УДК 004.93'12

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Benefits and Challenges of Telemetry

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Telemetry is the automatic recording and transmission of data from remote or inaccessible sources to an IT system in a different location for monitoring and analysis. In the software development world, telemetry can offer insights on which features end users use most, detection of bugs and issues, and offering better visibility into performance without the need to solicit feedback directly from users [3].

In the context of software development, the concept of telemetry is often confused with logging. But logging is a tool used in the development process to diagnose errors and code flows, and it's focused on the internal structure of a website, app, or another development project. Once a project is released, however, telemetry is what you're looking for to enable automatic collection of data from real-world use. Telemetry is what makes it possible to collect all that raw data that becomes valuable, actionable analytics [1].

Computer systems commonly encounter various failures due to electrical component or system issues under different service conditions. Users sometimes lose data or experience unavailability at critical moments. More seriously, critical business users may suffer tremendous financial loss from unpredicted failure. From the manufacturer's point of view, the reliability of a computer system is directly related to its specifications and leads to the customers' loyalty to the product.

Good understanding and control of computer systems' reliability is fundamental and crucial to computer system manufacturers. In general, environmental factors and the quality of the computers' parts contribute to the failure of computer systems. For manufacturers, in-service environmental factors cannot be avoided. However, the quality of individual components in each system can be evaluated and controlled. In computer manufacturing, it is therefore valuable to have prognostics capability for computer systems for the minimization of unexpected failures.

To collect in-service information from computer systems for health monitoring, data collection methods employing remote telemetry are regarded as very effective. Often, the telemetry task generates a very large database that has complex data types as well. With the data collected from a variety of sensors in field applications, the telemetry database will inevitably contain faulty data information. Therefore, analysis of the telemetry database is another important task following the telemetry work.

Also, it must be noted that factors leading to the failure of computer systems are multi-dimensional and need multi-variate analysis.

With the large and complex nature of the telemetry database, extensive analysis of the database is demanded before useful knowledge can be extracted from the database. It is therefore an important task to develop a data analysis protocol with accompanying enhanced analytical tools. To accomplish this task, an automatic data mining platform is developed to extract useful knowledge from a large and complex telemetry database.

The kernel of this platform is a computer program designed to manage the automatic data mining process. The backbone functions of the platform include pre-processing and filtering of the database, analysis computation, and generation

of data mining reports. The database task is responsible for automatic database functions such as querying, sorting, and temporary storage. The statistics task interfaces with external third-party statistical analysis functions for the purpose of conducting robust statistical analysis. The main functions for the developed automatic platform include database management, pre-processing of the database for analysis, data analysis, and analysis reporting [2].

The primary benefit of telemetry is the ability of an end user to monitor the state of an object or environment while physically far removed from it. Once you've shipped a product, you can't be physically present, peering over the shoulders of thousands (or millions) of users as they engage with your product to find out what works, what's easy, and what's cumbersome. Thanks to telemetry, those insights can be delivered directly into a dashboard for you to analyze and act on.

Telemetry enables you to answer such questions as:

– Are your customers using the features you expect? How are they engaging with your product?

– How frequently are users engaging with your app, and for what duration?

– What settings options to users select most?

– What happens when crashes occur? Are crashes happening more frequently when certain features or functions are used?

Telemetry is clearly a fantastic technology, but it's not without its challenges. The most prominent challenge – and a commonly occurring issue – is not with telemetry itself, but with end users and their willingness to allow what some see as spying.

In short, some users immediately turn it off when they notice it, meaning any data generated from their use of the product won't be gathered or reported.

That means the experience of those users won't be accounted for when it comes to planning future roadmap, fixing bugs, or addressing other issues in the app. It's a problem without a clear solution — and it doesn't negate the overall power of telemetry for driving development — but this should be kept in mind when analyzing data [1].

References:

1. What is telemetry? How Telemetry Works, Benefits of Telemetry, Challenges, Tutorial, and More [Electronic resource]. – Mode of access: https://stackify.com/telemetry-tutorial/. – Date of access: 18.04.2020.

2. C.-H. Wu, C.-H. Yang, S.-C. Lo, M. Pecht. Automatic data mining for telemetry database of computer systems [Electronic resource]. – Mode of access: https://www.researchgate.net/publication/220454601. – Date of access: 19.04.2020.

3. Techopedia explains Telemetry [Electronic resource]. – Mode of access: https://www.techopedia.com/definition/14853/telemetry. – Date of access: 17.04.2020.

4. German Data Protection Agency: Windows 10 1909 Enterprise Telemetry can be fully disabled [Electronic resource]. – Mode of access: https://www.ghacks.net/2020/02/02/german-data-protection-agency-windows-10-1909-enterprise-telemetry-can-be-fully-disabled/. – Date of access: 20.04.2020.