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CARD-BASED SECURITY SYSTEM

Smart card-enabled applications are becoming more prevalent in many of today's businesses. The financial payments industry has moved to smart cards. The majority of the regional financial organizations worldwide have mandated that financial credit and debit cards must be smart card-enabled by a specified date. Plus, there has been rapid acceptance of contactless smart card technology for fast, convenient and secure credit and debit payment. The United States Federal government has adopted smart card technology for its major credentialing initiatives. The Department of Defense Common Access Card uses smart card technology for the credentialing of all military and civilian personnel. The Department of State uses contactless smart card technology for the electronic passport. Smart card-based identity credentials are now being issued to all Federal government employees to meet Homeland Security Presidential Directive 12. Enterprises are issuing smart ID badges to employees to secure physical and logical access. Plus, many government identity programs around the world are issuing smart card-based identity credentials to citizens.

A smart card includes an embedded secure integrated circuit (IC) that can be either a secure microcontroller with internal memory or a secure memory IC alone. The card connects to a reader with direct physical contact or with a remote contactless radio frequency (RF) interface. With an embedded microcontroller, smart cards have built-in tamper resistance and have the unique ability to securely store large amounts of data, carry out their own on-card functions (e.g., encryption and digital signatures), and interact intelligently with a smart card reader.

The smart card itself is only one component in a smart card-based system implementation. Security mechanisms are typically implemented in the card and at the operating system (OS), software, and system levels, providing layers of security to protect the system and information within the system from unauthorized access. In any smart card system implementation, the issuer needs to determine the risks that the system will be exposed to and implement the security measures necessary throughout the system to address those risks.

The government and financial payments industries have also led the way in establishing security evaluation and certification programs for the various layers of smart card security. Standardized evaluations and certifications use trusted third party labs to empirically verify that specific threats are prevented to a defined level of effectiveness, providing issuers with the confidence that certified products meet specified security requirements.

By placing a secure smart card in the hands of the user, organizations can implement a layered security architecture that addresses the expected risk of security breaches and implements an end-to-end chain of trust.



SIXTH SENSE TECHNOLOGY

Sixth Sense is a wearable gestural interface that enhances the physical world around us with digital information and lets us use natural hand gestures to interact with that information. It is based on the concepts of augmented reality and has well implemented the perceptions of it. Sixth sense technology has integrated the real world objects with digital world. The fabulous 6th sense technology is a blend of many exquisite technologies. The thing which makes it magnificent is the marvelous integration of all those technologies and presents it into a single portable and economical product. It associates technologies like hand gesture recognition, image capturing, processing, and manipulation, etc. It superimposes the digital world on the real world.

Sixth sense technology is a perception of augmented reality concept. Like senses enable us to perceive information about the environment in different ways it also aims at perceiving information. Sixth sense is in fact, about comprehending information more than our available senses. And today there is not just this physical world from where we get information but also the digital world which has become a part of our life. This digital world is now as important to us as this physical world. And with the internet the digital world can be expanded many times the physical world. God hasn't given us sense to interact with the digital world so we have created them like smart phones, tablets, computers, laptops, net books, PDAs, music players, and others gadgets. These gadgets enable us to communicate with the digital world around us.

But we're humans and our physical body isn't meant for digital world so we can't interact directly to the digital world. For instance we press keys to dial a number; we type text to search it and so on. This means for an individual to communicate with the digital world he/she must learn it. We don't communicate directly and efficiently to the digital world as we do with the real world. The sixth sense technology is all about interacting to the digital world in most efficient and direct way. Hence, it wouldn't be wrong to conclude sixth sense technology as gateway between digital and real world. Before Wear Ur World (WuW) came there were other methods like speech recognition software, touch recognition etc., which empowered us with direct interfacing.

How does sixth sense works?

The sixth sense technology uses different technologies like gesture recognition, image processing, etc. At present the commercial product isn't launched but the prototype is prepared. The sixth sense prototype is made using very common and easily available equipments like pocket projector, a mirror, mobile components, color markers and a camera.

The projector projects visual images on a surface. This surface can be wall, table, book or even your hand. Thus, the entire world is available on your screen now. When user moves their hands to form different movements with colored markers on the finger tips, the camera captures these movements. Both the projector and the camera are connected to the mobile computing device in the user's pocket. Recognition is made using computer vision technique. These markers act as visual tracking fiducials. The software program processes this video stream data and interprets the movements into gestures. The gestures are different from one another and are assigned some commands. These gestures can act as input to application which is projected by the projector. Since, the projector is aligned downwards for compactness; therefore images would be formed at the user's feet if mirror wasn't used. The mirror reflects the image formed by the projector to front. The entire hardware is fabricated in the form of a pendent. The entire product cost around \$ 350 and that also because of projector. It works very similar like a touch screen phone with entire world as the screen.

MICROFUEL CELLS

Micro fuel cell and reformer systems will play an important role in upcoming micro energy systems as a supplement or a replacement for batteries for off-grid or portable electronic devices. Micro reformers process hydrocarbon fuels or alcohols into hydrogen rich gases which are subsequently converted into electric power within micro fuel cells. Reformers do play a crucial role when it comes to disseminating fuel cell systems into mass markets, because they allow the end user to use fuels that are more readily available than hydrogen. This is reflected by the great amount of global players in consumer electronics that research micro fuel cells and reformer systems.

A micro fuel cell (MFC) is a power source that uses oxidized hydrogen to convert chemical energy into usable electrical energy. MFCs power small electronic devices such as laptops, cameras and portable radios.

MFCs are scaled-down versions of the hydrogen fuel cells used in vehicles. Unlike a voltaic cell battery, which uses an electrolyte and various metals and may take hours to recharge, MFCs are self-consuming and can be refilled as needed. Each MFC has a membrane bordered on each side by water, which serves as a catalyst and agent to induce a chemical reaction. Because a fuel cell is always discharging and self-consuming, the negative electrode (anode) produces protons, electrons and carbon dioxide. During discharge, the electrons inside the MFC move toward the positive electrode (cathode) and then move through outside wires back toward the anode. Then, the electrons and protons meet again, reacting with oxygen and producing heat and water vapor, which are emitted into the air. The electrons moving from the cathode toward the anode provide the power for the electrical systems of devices such as laptop computers, smartphones and personal digital assistants (PDAs). The anode also produces carbon dioxide, which is emitted into the air.

The cost of MFCs is expected to decrease over the next few years as technology develops and the worldwide MFC device market expands.

A proton exchange membrane (PEM) serving as the electrolyte is not electronically conductive, so the electrons that are released from the hydrogen are unable to pass through it, but instead flow through an external circuit from the anode to the cathode. The flow of electrons within the circuit creates an electric current that can be used to power various electronic devices. The reaction will continue until all of the fuel is consumed; thus, the overall reaction equation in a hydrogen-air PEM fuel cell is the formation of water from hydrogen and oxygen.

Another simple fuel for PEM fuel cells is methanol; and the same basic principles apply. In a direct methanol fuel cell, the oxidation of methanol and the reduction of oxygen result in the production of water and carbon dioxide and the water can be recycled to be used at the reaction occurring at the anode.

