

# USER AUTHENTICATION AND VEHICLE CONTROL USING ARM CONTROLLER

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## Abstract

Nowadays there are many risks while hiring the call taxis. This project is to solve those conflicts. Many of the problems are because of drivers of taxis. In this project without drivers the customers can access the vehicle. For this there must be so many challenges needed to be answered regarding authentication, driving license, security keys, automatic door lock of car etc. So this project helps for [3] authentication of user, verifying driving license, automatic door lock control. The customer must wear the seat belt to start the ignition. When the customer wants to leave the car, he should pay using his smart card according to his billing. If the customer damages the car then he should pay according to the damages made.

Keyword: Advance RISC Machine(ARM), UART(Universal Asynchronous Receiver Transmitter, Global Positioning System(GPS), Global System for Mobile communication(GSM).

## 1. INTRODUCTION

Embedded System is used in various applications. The applications include variety of aspects such as security, robotics, industries etc. In this paper, the security and authentication are discussed. There are many risks while hiring the call taxis. This project is to solve those conflicts. Many of the problems are because of drivers of taxis like smuggling, robbery, abusing women etc. In this project without drivers the customers can access the vehicle. For this he/she must be authorized and have driving license. Customer can drive this car where ever he wants. They should pay according to the distance they drive. And they should be monitored by the control room. The customer must wear the seat belt to start the ignition. When the customer wants to leave the car, he should pay using his smart card according to his billing. If the customer damages the car then he should pay according to the damages made.

## 2. PROPOSED AUTHENTICATION METHOD

In this section we give an overview of basic WLD descriptor and its extension. This descriptor represents an image as a histogram of differential excitations and gradient orientations, and has several interesting properties like robustness to noise and illumination changes, elegant detection of edges and powerful image representation.

WLD descriptor is based on Weber's Law. According to this law the ratio of the increment threshold to the background intensity is constant. Inspired by this law, Chenetalproposed WLD descriptor for texture representation. The computation of WLD descriptor involves three steps i.e. finding differential excitations, gradient orientations and building the histogram.

### Weber's Law

Ernst Weber, an experimental psychologist in the 19<sup>th</sup> century, observed that the ratio of the increment threshold to the background intensity is a constant. This relationship, known since as Weber's Law, can be expressed as:

$$\frac{\Delta I}{I} = k,$$

Where  $\Delta I$  represents the increment threshold (just noticeable difference for discrimination);  $I$  represents the initial stimulus intensity and  $k$  signifies that the proportion on the left side of the equation remains constant despite variations in the  $I$  term. The fraction  $\Delta I/I$  is known as the Weber fraction. Weber's Law, more simply stated, says that the size of a just noticeable difference (i.e.,  $\Delta I$ ) is a constant proportion of the original stimulus value.

### WLD

In this part, we describe the [1]two components of WLD: differential excitation ( $\xi$ ) and orientation ( $\theta$ ). After that we present how to compute a WLD histogram for an input image (or image region).

### Gradient Orientation

Next main component of WLD is gradient orientation. For a pixel the gradient orientation is calculated as follows:

$$\theta(x_c) = \arctan \left[ \frac{I_{73}}{I_{51}} \right]$$

Where  $I_{73}$  is the intensity difference of two pixels on the left and right of the current pixel  $x_c$ , and  $I_{51}$  is the intensity difference of two pixels directly below and above the current pixel,

$$\theta \in \left[ -\frac{\pi}{2}, \frac{\pi}{2} \right].$$

### Differential Excitation

We use the intensity differences between its neighbours and a current pixel as the changes of the current pixel. By this means, we hope to find the salient variations within an image to simulate the pattern perception of human beings. Specifically, a differential excitation  $\xi(x_c)$  of a current pixel  $x_c$  is computed as illustrated in Fig. 1. We first calculate the differences between its neighbors and the center point using the filter  $f_{00}$ :

$$v_s^{00} = \sum_{i=0}^{p-1} (\Delta x_i) = \sum_{i=0}^{p-1} (x_i - x_c).$$

Where  $x_i$  ( $i=0,1,\dots,p-1$ ) denotes the  $i$ -th neighbors of  $x_c$  and  $p$  is the number of neighbors. Following hints in Weber's Law, we then compute the ratio of the differences to the intensity of the current point by combining the outputs of the two filters  $f_{00}$  and  $f_{01}$  (whose output  $01$   $s_v$  is the original image in fact):

$$G_{ratio}(x_c) = \frac{v_s^{00}}{v_s^{01}}.$$

We then employ the arctangent function on  $G_{ratio}(\cdot)$ :

