



Biometric Fingerprint/Card Based Student Tracking System

Practical Solutions for Accountability & Security in Schools

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Biometric technology has become an accepted method of identification. Specifically, finger scanning biometric identification has proven to be a better, faster, safer and more cost-effective solution than other methods of identification such as swipe cards and PINs.

Finger scanning biometrics can provide an ideal solution for school administrators in their effort to identify and track students, provide accurate and auditable student records and provide a safer and more secure environment for students, teachers and staff.

The following discussion provides information for school administrators who are evaluating biometric solutions for student identification, security and tracking.

Purpose

One of the many challenges facing schools today is accurately identifying students. The bottom line is that schools receive federal and state money based on accurate and auditable records. In addition, schools need to provide a safe and secure environment for everyone on campus. Now more than ever, accurate student identification is key to the efficient operation of a school. Over the past few decades, schools have been implementing all kinds of new technologies to both enhance learning and improve operations. Smart boards, laptops and real-time internet resources are just a part of a student's everyday experience. And schools world-wide have been implementing biometric finger scanning to streamline operations, increase teaching time and enhance security.

How does it work?

Fingerprint identification is the oldest method that has been successfully used in numerous applications. Each of our ten fingerprints is different from one another and from those of every other person. Even identical twins have unique fingerprints. That makes them ideal for personal identification. A fingerprint is made of a series of ridges and furrows on the surface of the finger. The uniqueness of a fingerprint is determined by the pattern of ridges and furrows as well as the minutiae points. Minutiae points are local ridge characteristics that occur when a ridge splits apart or a ridge ends.



Finger is scanned. Unique points are identified. Points are transferred to binary number. Number is encrypted and identified. The fingerprint is destroyed! and equals the student's ID number.

When the student returns to be identified, the finger scanner again scans the finger. The computer software now compares the new template with the other templates in the database. When a matching template is found, the student is identified. This identification and matching process takes under one second to complete. At no time is a fingerprint image ever stored and no fingerprints can be recreated from the template.

Why Biometrics in Schools?

Many areas in a school require identification. The most common kinds of identification currently in use are picture ID cards, PINs, and, of course, visual identification. Each of these methods creates its own issues and is a drain on the time and resources of IT departments. Cards are regularly forgotten, lost, mutilated and shared; PINs are easily forgotten, swapped or stolen. Also, visual identification is a poor solution, especially with today's considerable security concerns and reporting issues. By using biometrics for identification, the problems and costs associated with the current methods can be avoided and new standards of accountability can be put into place.

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Practical Applications in Schools

Why would a school use biometrics? Quite simply, to save time and money – improve operations. Biometric technology can also provide benefits in terms of convenience, safety and security. A typical first installation in a school is in the cafeteria where accurate records are critical for reimbursement from the federal government's \$9 billion free and reduced lunch program. Schools can then use the same biometric database to identify students to other applications such as those used for attendance, in the nurse's office, in the library or media center and on the bus. Once biometrics is being used successfully in one part of a school, the idea is usually embraced in other areas as well. Schools even use it for student identification at athletic events and dances to keep out other students who don't belong.

School Access:

A controlled environment is critical to a school's success. Access to the school must be permitted only to authorized persons. Students, teachers, staff and recurring visitors can be accurately time-stamped and identified using biometric finger scanning technology and attendance applications. Administrators will have an irrefutable record of the date and time of each person's entry into the building. Biometric finger scanning systems can assure administrators that those entering their schools actually belong there.

Attendance:

School administrators are being held accountable by federal and state governmental funding sources for accurate and auditable attendance records since certain funding is provided based on the number of students who attend the school each day. Schools that have made errors in attendance reporting have been required to pay back hundreds of thousands of dollars to the governmental funding sources. Biometric finger scanning technology provides administrators with irrefutable proof of student attendance for accurate and auditable reporting. In addition, administrators can be provided with period-by-period attendance records in real-time, quickly identifying students who are not in the appropriate classrooms. Also, teachers of large classes, such as band, orchestra, chorus, and physical education can use the entire classroom period for instruction instead of using valuable time to take attendance.

Cafeteria:

Most cafeteria debit systems use swipe cards or PINs. Schools are now using finger scanning to eliminate the expense and problems associated with these systems and to ensure accurate reporting. Biometrics are also being used in vending machines to increase reimbursements and decrease costs. In addition, by integrating a biometric finger scanning system with the cafeteria application, accurate lunch reporting for students entitled to the free or reduced lunch program is provided anonymously, with the important result of increasing participation by eliminating embarrassment.

