System of Detection and Scanning Bar Codes in Panoramic Images on Raspberry PI

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Abstract. This work is focuses on the problem of detecting and scanning bar codes in panoramic images. The block diagram of a system identifying bar codes in panoramic images using Raspberry PI. The program algorithm of the system detection and scanning bar codes in panoramic images for Raspberry PI were proposed. It is established that systems can be used in industry, medicine, and in the control system.

Keywords – Raspberry PI, bar code, structural scheme, algorithm, program, OpenCV.

I. Introduction

Bar code is a sequence of black and white stripes containing certain information in a suitable form for reading by technical equipment. Bar codes were widely used. Baare codes are using as the key index for access to the database. But traditional one-dimensional bar codes allow only one-axis scan for which values only have widths of strokes and intervals. Requirements of introducing bar codes dictated by the extremely high volume of deliveries, territorial dispersion of interdependent organizations and enterprises lack information about product features on the packaging and accompanying documents. Today the most commonly in using are linear barcodes for reading information [1]. Panoramic photography can take pictures from 180^0 and more, so it can capture at this frame a large number of products with bar codes. Then, these images will be scanned and recorded in the database. Then you can run other bar codes in the frame [1,2].

II. Structural scheme of the system

To solve the problem, it is necessary to develop a structural scheme (Fig. 1). In this structural scheme is most appropriate to use Raspberry PI (unicameral computer).
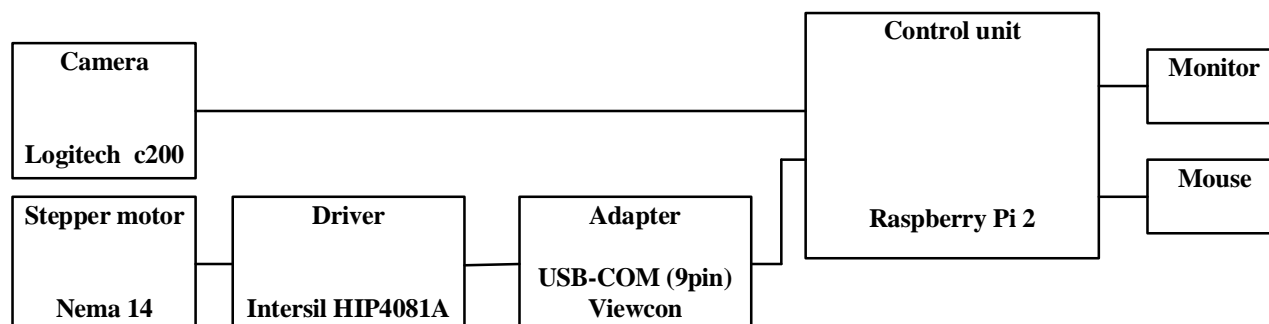
Raspberry PI has the following features: processor ARM Cortex-A7, 900 MHz, number of core 4, RAM 1 GB, number of ports 4, Ethernet port. In addition to Raspberry PI board in the scheme provided the stepper motor Nema 14, driver Intersil HIP 4081 that provide this engine in action. Also adapter uses for communication between the board the Raspberry PI and Driver Intersil HIP 4081. For shooting the panoramic image using a webcam, which is attached to the stepper motor. Also Raspberry PI board connected to the monitor and to the mouse. Raspberry PI is similar to Linux, so you can record a program on the board and this system will successfully perform its functions without a computer. For the successful work of the structural scheme of the system, it is necessary to develop an algorithm for the program. This task is completed and presented on (Fig. 2.). For this purpose used library OpenCV, which used to work with digital photos and video stream. [3] Algorithm includes following steps. First of all, our system required a panoramic image, a panoramic picture is composed of several images. The number of pictures is chosen in a program, then stepping motor rotates the camera and run specified number of shots. The next step is to compare a given number of steps with the already passed, if these numbers are the same, then all the pictures are taken and you can begin to glued them. Snapshots may not stick together unless there is a need for common endpoints. Further, if the image is successfully glued can see a ready-made image. At this stage, the task of panorama shooting ended, the next step is to find and recognize bar codes on an image. First we transform the image to black and white for a successful search bar codes on the image. After the black and white panoramic photos was made bar codes can be recognized and scanned.. Recognition results are displayed and written to the file.[3,2].

