1. An alternative proposal of tracking products using digital signatures and QR codes

Abstract:
This paper proposes an alternative tracking and data verification system for products. The proposed system tracks and verifies the commercial status of products in a secure environment, it verifies and records in an internal datacenter the production and transport process from the manufacturer or retailer to customer using the QR Code technology for messages and digital signature store. In this paper is also described the QR Code’s technical features and the usage of a digital signature encrypting a hash function which maps an identification message of the device that is going to be tracked or verified.

2. Analysis of smart mobile applications for healthcare under dynamic context changes

Abstract:
Smart mobile medical computing systems (SMDCSes), e.g., mobile medical applications use context information from the environment to provide useful and often critical healthcare services such as continuous monitoring and control of blood glucose levels by infusion of insulin. Given the unsupervised nature of operation of SMDCSes, context changes that are unaccounted for can cause unprecedented faults leading to violation of requirements such as safety, energy sustainability and reliability. Analysis of SMDCSes for testing requirements violations necessitates consideration of context dependent interactions between the SMDCS software, represented by discrete operating modes and its environment, represented by nonlinear partial differential equations over space and time. An intractable number of context change sequence and lack of closed form solutions to differential equations makes the requirements analysis of SMDCSes a challenging task. This paper proposes a novel technique to analyze SMDCSes taking into account the dynamic changes in the context and the constant interaction of the computing systems with the physical environment. To show the usage of the technique, Ayushman pervasive health monitoring system is considered as an example SMDCS. Analytical results show that practices considered healthy for a person such as mobility may not be beneficial when an SMDCS is controlling health.
3. Context-Based Access Control Systems for Mobile Devices

Abstract:

Mobile Android applications often have access to sensitive data and resources on the user device. Misuse of this data by malicious applications may result in privacy breaches and sensitive data leakage. An example would be a malicious application surreptitiously recording a confidential business conversation. The problem arises from the fact that Android users do not have control over the application capabilities once the applications have been granted the requested privileges upon installation. In many cases, however, whether an application may get a privilege depends on the specific user context and thus we need a context-based access control mechanism by which privileges can be dynamically granted or revoked to applications based on the specific context of the user. In this paper we propose such an access control mechanism. Our implementation of context differentiates between closely located sub-areas within the same location. We have modified the Android operating system so that context-based access control restrictions can be specified and enforced. We have performed several experiments to assess the efficiency of our access control mechanism and the accuracy of context detection.

4. Continuous and Transparent User Identity Verification for Secure Internet Services

Abstract:

Session management in distributed Internet services is traditionally based on username and password, explicit logouts and mechanisms of user session expiration using classic timeouts. Emerging biometric solutions allow substituting username and password with biometric data during session establishment, but in such an approach still a single verification is deemed sufficient, and the identity of a user is considered immutable during the entire session. Additionally, the length of the session timeout may impact on the usability of the service and consequent client satisfaction. This paper explores promising alternatives offered by applying biometrics in the management of sessions. A secure protocol is defined for perpetual authentication through continuous user verification. The protocol determines adaptive timeouts based on the quality, frequency and type of biometric data transparently acquired from the user.
5. Privacy-Preserving Relative Location Based Services for Mobile Users

Abstract:

Location-aware applications have been used widely with the assistance of the latest positioning features in Smart Phone such as GPS, AGPS, etc. However, all the existing applications gather users’ geographical data and transfer them into the pertinent information to give meaning and value. For this kind of solutions, the user’s privacy and security issues might be raised because the geographical location has to be exposed to the service provider. A novel and practical solution is proposed in this article to provide the relative location of two mobile users based on their WiFi scanned results without any additional sensors. There is no privacy concern in this solution because end users will not collect and send any sensitive information to the server. This solution adopts a Client/Server (C/S) architecture, where the mobile user as a client reports the ambient WiFi APs and the server calculates the distances based on the WiFi AP’s topological relationships. A series of technologies are explored to improve the accuracy of the estimated distance and the corresponding algorithms are proposed. We also prove the feasibility with the prototype of “Circle Your Friends” System (CYFS) on Android phone which lets the mobile user know the distance between him and his social network friends.

6. Review selection using micro reviews

Abstract:

Given the proliferation of review content, and the fact that reviews are highly diverse and often unnecessarily verbose, users frequently face the problem of selecting the appropriate reviews to consume. Micro-reviews are emerging as a new type of online review content in the social media. Micro-reviews are posted by users of check-in services such as Foursquare. They are concise (up to 200 characters long) and highly focused, in contrast to the comprehensive and verbose reviews. In this paper, we propose a novel mining problem, which brings together these two disparate sources of review content. Specifically, we use coverage of micro-reviews as an objective for selecting a set of reviews that covers efficiently the salient aspects of an entity. Our approach consists of a two-step process: matching review sentences to micro-reviews, and selecting a small set of reviews that covers as many micro-reviews as possible, with few sentences. We formulate this objective as a combinatorial optimization problem, and show how to derive an optimal solution using Integer Linear Programming. We also propose an efficient heuristic algorithm that approximates the optimal solution. Finally, we perform a
detailed evaluation of all the steps of our methodology using data collected from Foursquare and Yelp.