Library:

School libraries store thousands of dollars of schools' assets such as books, periodicals, recordings and pieces of art. Librarians can use finger scanning to replace library cards eliminating the sharing of library cards with students who have overdue materials.

Nurse's Office:

School nurses are charged with dispensing medication to students everyday. In many schools, nurses change duties or teachers and substitutes dispense medication when the school nurse is unavailable. Finger scanning provides an irrefutable record, and prevents any potential life threatening errors.

Transportation:

School students get lost or get off at wrong schools and bus stops each day, especially young students. New bus drivers are hired throughout the school year due to turnover or their routes are frequently changed. This makes it difficult for them to get to know the students well enough to visually identify them and where they belong. School districts have implemented finger scanning on buses in order to help the driver know if the student is on the correct bus, goes to the correct school and gets off at the correct stop.

Other Applications:

Wireless applications now being developed can assist large schools in hallway monitoring. This technology can also be applied to off-site student identification for field trips and outdoor events. Emergency identification as a result of a fire or other disaster is a critical use of this technology.

Practical Ways of Implementing Biometric



What area in your school would be the first place where the use of finger scanning will save you time and money? Is it in the cafeteria eliminating the cards and PINs and making your audits easier? Is it at the front door for attendance so you know who is entering your school and that your attendance records are accurate? Start by making improvements in one area of the school. You want to increase productivity, recordkeeping and of, course, safety. Communicate, educate and train the people who will be involved. This is usually the weak link in implementing any new technology and implementing biometrics is no different. You will find that once finger scanning is being used successfully in one part of the school, the idea migrates and is embraced in other areas as well.

Choosing the Right Biometric Solution

It is really important to not be short sighted here. Choose a biometric finger scanning identification system that can eventually be used throughout your entire school. This means that students should be enrolled only once to be identified in a variety of areas in the school – the cafeteria, the front door, the classroom for attendance, the nurse’s office, the library and the attendance office for late students. Make sure that it can scale. Some biometric technologies work great with ten students

or less in a standalone environment, but fail miserably as the number of students increase in a networked environment. A more robust biometric technology will be worth it in the long run.

Make sure that it can integrate with the software applications you already have in place. Many biometric technologies will only work with a specific application, and you have to buy that application for it to work. Other biometric technologies can easily be integrated into applications that you already have. Make sure that it works! The fingers of young children are difficult for many biometric technologies to scan. Most biometric companies have only focused on adults for employing biometrics in mass implementations. Axies Technologies has successfully developed biometric technology to scan the fingers of very young children – a must in any school setting. You want your biometric finger scanning system to work with all of your students...every time. Ask about performance accuracy. There are basically four metrics: false acceptance rate, false rejection rate, failure to enroll rate and failure to acquire rate. In particular, false acceptance rates are what you should be most concerned about - that means when you place your finger on the scanner, someone else is identified. The Axies Technologies Finger Scanning System, for instance, has a false acceptance rate of 1 in 200 million, certainly an acceptable limit for schools.

Compare, but not just on price. Check up on customer support and roll-out experience, especially experience in schools. Once again, make sure the technology works in a practical setting and not just in a vendor lab. 6

Communication, communication and communication! Make sure everyone – parents, teachers, students, administrators, the school board and the media have up to date and accurate information about biometrics. Axies Technologies has a “*Finger Scanning Reference Kit*” that includes sample letters to parents, biometric FAQs, best practices and other important information to make the whole process run smoothly and easily.

Case Studies

Beverly E. Blough MS, RD, LD, Director of Food Service of Wood County, West Virginia, was a pioneer in implementing biometric technology in her schools five years ago. Beverly is responsible for serving over 1.8 million meals a year as well as following all U.S. federal laws for the Child Nutrition Program. One of the requirements is accurate student identification for reimbursement. They were using student ID cards and a 9-digit PIN. On some days, more than 80% of students would show up for lunch without their cards. This meant that the cook had to type in every 9-digit student ID number. Lines backed up, mistakes were made keying in the numbers and each month irritated parents called claiming their children did not eat the meals they were charged for. The school district then had to bear those costs. “With all of the lost, stolen and damaged cards, sometimes I thought Food Service was in the card business rather than serving meals to students! We obviously needed a better solution,” said Beverly. “We decided that finger scanning biometrics was the solution. Students would never forget their fingers,” she added. 600 miles away in Rogersville, Alabama, Debbie Romine, Cafeteria Manager, was

experiencing the same headaches. “We wanted something that students could not forget, lose, damage or steal. But it had to be compatible with our existing cafeteria software and it had to be cost-effective. We also needed biometrics that worked with 4, 5 and 6 year old children without any difficulties.” Debbie continues, “In food service, seconds count. Our goal is to keep it simple for the students, my staff and myself and make it an enjoyable experience to come to the school cafeteria. Since we implemented the biometric system last fall, our food service operation has improved; we’re saving time and money. This was the best start of the school year I’ve had in 21 years. The kindergarten students are just soaring through the lunch lines in record time.”

