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Student ID card Barcode Recognition for Android Mobile Phone

Project Plan

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Introduction

This plan is for building Android mobile based barcode recognition application. The application will be able to recognize barcode on student ID card, Carlow IT.

A waterfall like software development process is used in this project plan.

One point which has to be pointed out here is that, there is a big mistake in previous Specification document. Image pre-processes like gray-scaling, median filter, thresholding, trimming and gridding are parts of Digital Signal Processor rather than Decoder. And in this document, it will be correct (later documents also).

Requirements

Software

- Android Mobile System
- Android Application Framework
- …

Hardware

- Android platform based mobile, with Webcam and Wifi support
- Web Server, which stores details of student ID card holders
- Networking connect

Project scheduling

A total number of 24 tasks are included in the scheduling. Project plans to finish on 12th April 2010.

Those underlined tasks are documentation tasks. Those without underline are either design tasks or coding tasks, and we mainly comment them below.

- **Task 2: Main system developing phase.**
  It includes task 3-18

- Task 3: GUI design
  an original version graphic user interface is designed and built in this phase. When this phase is finished, we are able to get the basic GUI.

- Task 4: Initializer
  it includes application initialize and webcam initialize. The application initializer initializes the application and start menu. The webcam initializer will first check whether webcam driver works. If true, it initializes the webcam in the application.

- Task 5: Image capture
  image will be able to be captured when this phase is finished. And unlike taking image picture manually, it takes picture automatically by system every 2 seconds (to make it dynamic scanning).

- Task 6: A/D Converter
  A/D converter converts analog signal of image to digital signal for digital signal processor use. Furthermore, digital signal is really a matrix storing information of each pixel.

- **Task 8: Digital signal processor.**
  It's the core phase. Most work is computing in this phase. It includes task 9-15.

- Task 9: Gray-scaling
  Digital signal get from A/D converter contains information of both brightness and color. By gray-scaling, information of color is replaced by grayscale. And after gray-scaling, it gets a new matrix storing only grayscale of each pixel.

- Task 10: Median filter
  it's to filter interference points which usually caused by unclear print or dirt on student card surface.

- Task 11: Thresholding
  It's similar to gray-scaling. But it uses either black or white instead of grayscale. Each pixel is deemed to either black or white based on its grayscale against the average grayscale of all pixels. If bigger than, it's deemed to black(0). Otherwise, it's deemed to white(255). We are able to get matrix storing pixels information(black or white).

- Task 13: Trimming
  Trim the effective(useful) image and get a reduced matrix from last phase.

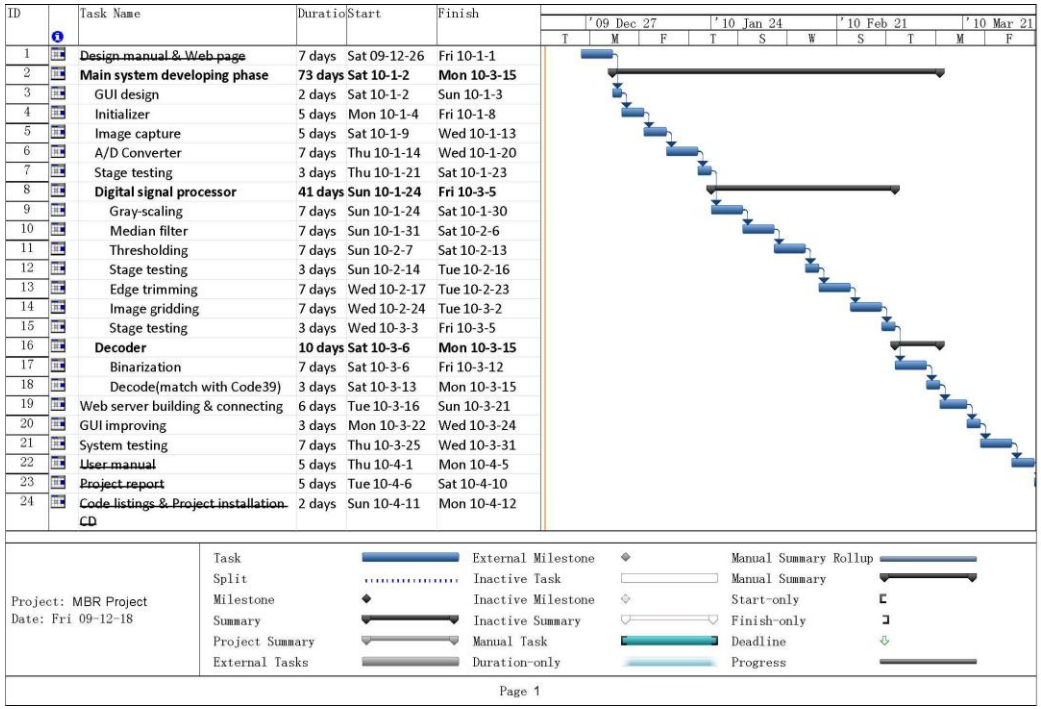
- Task 14: Image gridding
  Grid the image(matrix).

- **Task 16: Decoder**
  it includes task 17-18

- Task 17: Binarization
  it cooperates with Image gridding. After binarization, it gets series of binary number representing the meaning of barcode.

- Task 18: Decode(match with Code39)
  After Binarization, it actually gets a decoded information. But we need it make sense with Code39. In this phase, we match the gotten series of binary number in last phase with Code39 rules, and get the final product.

Gantt Chart (see separate page)



ID	Task Name	Duration	Start	Finish
1	~~Design manual & Web page~~	7 days	Sat 09-12-26	Fri 10-1-1
2	**Main system developing phase**	**73 days**	**Sat 10-1-2**	**Mon 10-3-15**
3	GUI design	2 days	Sat 10-1-2	Sun 10-1-3
4	Initializer	5 days	Mon 10-1-4	Fri 10-1-8
5	Image capture	5 days	Sat 10-1-9	Wed 10-1-13
6	A/D Converter	7 days	Thu 10-1-14	Wed 10-1-20
7	Stage testing	3 days	Thu 10-1-21	Sat 10-1-23
8	**Digital signal processor**	**41 days**	**Sun 10-1-24**	**Fri 10-3-5**
9	Gray-scaling	7 days	Sun 10-1-24	Sat 10-1-30
10	Median filter	7 days	Sun 10-1-31	Sat 10-2-6
11	Thresholding	7 days	Sun 10-2-7	Sat 10-2-13
12	Stage testing	3 days	Sun 10-2-14	Tue 10-2-16
13	Edge trimming	7 days	Wed 10-2-17	Tue 10-2-23
14	Image gridding	7 days	Wed 10-2-24	Tue 10-3-2
15	Stage testing	3 days	Wed 10-3-3	Fri 10-3-5
16	**Decoder**	**10 days**	**Sat 10-3-6**	**Mon 10-3-15**
17	Binarization	7 days	Sat 10-3-6	Fri 10-3-12
18	Decode(match with Code39)	3 days	Sat 10-3-13	Mon 10-3-15
19	Web server building & connecting	6 days	Tue 10-3-16	Sun 10-3-21
20	GUI improving	3 days	Mon 10-3-22	Wed 10-3-24
21	System testing	7 days	Thu 10-3-25	Wed 10-3-31
22	~~User manual~~	5 days	Thu 10-4-1	Mon 10-4-5
23	~~Project report~~	5 days	Tue 10-4-6	Sat 10-4-10
24	~~Code listings & Project installation CD~~	2 days	Sun 10-4-11	Mon 10-4-12

Figure 1: Gantt chart of Project Plan