7. Smartphone-Based Wound Assessment System for Patients With Diabetes

Abstract:

Diabetic foot ulcers represent a significant health issue. Currently, clinicians and nurses mainly base their wound assessment on visual examination of wound size and healing status, while the patients themselves seldom have an opportunity to play an active role. Hence, a more quantitative and cost-effective examination method that enables the patients and their caregivers to take a more active role in daily wound care potentially can accelerate wound healing, save travel cost and reduce healthcare expenses. Considering the prevalence of smartphones with a high-resolution digital camera, assessing wounds by analyzing images of chronic foot ulcers is an attractive option. In this paper, we propose a novel wound image analysis system implemented solely on the Android smart phone. The wound image is captured by the camera on the smart phone with the assistance of an image capture box. After that, the smart phone performs wound segmentation by applying the accelerated mean-shift algorithm. Specifically, the outline of the foot is determined based on skin color, and the wound boundary is found using a simple connected region detection method. Within the wound boundary, the healing status is next assessed based on red–yellow–black color evaluation model. Moreover, the healing status is quantitatively assessed, based on trend analysis of time records for a given patient. Experimental results on wound images collected in UMASS—Memorial Health Center Wound Clinic (Worcester, MA) following an Institutional Review Board approved protocol show that our system can be efficiently used to analyze the wound healing status with promising accuracy.

8. A Probabilistic Discriminative Model for Android Malware Detection with Decompiled Source Code

Abstract:

Mobile devices are an important part of our everyday lives, and the Android platform has become a market leader. In recent years a number of approaches for Android malware detection have been proposed, using permissions, source code analysis, or dynamic analysis. In this paper, we propose to use a probabilistic discriminative model based on regularized logistic regression for Android malware detection. Through extensive experimental evaluation, we demonstrate that it can generate probabilistic outputs with highly accurate classification results. In particular, we propose to use Android API calls as features extracted from
decompiled source code, and analyze and explore issues in feature granularity, feature representation, feature selection, and the probabilistic discriminative model also works well with permissions, and substantially outperforms the state-of-the-art methods for Android malware detection with application permissions. Furthermore, the discriminative learning model achieves the best detection results by combining both decompiled source code and application permissions. To the best of our knowledge, this is the first research that proposes probabilistic discriminative model for Android malware detection with a thorough study of desired representation of decompiled source code and is the first research work for Android malware detection task that combines both analysis of decompiled source code and application permissions.

9. A Location- and Diversity-aware News Feed System for Mobile Users

Abstract:

A location-aware news feed (LANF) system generates news feeds for a mobile user based on her spatial preference (i.e., her current location and future locations) and non-spatial preference (i.e., her interest). Existing LANF systems simply send the most relevant geo-tagged messages to their users. Unfortunately, the major limitation of such an existing approach is that, a news feed may contain messages related to the same location (i.e., point-of-interest) or the same category of locations (e.g., food, entertainment or sport). We argue that diversity is a very important feature for location-aware news feeds because it helps users discover new places and activities. In this paper, we propose D-MobiFeed; a new LANF system enables a user to specify the minimum number of message categories (h) for the messages in a news feed. In D-MobiFeed, our objective is to efficiently schedule news feeds for a mobile user at her current and predicted locations, such that (i) each news feed contains messages belonging to at least h different categories, and (ii) their total relevance to the user is maximized. To achieve this objective, we formulate the problem into two parts, namely, a decision problem and an optimization problem. For the decision problem, we provide an exact solution by modeling it as a maximum flow problem and proving its correctness. The optimization problem is solved by our proposed three-stage heuristic algorithm. We conduct a user study and experiments to evaluate the performance of D-MobiFeed using a real data set crawled from Foursquare. Experimental results show that our proposed three-stage heuristic scheduling algorithm outperforms the brute-force optimal algorithm by at least an order of magnitude in terms of running time and the relative error incurred by the heuristic algorithm is below 1%. D-MobiFeed with the location prediction method effectively improves the relevance, diversity, and efficiency of news feeds.
10. Active Monitoring for Lifestyle Disease Patient Using Data Mining of Home Sensors

Abstract:
This paper describes user activity recognition for lifestyle disease patients at home: ways to define data mining system for sensing, logging, analyzing, mining, measuring and recognizing user’s daily activities. Lifestyle disease patients spend most of the time at home. There are lots of sensing data that can be based on home devices with home networking (sensors, gadgets, appliances, cameras, smart phones and some software applications running on computers). Main problem is interoperability, there is no standard framework for logging, analyzing and utilizing the available data sources. In this paper, we will introduce our layered architecture to do data mining for user’s activity recognition. Understand user’s life pattern can help medical services to cure and prevent diseases from developing.