And in another part of the United States, Edgefield County, South Carolina, Greg Thompson, Principal of Strom Thurmond High School, had yet another requirement. He wanted to use finger scanning biometrics as a complete student identification system throughout his entire school, beginning with the cafeteria, then migrating to the library and finally in each classroom for period-by-period attendance so he would know where his students are throughout their day. How's it working? According to Greg, "Biometric finger scanning identification was well accepted by the Board, Superintendent, Principals, teachers, parents and the community. They all understood our need to correctly identify students and realized the time and money it was costing each day to administer the card program. Initially, there were questions regarding privacy. But the system doesn't take an actual fingerprint, just unique identifying points. Everyone felt comfortable that the fingerprints can't be recreated. The students are enrolled only once so we can roll out our finger scanning identification program to different areas of the school. Now, students ALWAYS have their ID with them!" he added. And across the world in Nigeria, biometrics are being used at the prestigious Covenant University, a World-Class Christian Mission University. Pastor Michael Ogbolu, Director

of the Centre for Systems and Information Services, currently uses finger scanning biometrics for the weekly chapel attendance and for special meetings and halls of residence. According to Pastor Michael, "Biometrics enables us to track attendance at the various meetings as well as monitor late comers effectively and efficiently. Unlike the previous methods of card swiping and paper attendance marking which are not as reliable in tracking the over 7000 students who are resident on campus, this finger scanning biometrics requires a physical presentation of a live finger and hence is much more precise and accurate. Issues bordering around missing attendance sheets, buddy swiping, etc are completely eliminated." "We piloted biometric finger scanning in March 2005. This was quite successful and has encouraged our continued use of biometrics after comparing with several other methods including card scanning. Our vision is to deploy the finger scanning biometrics in taking classroom attendance in about 50 classrooms beginning with the 2009/2010 Session which is just a few months away. No doubt, our implementation of biometrics has been a factor in achieving The Best ICT (Information & Communications Technology) driven University in Nigeria for 2007 and 2009, respectively," he added.

Summary

As we move into the 21st century, schools are faced with a myriad of problems never encountered in previous decades. Security has become a significant concern. It is now crucial that school administrators know who is in their schools and where the students are at all times. Accurate and auditable attendance and reporting is vital in not only securing, but also maintaining, essential governmental funding. Accurate identification and tracking of students is now critical in all aspects of the day-to-day management and administration of our schools. Biometric finger scanning identification offers a cost-effective, reliable, easy and efficient way for school administrators to know for certain who is in their schools, where the students are each period of the day, and that they receive the services they require and deserve. By utilizing the unique fingerprint of the student for identification, tracking, and security, the problems and costs associated with the current expensive or inaccurate methods of identification are avoided. Finger scanning is the missing component that provides the irrefutable accuracy that has long been needed in our schools. Cost-effective biometric technology is here today with practical uses for schools. At Axies Technologies, the leader in the development, integration and marketing of biometric student identity management solutions for schools, we provide finger scanning identification systems to schools and school districts worldwide, to make things work faster, safer, more reliably and efficiently. It's just smart business!

HARDWARE CONFIGURATION

Processor : Pentium III 630MHz

RAM : 128 MB

Hard Disk : 20GB
Monitor : 15 Color monitor
Key Board : 122 Keys

SOFTWARE CONFIGURATION

Operating System : Windows NT,
Windows 98,
Windows XP.
Language : Java 2 Runtime Environment
Database : MS Access2007.

SYSTEM REQUIREMENTS

This management system can be used in windows 98, Windows2000, Windows XP and Windows NT, supported for other platform such as Applet, Macintosh and UNIX.

The system must be running Windows 98, Windows 98 or Windows NT4.0 operating system and must meet the following hardware requirements.

For Windows 95 based computers , a 486 / 66 MHz or higher processor with 8MB

For Windows 98 based computers , a 500/88MHz or higher processor with 32 Mb of RAM

For Windows NT based computers , a 488 / 66 MHz or higher processor with 16 MB of RAM

For Windows 200 based computers , a 700/850 MHz or higher processor with 512 MB of Ram

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