Title

***1.Multi-programming language software systems modularization"* by Masoud Kargar, Ayaz Isazadeh, and Habib Izadkhah:**

Review of Related Literature

Modern software systems often evolve over time, leading to structural degradation and reduced maintainability. To address this, **modularization** is used to improve system understanding by dividing programs into cohesive and loosely coupled modules (Kargar et al., 2019). Traditional modularization methods rely on language-specific structures like **Artifact Dependency Graphs (ADGs)** and **Call Dependency Graphs (CDGs)**, which are effective for mono-language systems. However, large-scale applications today are often built using **multiple programming languages**. For example, Mozilla Firefox uses over twenty languages, making traditional methods insufficient. Tools like **Understand** and **NDepend** only support single-language analysis, which can miss over 60% of code in multi-language systems. To solve this, Kargar et al. proposed a **language-independent modularization approach**. They introduced the **Semantic Dependency Graph** and **Nominal Similarity Graph**, which focus on code semantics and filenames instead of syntax. These graphs help identify related components across languages, allowing modularization without needing deep language-specific knowledge. Tested on Mozilla Firefox, the method showed modular structures comparable to expert evaluations. Combining semantic and nominal graphs also improved results further, demonstrating the method's effectiveness for polyglot systems.

References:

Kargar, M., Isazadeh, A., & Izadkhah, H. (2019). Multi-programming language software systems modularization. *Computers & Electrical Engineering*, 76, 106500. https://doi.org/10.1016/j.compeleceng.2019.106500

***2. Go.Travel – A Smart Tourism Guide Mobile Application"* by Wong Yit Meng et al., maintaining the core content and insights:**

Review of Related Literature

Tourism, as defined by the World Tourism Organization, is a cultural, social, and economic activity involving people traveling beyond their usual environment for leisure, business, or other purposes. In line with the rise of smart cities, **smart tourism** has emerged, leveraging **Information and Communication Technology (ICT)**, artificial intelligence, cloud services, and mobile networks to improve the travel experience (Wong et al., 2022).Smart tourism aims to enhance tourist experiences by integrating natural, public, and economic resources with digital tools. It focuses on **sustainability, optimization of resources, and destination attractiveness** through continuous innovation. The effectiveness of smart tourism depends heavily on the collection and analysis of real-time data to guide decision-making and promote equitable distribution of tourism benefits.To address limitations in existing tour guide apps, the authors developed **"Go.Travel"**, a mobile application designed to enhance tourism in Malaysia. The app offers location-based services anduser-friendly features to improve travel efficiency and satisfaction for tourists visiting the country

.**Reference:**

Wong, Y. M., Shibghatullah, A. S. B., & Subaramaniam, K. (2022). *Go.Travel – A Smart Tourism Guide Mobile Application*. Institute of Computer Science & Digital Innovation, UCSI University. https://www.ucsiuniversity.edu.my

3. Multi-Language Software Development: Issues, Challenges, and Solutions" **by Yang et al. (2024), keeping the essential content intact for use in a Review of Related Literature (RRL):**

Review of Related Literature

Developing software using multiple programming languages is common in modern projects but presents notable challenges. Yang et al. (2024) conducted an in-depth study of 586 Stack Overflow posts over 14 years to investigate the **issues, challenges, and solutions** in **multi-language software development**. Their analysis revealed that multilingual development remains an **active and evolving topic**. Developers frequently encounter issues in **11 categories**, with key problems revolving around **language interfacing, data handling, error handling, message passing**, and **memory management**. Among these, **error and exception handling** was found to be the most difficult, while **security-related issues** were more likely to receive accepted solutions. A major challenge is the inherent **complexity and diversity** of combining different languages, especially when developers lack technical knowledge of language-specific features like **threading or memory models**. Interoperability between languages also introduces hurdles in managing data formats and smooth function execution. Despite these difficulties, **Stack Overflow** has proven to be a **valuable resource**, offering accepted solutions for 73% of posts—many within a week. The study highlights the need for better documentation, knowledge sharing, and cross-language development practices.

Reference:

Yang, H., Nong, Y., Wang, S., & Cai, H. (2024). *Multi-Language Software Development: Issues, Challenges, and Solutions*, IEEE Transactions on Software Engineering, 50, 512–533. https://doi.org/10.1109/TSE.2024.3358258

4. Real-time Data Integration: A Game-Changer for Mobile App Developers" **by Sohail Shaikh (2023), preserving its core content for use in a Review of Related Literature:**

Review of Related Literature

Real-time data integration has become essential in mobile app development, offering more than just faster data—it enables **personalized, dynamic, and responsive user experiences**. According to Shaikh (2023), this shift from traditional batch processing to real-time integration allows data to be captured and acted upon instantly, improving app performance and decision-making. Key technologies enabling this include **IoT devices, APIs, integration middleware (e.g., ESBs, message brokers)**, and stream processing frameworks like **Apache Kafka** and **Flink**. These tools facilitate continuous data flow and low-latency processing. The benefits of real-time integration are significant:

