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PRESENTACIÓN

Los servicios software se están convirtiendo en un factor clave en el crecimiento de cualquier economía. Es hecho ha motivado en los últimos tiempos el interés de los distintos actores económicos por desarrollar lo qu ha denominado la "Ciencia de los Servicios", también conocida desde una perspectiva más amplia como "Cie Gestión e Ingeniería de los Servicios" (SSME). Se trata de una llamada a la acción dirigida principalmente a Universidad, la Industria informática y la Administración pública, con el propósito final de crear principios, conocimiento, métodos y técnicas para articular sus respectivas responsabilidades y actividades en torno concepto de servicio.

En este nuevo marco, las Jornadas de Ciencia e Ingeniería de Servicios (JCIS) surgen como un foro de discus intercambio de conocimiento y experiencias abierto a los distintos actores implicados. El interés no sólo se ce en los nuevos avances científicos, sino también en las tecnologías existentes en torno a la computación orient servicios y los procesos de negocio, las nuevas prácticas de ingeniería de servicios y las lecciones aprendida medio de experiencias reales. Desde sus inicios JCIS proporciona un foro donde puedan darse encuentro tod comunidades relacionadas con el ámbito de la Ingeniería de Servicios incluyendo los Servicios Web, SOA Procesos de Negocio, etc. Con este enfoque pretendemos mantener e incrementar la participación de los profesionales de la Industria, la Administración Pública y los investigadores más relevantes en las áreas involucradas.

En esta nueva edición de JCIS se quiere potenciar el valor de las jornadas como foro para el encuentro, discu generación de sinergias tanto entre investigadores como entre empresas e investigadores. Para ello se anim envío de artículos no solo que recojan trabajos técnicos sino que presenten reflexiones en torno a la Cienci Ingeniería de Servicios.

JCIS 2015 es una conferencia organizada bajo los auspicios de Sistedes (http://www.sistedes.es) (Soci de Ingeniería del Software y Tecnologías de Desarrollo de Software).

X Jornadas de Ciencia e Ingeniería de Servicios

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Towards Defining Data-Based Thresholds for Process-Related KPIs*

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Abstract. The definition of process-related key performance indicators (KPIs) is a key part of performance measurement and one of the most challenging because of the lack of one best way to define business-applicable KPIs that are both aligned with the strategic goals that the organisation wants to achieve and, at the same time, achievable in its context. It requires the identification of relevant threshold values able to distinguish different levels of process execution quality. However, obtaining these values remains an organization-specific task based on human abilities and no consensual technique exists. To overcome this problem, this paper introduces a methodology for threshold determination that considers not only the expert opinion but also data from real process executions.

1 Introduction

In process-oriented organizational settings, the evaluation of process performance plays a key role in obtaining information on the achievement of their strategic and operational goals. This evaluation of performance measures implies "having an alarm whenever the value of the specific measure exceeded some predetermined value" [1, 2], also called threshold [3].

One of the major challenges when implementing a performance measurement system for continuous improvement of business processes is related to the lack of one best way to define business-applicable process-related KPIs that are aligned with the strategic goals that the organisation wants to achieve while, at the same time, are achievable in its context. These requirements for process-related KPIs, also known as Process Performance Indicators (PPIs) [4], are determined

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by the *SMART* criteria that any indicator must fulfill, where SMART is an abbreviation for *Specific*, *Measurable*, *Achievable*, *Relevant* and *Time-bounded*.

Though most process best practice or reference frameworks such as ITIL, SCOR or CMMi provide PPIs for the processes defined in them, the specification of thresholds remains an organization-specific task that does not follow any methodology or best practices framework. In current state of practice, definition of PPI thresholds is usually carried out by experts based on their previous knowledge and intuition, and sometimes following a trial and error model. This is far from desired, since, according to [5], definition of thresholds requires a theory and a practical base and it should meet certain requirements: not being based on experts opinion, but on measurement data; respecting the statistical properties of the measure, such as measure scale and distribution, and be resilient against outlier values; and being repeatable, transparent and easy to carry out.

To overcome this problem, in this paper, we propose a methodology for determining PPI thresholds, where not only the expert opinion is taken into account but also data obtained from previous process executions.

2 Methodology for PPI Threshold Determination

Based on previous results [6, 7], where several statistical techniques have been applied to determine thresholds for different business process model measures, we propose a methodology to define PPI thresholds considering both, expert opinion and process execution data, whose main steps are the following:

Context Selection: First, the context needs to be selected, i.e. the organisation, its business process and the PPI set for which thresholds are to be defined.

Experts Feedback: Then, some interviews with experts are required, so that they, based on their knowledge about the process and its context (organisation, section, experience), can provide their opinion about the values they propose as thresholds for the selected PPIs.

Execution Data Gathering: Process execution data, including PPI values, need to be gathered from existing sources such as event logs, or other process aware information systems (PAISs).

Threshold Determination: Taking as input both, data provided by the experts and PPI values obtained from real process executions, several statistical techniques found in literature can be applied to determine best threshold values for the selected PPIs.

Threshold Validation: Once a group of threshold values is determined, it is interesting to know how efficient they are in classifying process executions according to the selected PPIs, that is, to validate the suitability of the threshold values obtained. For performing this step, we will follow the methods applied in [6, 7] to validate them, for which statistical techniques, such as ROC curves, and approaches from the information retrieval field, such as the calculation of Precision and Recall based on true/false positives and

negatives, can be applied. In both cases, real execution data will be again used, but cannot be the same as the used for threshold determination.

Dashboard Development: Finally, it would be very useful from a practical point of view to provide a dashboard including the PPI thresholds obtained so that process executions can be classified according to them and alerts can be stablished in case of undesired values.

3 Ongoing and Future Work

The methodology proposed above is being currently applied to a real case in one of the divisions of the Andalusian Health Service. In this case, the Delphi method is being used for obtaining the experts feedback. Process execution data is directly provided by the PAIS they use in their daily work. For the thresholds determination, statistical techniques such us ROC curves or the Bender method are being considered. Regarding the thresholds validation, we plan to use ROC curves too.

Finally, we plan to implement a software tool that assists users in applying this methodology. Furthermore, this tool will integrate a semaphoric dashboard including the selected PPIs, their execution values and the determined thresholds. This dashboard will provide charts where, using a red–yellow–green code, the user can identify how good/bad the process executions were according to the threshold values.

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