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A Fingerprint Based License Verification System Design for Vehicle Control using FPGA

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Abstract: Security systems are becoming the unavoidable systems in today's life because of the increasing criminal activities. In this project work a proposed real time vehicle security system is implemented. If any person starts the car, the security system will check the person's authentication. The proposed system allows only the authorized user to use the vehicle. If it finds any unauthorized person , the proposed Person Authentication System (PAS) will block the person to operate the car . This application design was carried out using FPGA using Xilinx ISE.
Keywords: Security, FPGA, Xilinx ISE

I. INTRODUCTION

Now a daysthefting is increased in the field of vehicle steal. Mainly in the luxurious system Cars are expensive. Other than a house, perhaps, few purchases we make will compare to a new car. And just like any other expensive asset, a car brings with it a secondary cost . Most of the people are using cars today to make their life well. According to this requirement the manufactures also bring the cost of the car too low. So even a middle class family can also purchase that freely. This improves the car usage among the public.

Increased car usage turns increase the theft also. In this project work a proposed security system is introduced in order to overcome this problem. The PAS block representation will illustrate the function of the entire project work.

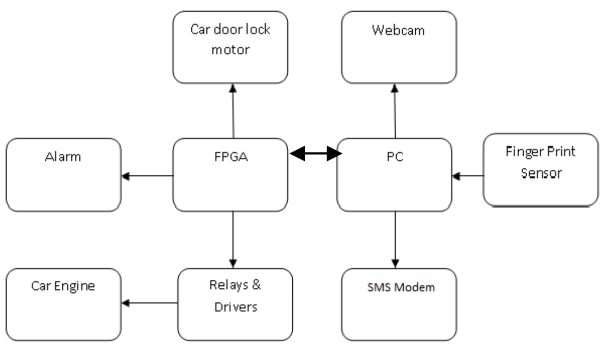

Fig 1: Proposed PAS block representation

This project consists of a Processor using FPGA , MMS module unit as hardware parts and an effective face recognition system using Matlab platform. In this project initially the owner's image or else the driver's image should be stored in the database.Whenever a person is starting the car, the face detection recognition unit will takes the image and it will compare with the database image.If the image is matched then finger print Verification will be done if authenticates car will start. If face was un authorized MMS was sent to owner using MMS Module.

II. DESIGN AND IMPLEMENTATION

This project uses two important platforms. 1. Software Platform and 2. Hardware Platform. These platforms are discussed below

Software Platform:

In this project a Fingerprint recognition system is used which will do the key role in the entire operation. For VB Platform is used.. The image recognition will process in the following way.

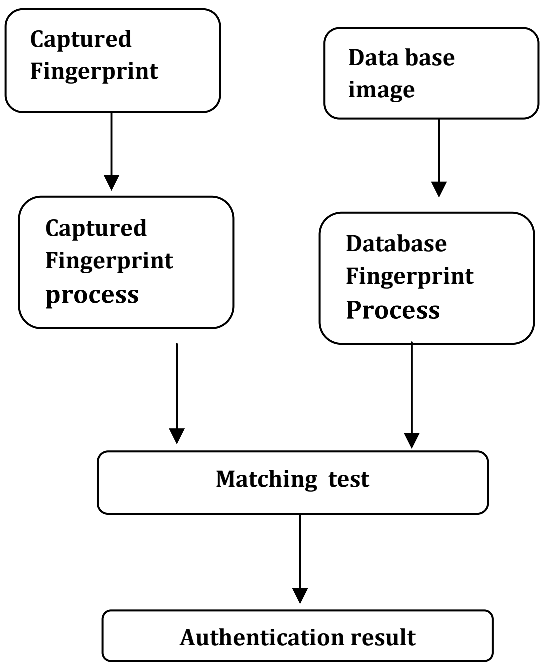

Fig 2: PAS Software architecture

The fingerprint module captures the finger print of the person who starts the car once fingerprint was captures then a matching procedure was starts which matches the finger print with data base by using template matching method and makes a process of authorize or un authorize.

