Technologies Aiming To Improve Work Efficiency And Sustainability: Personnel Tracking Systems

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Abstract

In this study, by dealing with personnel tracking systems used in business sector, it is examined their effects on business productivity and sustainability of these effects. Personnel tracking systems are computer-based electronic systems which enable to record business entry and exit times and preparation of the daily and monthly reports. It is aimed to increase business efficiency by ensuring the continuation and sustainability of personnel.

Personnel tracking systems, according to application of RFID (Radio Frequency Identification), are performed by using biometric and barcode technologies. RFID can work contactless different from biometric and barcode technologies. RFID is the most common technology used in Personnel tracking systems because of this advantage.

It is thought that staff awareness will increase on the use of tracking systems in the workplace with this study discussed the sustainability and dealing with the benefits of the Personnel tracking systems enabling the detection of workplace entry and exit times of workers.

Keywords: Radio Frequency Identification, Personnel Tracking Systems, Sustainability, Business Efficiency, Identification Technologies

1. INTRODUCTION

It needs to ensure the control of employees in order to work much more quickly and efficiently in companies that have many employees. In workplaces, in order to increase the productivity of personnel and maintain control of the personnel can be achieved by using tracking systems. Personnel tracking systems: having software and hardware equipments and developed for monitoring and control of factory staff, are a control mechanism that follows the monthly fees, all working hours and overtime of staff. With this system, business enterprises are able to follow, without any fault and forgetting, that staff work how many days and hours of within a specified period; lost time such as permit, late coming, early going and

no-coming. Personnel tracking systems are the contemporary systems of the key productivity. Personnel tracking systems provide to obtain mainly scoring payroll, and a wide variety of reports related to continuity of control.

2. PERSONNEL TRACKING SYSTEMS

Personnel tracking systems are the systems which provide monitoring work, overtime, absenteeism, leave, rest periods and the calculation, employees in the workplace is a workplace inputs / outputs to be authorized. Employers with these systems are intended to provide the most efficient use of the total workforce.

Thanks to personnel tracking systems, caused by human factor errors are minimized during the preparation of payroll. In addition, these obtained reports help the top management of enterprises by lighting the way to get more reliable decisions for the future.

Personnel tracking systems, enterprises that perform calculations by hand due to lost time and human error factor in the prevention of the damage caused to the economies provided by businesses, such as follow-up of operational staff brings discipline and modernity. The business which is able to control the personnel costs of staff and working hours control, can also capture the chances of becoming more effective in highly competitive markets (Buyurgan, N. at al., 2009).

Firstly, the follow-up of personnel has been followed up with procedure of the signature. It has not found safe by business since staff write working hours themselves. In order to ensure the safety, it needed manpower, that is, an additional staff to control. In order to confirm the correctness of the staff working hours used card instead of staff constitutes the beginnings of personnel tracking systems. Punch clocks, has been followed up by giving each individual named and anonymous tally cards.

After scoring cards, with the systems of barcode cards, personnel tracking have been done. By developing personnel tracking systems, proximity systems have been used. It has began to establish a remote connection with the development of devices connected TCP / IP protocol. With recent technological advances, a lot of systems have become used for personnel tracking (Pala, Z., 2007).

3. TECHNOLOGIES USED PERSONNEL TRACKING SYSTEMS

In personnel tracking systems, many automatic identification systems are used. The process of identification automatically makes life easy and most systems are designed for it. Each of these systems used a different technology, have different characteristics (Pala, Z., 2007).

In personnel tracking systems, automatic identification systems can be grouped mainly in 5 groups (Fig. 1):

1. OCR: Optical Character Recognition Systems
2. Biometric Identification System (Face Recognition, Fingerprint recognition ... etc.).
3. Barcode Systems
4. Smart Card Systems
5. RFID: Identification with Radio Frequency

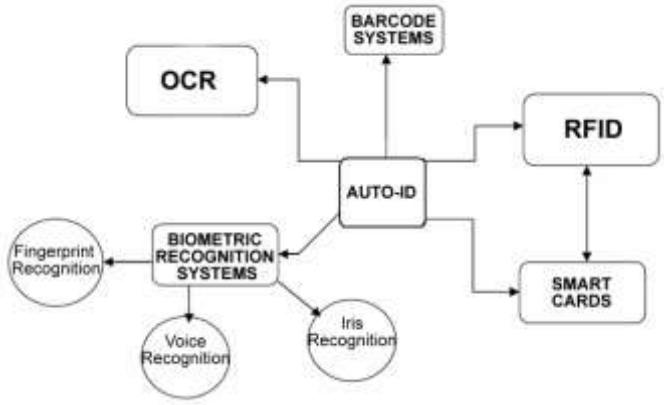

Figure 1. Automatic identification systems (AUTO-ID)

3.1. OPTICAL CHARACTER RECOGNITION SYSTEM (OCR)

Optical character recognition systems (OCR), provides an understanding of different fonts are read by machines. In scanners, to scan text and images, these systems are used. However, because the system is expensive, the field of using remains in a narrow frame. There are personnel tracking systems based on identification of signatures that are taken in entry and exit of staff.