III. Results and Disscusion

After creating a search and recognition system bar codes for panoramic images, studies to determine the optimal conditions for proper system work. Studies were conducted using cameras with different resolutions 5, 10, 15 Mpx and at different distances. Then the expirement was conduct. Main aim was to find optimal distance.
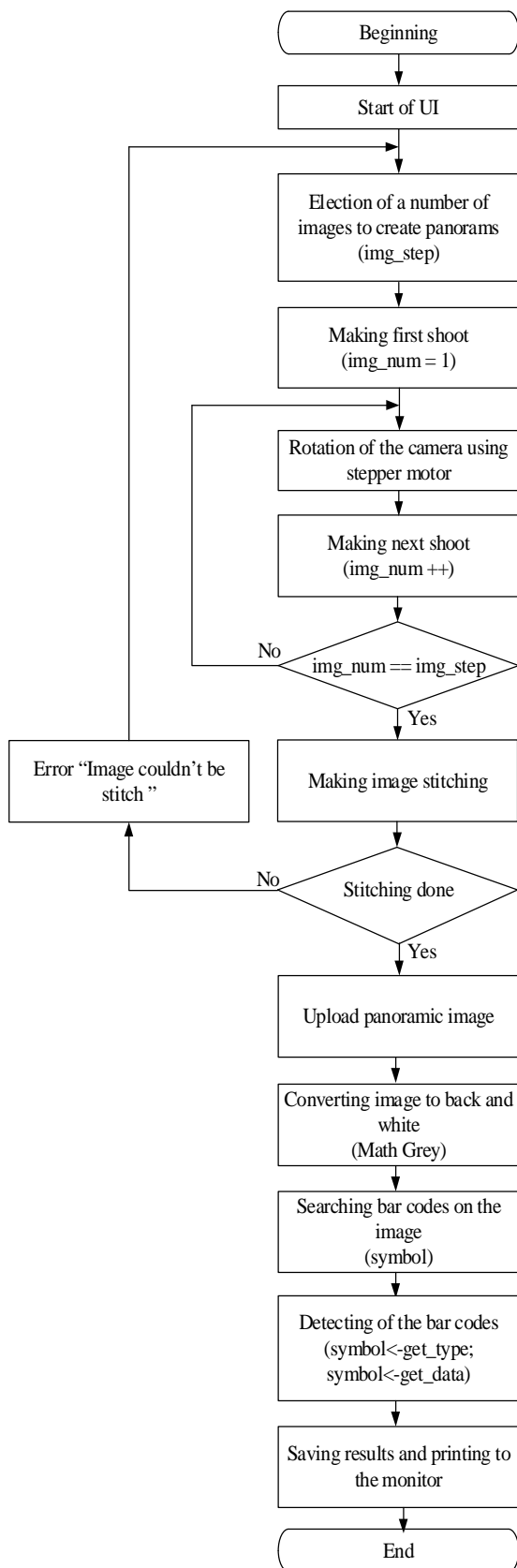

Fig.1. The structural scheme of system

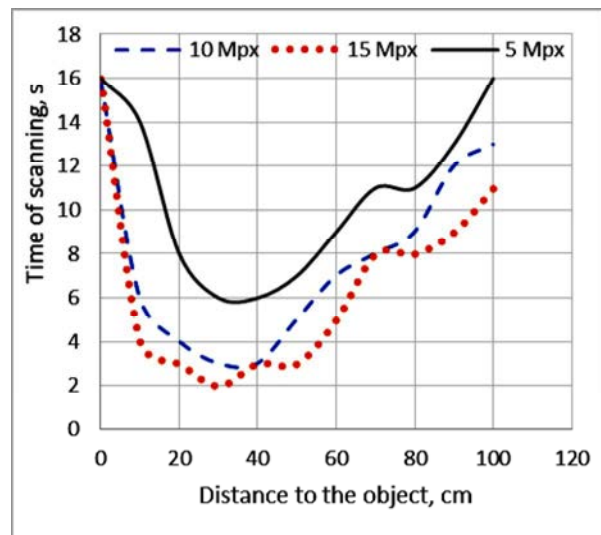Fig.2. Algorithm for system's program.

Fig.3. Depending on the time of scanning from distance to object.

To identify the optimal parameters used two parameters, namely the distance to the subject and time for the scanning. The results of the study are shown in Fig.3.

The diagram shows that for cameras with different resolutions most optimal distance for scanning is 30 cm. This scanning with camera resolution of 5 Mpx is 6 seconds for the camera 10 Mpx – 3 seconds for the camera 15 Mpx – 2 seconds. Speed depends on the resolution of the camera .

Conclusion

The structural scheme of detection and scanning bar codes in panoramic images for Raspberry PI, and the algorithm of the program is the best option for proper system work, the optimal distance is 30 cm for identification and recognition, speed depends on the resolution of the camera.

Acknovledgement

References

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