Hardware Platform:

FPGA

A **Field-programmable Gate Array** (**FPGA**) is an integrated circuit designed to be configured by the customer or designer after manufacturing—hence "field-programmable". The FPGA configuration is generally specified using a hardware description language (HDL), similar to that used for an application-specific integrated circuit (ASIC) (circuit diagrams were previously used to specify the configuration, as they were for ASICs, but this is increasingly rare). FPGAs can be used to implement any logical function that an ASIC could perform. The ability to update the functionality after shipping, partial re-configuration of the portion of the design[1] and the low non-recurring engineering costs relative to an ASIC design (notwithstanding the generally higher unit cost), offer advantages for many applications.

FPGAs contain programmable logic components called "logic blocks", and a hierarchy of reconfigurable interconnects that allow the blocks to be "wired together"—somewhat like many (changeable) logic gates that can be inter-wired in (many) different configurations. Logic blocks can be configured to perform complex combinational functions, or merely simple logic gates like ANDandXOR. In most FPGAs, the logic blocks also include memory elements, which may be simple flip-flops or more complete blocks of memory.

In addition to digital functions, some FPGAs have analog features. The most common analog feature is programmable slew rate and drive strength on each output pin, allowing the engineer to set slow rates on lightly loaded pins that would otherwise ring unacceptably, and to set stronger, faster rates on heavily loaded pins on high-speed channels that would otherwise run too slow. Another relatively common analog feature is differential comparators on input pins designed to be connected to differential signaling channels. A few "mixed signal FPGAs" have integrated peripheral Analog-to-Digital Converters (ADCs) and Digital-to-Analog Converters (DACs) with analog signal conditioning blocks allowing them to operate as a system-on-a-chip. Such devices blur the line between an FPGA, which carries digital ones and zeros on its internal programmable interconnect fabric, and field-programmable analog array (FPAA), which carries analog values on its internal programmable interconnect fabric.

I)Relay Unit

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Hence a CB amplifier is used to achieve the current rating of the relay.

Transistors and ICs must be protected from the brief high voltage produced when a relay coil is switched off. The diagram shows how a signal diode (e.g. 1N4148) is connected 'backwards' across the relay coil to provide this protection.

Current flowing through a relay coil creates a magnetic field which collapses suddenly when the current is switched off. The sudden collapse of the magnetic field induces a brief high voltage across the relay coil which is very likely to damage transistors and ICs. The protection diode allows the induced voltage to drive a brief current through the coil (and diode) so the magnetic field dies away quickly rather than instantly. This prevents the induced voltage becoming high enough to cause damage to transistors and ICs**.**

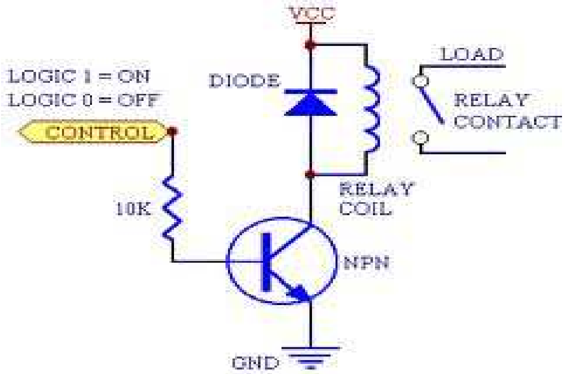

Fig 3. Drive circuit and protection diodes for relays

DC MOTOR:

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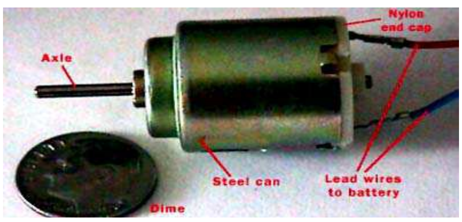
Basicprinciples relating to DC motor specifications and drivefrequency are presented. The PWM method of switched-mode voltage control is discussed with reference to armature current control, and hence output torquecontrol, of DC motors. A series of circuit configurations areshown to illustrate velocity and position servo applicationsusing a switched mode driver IC. Philips Semiconductors produce a wide range of control ICs for Switched ModePower Supply (SMPS) applications which can also be usedas controllers for PWM driven DC motors. This paperdemonstrates how one switched-mode controller, theNE5560, can be used to give a velocity and position servosystems using Philips power MOSFETs as the main powerswitches. Additional application ideas using the NE5560controller for constant speed and constant torque operationare also presented.