3.2. BIOMETRIC RECOGNITION SYSTEMS

Biometrics, on the basis of assets can be defined as the science of measuring and counting. Biometrics, developed to determine the user's identity by recognizing the physical and behavioral characteristics of a computer-controlled, is a general term used for automated systems. Therefore, there are not any problems such as forgotten or stolen in the loss of the card or encrypted systems.

Biometric systems aim to provide access controlled passage of individuals, that is, it is allowed for authorized persons it is denied to access the passage / the transition to unauthorized persons (Tuğaç, B., 2007).

Types of biometric recognition system used in personnel tracking systems:

• Face Recognition System

• Fingerprint Recognition

• Voice Recognition

• Iris Recognition

• Retina Recognition

(a) (b) (c) (d)

Figure 2. Biometric Recognition Systems a)Face recognition device b)Fingerprint recognition device c)Voice recognition device d)Iris recognition device

3.2.1. FACE RECOGNITION SYSTEMS

Facial recognition systems work on the basis of comparison by computer-aided that already committed to the database face images with an unknown face. These systems are used to select individuals within the access control or crowd (Fig. 2a). The main problem in facial recognition systems, with low quality pictures can cause problems in the comparison whom wearing glasses, etc. accessories (Dağoğlu, M., 2006).

3.2.2. FINGERPRINT RECOGNITION SYSTEMS

The fingerprint is unique and does not change according to age or other characteristics. Every person has different fingerprints Therefore; fingerprint is one of the most reliable means of personal authentication (Fig. 2b). The fingerprint is a fingerprint recognition algorithm for each of the received image is different and unique feature of fingerprint ID code by creating a customized database extracts and saves. Each fingerprint code at the base of data is different for each person (Jain, A. K. ve Ross, A., 2004).

3.2.3. IRIS RECOGNITION SYSTEMS

Iris recognition does not require close contact between the user and the reader and is an useful biometrics technology. The basic idea in iris recognition technologies is to perform on

layer of the iris of the eye by taking the picture (Fig. 2c). This image taken from a database with a person's iris removed and processed in accordance with the characteristic values. Then this characteristic in the database is used to the aim of comparing (Jain, A. K. ve Ross, A., 2003).

3.2.4. VOICE RECOGNITION SYSTEMS

Sound biometry, emerged, determining changes over time in the sound frequency, is a system used to identify the person (Fig. 2d).

The advantage of audio systems is the use of hands and eyes freely, but as in the case of the excitement, fear and chills, changes in sound volume, speed and quality, make identifying difficult. In today's technology, voice recognition tools with recorded sound are also possible deceiving. Therefore, application of this technique is not safe (Dağoğlu, M., 2006).

3.2.5. RETINA RECOGNITION SYSTEMS

Based on the principle scanning the retina by the unique structure of the optical systems is high reliability of this technology but it is difficult to use, since the user must look at a certain point. Although technology is adequate, it has not been accepted for this reason (Tuğaç, B., 2007).

3.3. BARCODE RECOGNITION SYSTEMS

Today, Barcodes are ones of used in many areas and at least one cost-effective automatic recognition systems.

Nowadays, the generally rectangular, the thickness of the thin lines are drawn parallel to each other and it is a symbol created by the black bars occurring in the gaps between the lines (Dağoğlu, M., 2006).

3.4. SMART CARD SYSTEMS

Smart cards are called “smart cards” including plastic cards into the “chips” (microprocessor). This is known as the main reason for smart cards, high information transport, processing, using data on the card, write and delete capabilities 'microprocessor' is carried out through.

The applications of smart card technology opened new fields of application faster than before, magnetic media, such as to render safe and low cost, which cannot be possible so far (Jain, A. K. ve Ross, A., 2004).

3.5. RFID

RFID systems have similarities with smartcard systems. The main differences are adjacent to smart cards; data is exchanged between the data carrier device and the reader using radio waves rather than being used with the contact surface offers considerable (Kılınç, T., 2007).

Without human impact/contribution on the RFID system design are motivated to collect creation of information. It is a newer technology according to barcode technology and a system having advantages. The use around the world has been increasing year by year (Altun Z., 2010).

The main advantage of RFID technology systems is characteristic of functioning that does not require contact with the vision and the line Labels, snow, ice, fog, paint, dirt, inside the box, and a warehouse-like vehicle can also be read visually and environmentally challenging conditions. RFID reader with a short response time of 100ms and a lot (several hundred), the label can be read almost simultaneously. With labels combined with sensors can be obtained very important information about the status of the product. In RFID technology, it is much more secure about security on the magnetic cards since the data can be conveyed by being encrypted thanks to many other features. In addition, not needing physical contact enables ease of use. For example, with RFID technology credentials can be read in your wallet (Ismael, N.M., 2010).

4. SUMMARY and CONCLUSION

In this study, it is researched the technologies to improve business efficiency and sustainability in their workplace in order to ensure that research on tracking systems used by staff researched used. In addition to increasing the efficiency of business today has great significance in maintaining the Auto-ID systems, personnel tracking systems with optical character recognition systems, biometric identification systems, barcode systems, smart card systems and radio frequency identification system is used. Control technology with the development of more secure systems can be done by employees in the workplace. Although Employee tracking systems improve business efficiency, there are lacks in terms of data security. With the development of future systems more reliable and stable in the workplace will be provided the maximum level of receiving and maintaining productivity.

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