1. Icon2Code: Recommending code implementations for Android GUI components

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Abstract: Context: Event-driven programming plays a crucial role in implementing GUI-based software systems such as Android apps. However, such event-driven code is inherently challenging to design and implement correctly. Despite a significant amount of research to help developers efficiently implement such software, improved approaches are still needed to assist developers in better handling events and associated callback methods. Objective: This work aims at inventing an intelligent recommendation system for helping app developers efficiently and effectively implement Android GUI components. Methods: To achieve the aforementioned objective, we introduce in this work a novel approach called Icon2Code. Given an icon or UI widget provided by designers as input, Icon2Code first searches from a large-scale app database to locate similar icons used in existing popular apps. It then learns from the implementation of these similar apps and leverages a collaborative filtering model to select and recommend the most relevant APIs. Results: Our approach can achieve an 81% success rate when only five recommended APIs are considered, and a 94% success rate if twenty results are considered, based on ten-fold cross-validation with a large-scale dataset containing over 45,000 icons and their code implementations. Conclusion: It is feasible to automatically recommend code implementations for Android GUI components and Icon2Code is useful and effective in helping achieve such an objective. © 2021 Elsevier B.V. (0 refs)

Main heading: Android (operating system)

Controlled terms: Collaborative filtering - Graphical user interfaces - Large dataset

Uncontrolled terms: Android apps - Cross validation - Design and implements - Event-driven - Event-driven programming - Large-scale dataset - Software systems

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Data Provider: Engineering Village