III. PRINCIPLES OF THE PWM DC MOTOR DRIVE

Pulse width modulated drives may be used with a number of DC motor types: wound field or permanent magnet. The discussion here will be particularly concerned withpermanent magnet excited DC motors. This does not impose a restriction on the applicability of switched mode control for DC drives since permanent magnet motors are available in a wide range of sizes, ratings andconfigurationsto suit many applications. The design of a pulse widthmodulated drive is affected by the characteristics of the DCmotor load, and this will now be considered in more detail.

DC motor configurations:

In a conventional DC motor the field energy is provided byeither a permanent magnet or a field winding. Both of thesearrangements involve quite large, bulky arrangements forth field. In the case of wound field DC motors this is dueto large number of turns needed to generate the requiredElectromagnetic field in the airgap of the machine. In thecase of permanent magnet DC machines the low energydensity of traditional permanent magnet materials means that large magnets are required in order to give reasonableair gap fluxes and avoid demagnetization. If either of thesetwo options are used with the field excitation on the rotor of the machine then the inertia and weight of the rotor makethe machine impractical in terms of its size and dynamic response. Aconventional DC machine has alarge number of armaturecoils on the rotor. Each coil is connected to one segment of a commutatorring. The brushes, mounted on the stator connect successive commutator segments, and hencearmature coils, to the externalDCcircuits the motor movesforward. This is necessary to maintain maximum motortorque at all times.



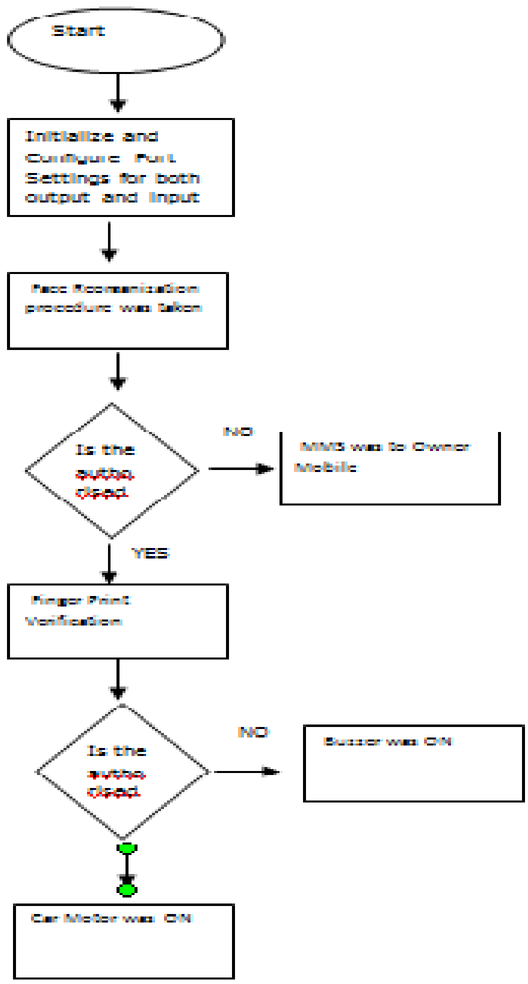
In a DCmotor, the static field flux is established using eitherpermanent magnets or a stator field winding. The armaturewinding, on the rotor of a dc machine, carries the main motorcurrent. The armature winding is a series of coils, eachconnected to segments of a commutator. In order that themotor develops constant torque as the rotor moves,successive armature coils must be connected to the external dc circuit. This is achieved using a pair of stationarybrushes held in contact with the commutator.

The motor torque is produced by the interaction of the fieldflux and the armature current and is given by:

(1)The back emf developed across the armature conductorsincreases with the motor speed:

(2)Permanent magnetDCmotors are limited in terms of powercapability and control capability. For field woundDCmotorsthe field current controls the flux and hencethe motor torqueand speed constants. The field winding can be connectedin series with the armature winding, in shunt with it, or canbe separately excited. For the separately excited dc motor, the field flux is controlled and the motor canbe made to operate in two distinct modes: constant torqueoperation up to the rated speed of the motor, and thenconstant power operation above rated speed.

Flow chart



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CONCLUSION:

From this we implement Fingerprint-recognition techniques that can provide the important functions required by advanced intelligent Car Security, to avoid vehicle theft and protect the usage of unauthenticated users**.** Secured and safety environment system for automobile users and also key points for the investigators can easily find out the hijackers image. We can predict the theft by using this system in our day to day life.

This project will help to reduce the complexity and improve security, also much cheaper and 'smarter' than traditional ones.

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