engineering, Mathematics and Science
New Faculty Start-Up (NFSU) Funding

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Proposal Title

Exploring the Convergence of Large Language Models and Mobile Application Development: Trends, Opportunities, and Research Challenges

Proposal Description

There is growing momentum among companies and institutions to adopt Generative AI, particularly Large Language Models (LLMs), as a strategic advantage to transform how they operate, interact with users, and deliver intelligent services. At the same time, mobile devices have become the dominant platform through which people engage with software applications—positioning the intersection of LLMs and mobile development as a high-impact area of innovation.

This Summer 2025 project proposes an exploratory study of the state of the art in LLMs and mobile development, including their convergence, current practices, architectural models, and emerging trends.

The goal is to develop a foundational understanding of the opportunities and technical challenges associated with integrating LLM capabilities—such as retrieval-augmented generation (RAG), intelligent assistants, and summarization—into mobile apps. As part of this effort, the project will include the development of a lightweight prototype application using React Native, Spring Boot, and a backend database to experiment with LLM integration via API-based services. This prototype will serve as a sandbox for gaining hands-on experience, surfacing limitations, and identifying areas for future scholarly exploration.

Core Objectives

- **Survey State of the Art:** Review current research papers, technical blogs, and industry reports about LLMs, mobile development (especially React Native), and the integration of AI into mobile platforms.
- **Trend and Architecture Analysis:** Identify current approaches for integrating LLMs in mobile apps (e.g., REST APIs, edge inference, RAG), and document existing use cases, trade-offs, and limitations.
- **Prototype Development:** Build a basic prototype using React Native (frontend), Spring Boot (backend), and MySQL (data layer) to explore how LLM-based services can be integrated.
- **Hands-on Exploration:** Use the prototype to test performance, API usage, interaction design, and possible integration pitfalls or constraints in mobile environments.
- **Documentation and Final Report:** Synthesize findings into a structured report that includes literature review, analysis, prototype description, lessons learned, and proposed future directions.

4-Week Timeline

Week 1 : Jun 2 – 6, 2025

Orientation and initial exploration of the literature and emerging practices related to LLMs and mobile application development. Begin identifying relevant trends and tools. prototype application

Week 2: Jun 9 – 13, 2025

Deepen the review of academic and industry materials. Reflect on challenges and opportunities in integrating AI with mobile platforms. Identify potential case examples or technical approaches. Develop prototype application.

Week 3: Jun 16 – 20, 2025

Begin exploratory activities, such as conceptual design or initial prototyping to assess technical feasibility. Continue collecting observations and documenting reflections. prototype application

Week 4: Jun 23 – 27, 2025

Synthesize key insights, summarize findings, and outline the structure of a report that can support further scholarly work in this area. Finalize any exploratory components initiated during the study.

Expected Deliverables:

1. A written summary report (5–10 pages) describing the findings of the exploratory study, including:
 - (a) a review of the current state of the art in LLMs and mobile development,
 - (b) key trends and integration approaches, and
 - (c) a reflective analysis of the feasibility, challenges, and future directions in this research area.
2. A basic functional prototype consisting of a mobile application developed in React Native with a Spring Boot backend and database integration. This prototype will demonstrate how LLM services (e.g., via API calls) can be integrated into a mobile context and will be used as a tool for technical exploration and discovery.

References :

Liu, An, Chen, Ye (2024). Trends and Applications of LLMs on Mobile Devices.
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Hau, Hassan, Zhou (2025). LLMs in Mobile Apps: Practices and Challenges.
<https://arxiv.org/abs/2502.15908>

Patton et al. (2024). Aptly: Making Mobile Apps from Natural Language.
<https://arxiv.org/abs/2405.00229>

Deloitte (2024). Tech Trends 2025: AI Is Everywhere.
<https://www2.deloitte.com/us/en.html>

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Ghosh, Pargaonkar, Eisty (2024). Requirements Elicitation from App Reviews Using LLMs.
<https://arxiv.org/abs/2409.15473>

Apple ML Research (2025). LLM-Based Review Summarization on the App Store.
<https://machinelearning.apple.com/research/app-store-review>