### 3 BLOCK DIAGRAM

#### 3.1 Block Diagram for Authentication

$$G_{\arctan} [G_{ratio} (x_c)] = \arctan [G_{ratio} (x_c)].$$

Combining (2), (3) and (4), we have:

$$G_{\arctan} [G_{ratio} (x_c)] = \gamma_s^0 = \arctan \left[ \frac{v_s^{00}}{v_s^{01}} \right] = \arctan \left[ \sum_{i=0}^{p-1} \left( \frac{x_i - x_c}{x_c} \right) \right]$$

So, the differential excitation of the current pixel  $\xi(x_c)$  is computed as:

$$\xi(x_c) = \arctan \left[ \frac{v_s^{00}}{v_s^{01}} \right] = \arctan \left[ \sum_{i=0}^{p-1} \left( \frac{x_i - x_c}{x_c} \right) \right].$$

Note that  $\xi(x)$  may take a minus value if the neighbour intensities are smaller than that of the current pixel. By this means, we attempt to preserve more discriminating information in comparison to using the absolute value of  $\xi(x)$ . Intuitively, if  $\xi(x)$  is positive, it simulates the case that the surroundings are lighter than the current pixel. In contrast, if  $\xi(x)$  is negative, it simulates the case that the surroundings are darker than the current pixel.

#### Gabor Filter Approach

[2] The low frequency subbands of two source images are fused based on selection of appropriate coefficients using gabor filtering. It is useful to discriminate and characterize the texture of an image through frequency and orientation representation. It uses the gaussian kernel function modulated by sinusoidal wave to evaluate the filter coefficients for convolving with an image.

The complex Gabor in space domain, here is the formula of a complex Gabor function in space domain

$$g(x, y) = s(x, y) wr(x, y)$$

where  $s(x, y)$  is a complex sinusoidal, known as the carrier, and  $wr(x, y)$  is a 2D Gaussian-shaped function, known as the envelop.

The complex sinusoidal is denoted as follows,

$$s(x, y) = \exp(j(2\pi(u_0 x + v_0 y) + P))$$

where  $(u_0, v_0)$  and  $P$  denotes the spatial frequency and the phase of the sinusoidal respectively.