- **Immediate insights** for analytics and event detection
- **Enhanced user experiences** through real-time updates
- **Competitive advantages** by adapting to market changes instantly
- **Improved operational efficiency** via real-time monitoring of resources

However, developers face **several challenges**, such as:

- **Scalability and latency issues** when handling high-velocity data
- **Data quality problems** due to inconsistencies and missing values
- **Security and privacy concerns**, requiring encryption, authentication, and regulatory compliance Despite these, overcoming such challenges positions developers to build superior mobile apps. Real-time integration is no longer optional—it's a **strategic necessity** in modern app development.

Reference:
Shaikh, S. (2023, December 6). *Real-time Data Integration: A Game-Changer for Mobile App Developers*. Retrieved from https://www.cmswire.com

5. *Systematic Review of Mobile Travel Apps and Their Smart Features and Challenges"* by Sia, Saidin, and Iskandar (2022), suitable for use in your Review of Related Literature:

Review of Related Literature

Sia, Saidin, and Iskandar (2022) conducted a **systematic review** to identify key smart features in Mobile Travel Apps (MTAs) and explore development challenges. Evaluating 36 apps from 443 initially identified (193 from Apple, 250 from Google), the study emphasized the growing **user acceptance** of smart technologies in tourism.

Three major smart features were commonly found:

- **Geolocation tracking services**
- **Travel itinerary generators**
- **Real-time personalization and recommendations**

These features enhance user engagement and improve the tourism experience by offering dynamic and responsive content.

However, the study also outlined **critical development challenges**, including:

- **High technological investment**
- **Accuracy issues with location services**
- **Privacy concerns**, especially around personal data usage

From a **developer-centric perspective**, the research highlights the need for integrated smart features to boost app effectiveness and market penetration. The findings serve as a guide for developers and tourism organizations aiming to build **engaging, data-driven travel applications**.

Reference:
Sia, P. Y.-H., Saidin, S. S., & Iskandar, Y. H. P. (2022). Systematic review of mobile travel apps and their smart features and challenges. *Journal of Hospitality and Tourism Insights*. https://doi.org/10.1108/JHTI-11-2022-0260

6. *Exploring the Impacts of Smart Tourism: The Future of Travel"* by Luisa (2024), suitable for inclusion in your study

Review of Related Literature

Luisa (2024) highlights that **smart tourism** is transforming the travel industry by leveraging digital technologies to deliver **personalized, sustainable, and inclusive experiences**. Smart tourism incorporates mobile applications, the Internet of Things (IoT), real-time analytics, and augmented reality to optimize every stage of the tourist journey. For travelers, this means access to tailored recommendations, seamless bookings, instant translations, and enhanced safety. For destinations, benefits include improved sustainability practices, better cultural heritage preservation, data-driven infrastructure decisions, and broader accessibility for people of all abilities. Cities like Malaga, Spain, have been recognized for implementing smart solutions that foster responsible and efficient tourism. Ultimately, this evolving approach creates a more connected and responsive travel ecosystem (Luisa, 2024).

Reference (APA 7th Edition)

Luisa. (2024, September 27). *Exploring the impacts of smart tourism: The future of travel*. Worldpackers. https://www.worldpackers.com/articles/impacts-of-smart-tourism

7. Mobile Apps in Tourism Communication: The Strengths and Weaknesses on Tourism Trips":

Review of Related Literature

The integration of mobile applications in tourism has reshaped communication and service delivery within the industry. According to Rashid et al. (2020), mobile apps are now essential tools in enhancing the travel experience, offering features that support information access, navigation, bookings, and real-time communication. These applications significantly improve the **efficiency, personalization, and convenience** of tourism activities. However, the study also emphasizes that despite their numerous advantages, mobile apps have not completely replaced the functions of tourism personnel. Challenges such as **limited interactivity, lack of human touch, and technical shortcomings** still exist and must be addressed. Additionally, the researchers note that the success of mobile tourism apps is shaped by users' experiences, cognitive behaviors, and contextual factors. As a result, understanding both the strengths and weaknesses of mobile tourism apps is critical for developers aiming to enhance tourist satisfaction and digital engagement in the travel industry (Rashid et al., 2020).

Reference (APA 7th Edition)

Rashid, R. A., Ismail, R., Ahmad, M., Abdullah, N. A. C., Zakaria, R., & Mamat, R. (2020). *Mobile apps in tourism communication: The strengths and weaknesses on tourism trips*. Journal of Physics: Conference Series, 1529(4), 042056. https://doi.org/10.1088/1742-6596/1529/4/042056