基於網頁及RFID技術的適地性狀態感知技術

Delivering Location Based Industrial Situational Awareness Using Web and RFID Technologies

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關鍵詞(Keywords)

- 狀態感知　Situational Awareness
- 顯示介面　Industrial Dashboard
- 無線射頻辨識　RFID
- 網頁技術　Web Technologies
- 行動裝置　Mobile Devices; WebSocket

摘要(Abstract)

在工廠內，作業員或管理階層適時地瞭解整個工廠設備的運作狀態是很重要的一環，因此設備的監控資料需要很容易且正確地傳遞到需要的人的手上。此文章介紹利用 WebSocket 和響應式網頁設計(responsive web design, RWD)等網頁技術將設備狀態即時更新至網頁介面(web dashboard)，利用網頁介面可以使資訊快速傳遞至需要的人手上，只要可以連接至網路，不受場地或裝置的限制，再藉由手持裝置上的 RFID 標籤，網頁上顯示的資訊可以自動隨著使用者移動，正確地顯示目前看到設備的運轉狀態以及統計資訊，使用者無須費心費時選取目前的機台，可將心力專注於解讀感興趣的資訊，快速瞭解產線/工廠的運轉狀態並做出最即時判斷。

It is indispensable for industrial facility operators to be situational aware of their environment at all time to make well-informed timely decisions. To achieve situational awareness, supervisory data must be made available, easily findable and comprehensible. In this work, web technologies such as WebSocket and responsive web design techniques

are used to create continuously updated dashboards and HMI interfaces. A web-based approach makes information available to operators at all times without being locked to a specific device or platform. Information is made easily findable by determining the location of handheld devices using RFID tags and automatically redirecting the operator to the corresponding dashboard or HMI interface. When the time required to find supervisory data is reduced, operators dedicate more time to the comprehension of information, resulting in a faster perception of their surrounding industrial environment. The present work was based on a successful implementation in our own facilities where RFID tags were used across multiple production lines.

1. Introduction

Dashboards are an essential tool used to monitor industrial facilities and machinery. They are used to deliver situational awareness to facility operators to effectively react when anomalies occur. Industrial environments require constant monitoring in real-time or near real-time, and delays in information delivery cannot be tolerated. Constant monitoring implies the need of constant data availability.

Handheld devices are a very suitable platform to deliver information thanks to their portability and networking capabilities, making them ideal to make supervisory data available at all times independently of the operator's location.

The creation of HMI dashboards is a complex matter when there is no control over the final display device. Mobile devices come with multiple screen resolutions and display dot densities, users also tend to adjust different font sizes to better fit their eyesight. Moreover, the creation of native applications for different handheld operating systems multiplies development time and effort.

Web technologies can be used to successfully overcome the difficulties introduced by the inclusion of handheld devices with different specifications. Web browsers are a common software present on handheld and desktop devices, and strictly follow web standards specified by the World Wide Web Consortium (W3C), with very little difference, to render interfaces.

In the proposed implementation, RFID antennas were installed near strategical points where situational awareness is needed as shown in fig. 1.

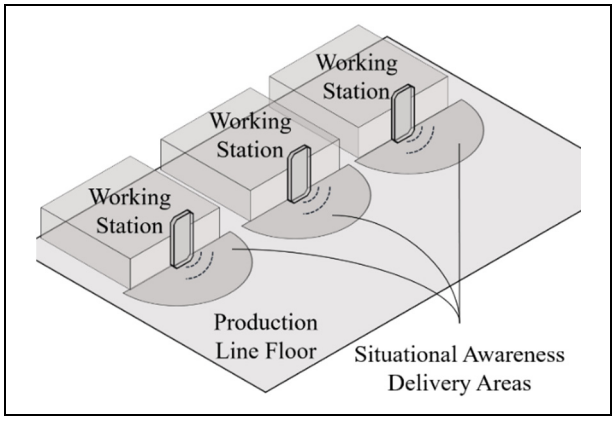

Fig. 1 Strategic antenna installation inside an industrial facility

更完整的內容

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