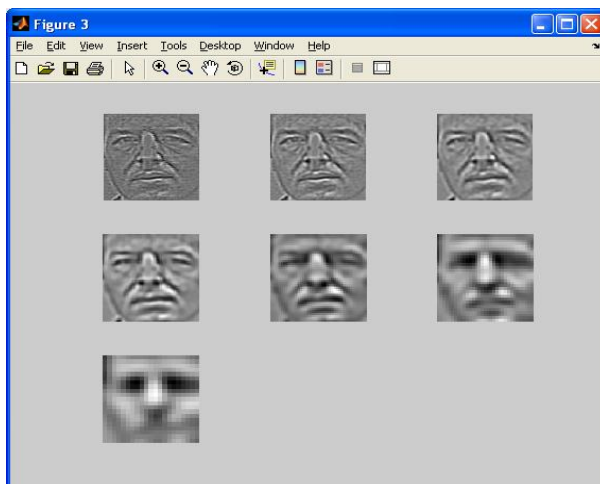


Fig 1: Gabor Face

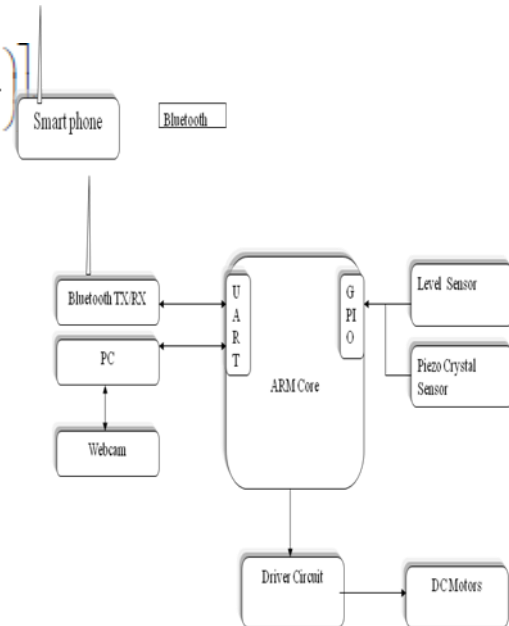


Fig 2: block diagram for authentication

#### 3.2 Block diagram monitoring the vehicle

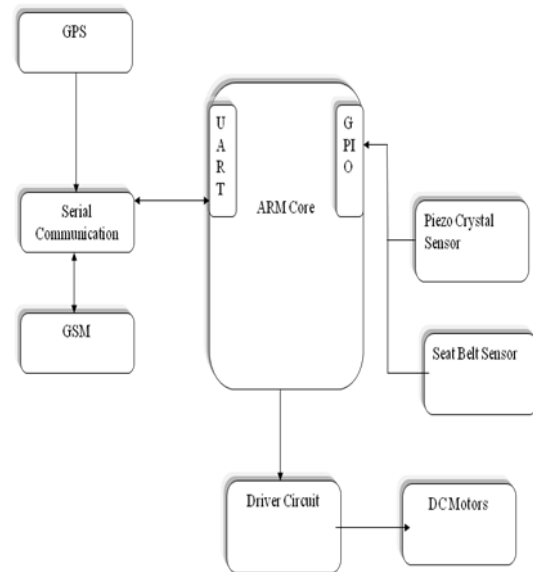
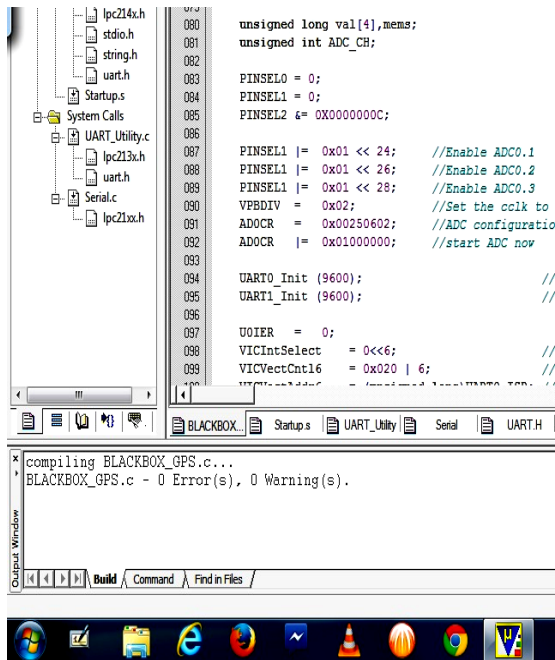


Fig 3: block diagram for monitoring the vehicle

### 4 COMPILATION OUTPUT



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080 unsigned long val[4],mems;
081 unsigned int ADC_CH;
082
083 PINSELO = 0;
084 PINSEL1 = 0;
085 PINSEL2 &= 0X0000000C;
086
087 PINSEL1 |= 0x01 << 24; //Enable ADC0.1
088 PINSEL1 |= 0x01 << 26; //Enable ADC0.2
089 PINSEL1 |= 0x01 << 28; //Enable ADC0.3
090 VPBDIV = 0x02; //Set the colk to
091 ADOCR = 0x00250602; //ADC configuratio
092 ADOCR |= 0x01000000; //start ADC now
093
094 UART0_Init (9600); //
095 UART1_Init (9600); //
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097 UOIER = 0;
098 VICIntSelect = 0<<6; //
099 VICVectCnt16 = 0x020 | 6; //
100 VICVectAddr1 = (uint32_t)0x00000000; //
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compiling BLACKBOX_GPS.c...
BLACKBOX_GPS.c - 0 Error(s), 0 Warning(s).
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## 5 CONCLUSION

The vehicle can be taken without driver, and customer can drive this car where ever he wants. They should pay according to the distance they drive. And they should be monitored by the control room. This project helps to avoid thefts, smuggling and provide protection to women passengers.

## REFERENCE

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