A

Project report

On

"EXPIRY DATE DETECTION THROUGH BARCODE USING IMAGE PROCESSING"

Submitted to

Amrutvahini Polytechnic, Sangamner

Department: - Information Technology

In partial fulfilment of the requirement for the diploma in

Civil Engineering

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2019-2020

Amrutvahini Polytechnic Sangamner,

Department: - Information Technology

Certificate

This is to that the project report entitled,

"EXPIRY DATE DETECTION THROUGH BARCODE USING IMAGE PROCESSING"

Is a Benefited Work Carrier Out By,

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n partial fulfilment of the requirement for the diploma in

Information Technology

During the academic year 2019-2020

Prof. Kasar Y.S.	**Prof. Chaudhari N.K**
(Project guide)	**H.O.D. (I.T)**

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Abstract

There have been numerous cases of various people consuming expired products. This act has led to them getting hospitalized and put themselves in extreme danger. This is mostly due to the fact that there isn't a system that is designed to detect the expiry date for various consumable products. This leads to people unknowingly consume expired products that put their lives in danger. Due to this reason, a methodology for the automatic detection of an Expiry date of a product is proposed. This system scans a barcode through a webcam and does a plethora of transformations on the frames received, such as grayscale conversion, binary conversion to the image to identify the barcode. The resultant frames are then subjected to Co-axis array formation and Pearson Correlation that helps identify and authenticate the Barcode, which contains the information about the expiry date. And is subsequently informed to the Admin by sending a message containing the Expiry date of the product scanned.

CONTENT:

Chapter 1: Introduction

1.1. Introduction

Few products can last forever, especially when it comes to food and medicine. To give consumers an indication of when the product must be used by, an expiration date is usually printed on the product packaging. Such information can be easily accessible by sighted people but not so for the visually impaired. While the visually impaired can ask a sighted person to help them to read the expiration date, such human assistance is not always available. When staying at home alone, if the visually impaired consumes some expired food or takes some expired medication, the result could even be life-threatening.

The growing number of people living in relative poverty is leading to an increase in food insecurity in Europe. Cities and regions are devising local policies to ensure food security for their inhabitants and promote resilient food systems. Such policies have led to a growth in food recovery initiatives. At the same time, food waste is exerting a pressing challenge in the design of sustainable food systems. Recent studies suggested the relevance of food waste induced emissions, water consumption, land use, and related economic and social impacts, representing the third emitter globally, with an estimated cost of about 940 billion USD. Consequently, food waste is now at the core of several international policy agenda including the U Sustainable Development Goals and the European plan for a Circular Economy.

Within this context, it becomes imperative to keep track of the expiration date of food products in order to identify and reduce waste. New standards of barcode such as the GS1 Data Bar, also known as EAN-128, introduce the possibility of including product validity and expiration date within the barcode, however this requires the usage of an extended barcode format on the product. Many retail stores still use Barcodes including only the Global Trade Identification Number (GTIN). It becomes then necessary to acquire the expiry date of a product displayed on a shelf by means other than barcode reading.

The digitization of the expiry date brings many advantages to both donors and beneficiaries. The donors can testify to the validity of their donated material for legal reasons and the beneficiaries are able to know in advance the state of the donated food to better prepare for receiving it and avoid unnecessary waste. This can be achieved by Optical Character Recognition (OCR) software.

Text detection from a natural scene image is a very challenging problem. Different from normal document images, a natural scene image may contain text with arbitrary perspective deformation in a complex background due to its unknown 3D position and orientation. In order to extract the text in such images, many algorithms have been proposed. Most partition the image to search for text region candidates and then group the neighboring regions using distinctive features of text characters**.**

1.2. Problem Definition

To design and develop secured system for identification of the Expiry date of a product through the Barcode by using Image Processing technology. In the India, 40% of the food supply is wasted in each year. It costs around $218 billion per year for producing, transporting, processing, and disposing of this unused food, and two-thirds of this lost economic value are due to household food waste. One of the reasons of this food waste is that the consumer forgets the expiry date of the food after purchase and do not consume the food before it expires, and when he/she finds out that the food is expired, it is tossed out. It is also difficult to manually check the expiry dates of all the items stored in a refrigerator full of foods and keep in mind all the expiry dates. Also, consuming foods that have expired may cause serious health problems. In this project, a novel cloud-based smart expiry system is developed which sends an automatic notification to customer's smartphone and on an Internet of Things (IoT) display device (that can be attached to a refrigerator) several days before the food expires. These notifications will aware the customers of the recently expiring foods and will give peace of mind. In the proposed method, the customer gives a customized smart-expiry card to the checkout operator for swiping. The checkout operator app generates a table containing product names with expiry dates and it is uploaded to the cloud. The customer's smartphone app then automatically downloads the table from the cloud and the customer is all set to receive the expiry date notifications. Alternatively, in case the customer forgets or does not have the smart-expiry card with him/her in the store, a Barcode is printed on the receipt. The customer just scans the single Barcode with his/her smartphone and the table is

downloaded from the cloud to the smartphone. No manual entry of each of the product name or expiration date by the customer into the smartphone is required

Chapter 2: Literature Survey

3.1. Literature Survey

R. Diachok[1] introduces bar codes are dictated by the extremely large volume of supplies, territorial scattering of interconnected organizations and enterprises, insufficient information on the properties of the product on its packaging and in the accompanying documentation, the lack of reliable and timely information on the receipt of goods to the buyer. The structural scheme of detection and scanning bar codes in 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

N.Liu [2]estimates that the bar code need increase its information capacity because of its widespread use. In this proposed paper, a novel bar code three-dimensional bar code is proposed. It can greatly increase the information capacity. The three-dimensional bar code combines the variety of widths, the variety of colors and a vertical array to provide significantly more information content. At first, the encoding technology of bar code is discussed. Then the three-dimensional bar code is proposed on the basis of the two-dimensional bar code. The design principle and information content of the three-dimensional bar is also discussed. Finally, the experiment proves the three-dimensional bar code can withstand the influence of noise and blur.

C.Rong[3] explains barcode is an alternative to the computer keyboard to enter numbers and letters means. Just scan bar codes on the numbers and letters can be directly entered into the computer without the need for tapping the keyboard. Wide and narrow strip of the group with the binary level and the black during the width of the white part of the empty office with the width of the group (multi-level), etc. PDF417 codes as their own characteristics, with strong error detection, error correction function. Select the appropriate corrective level, to meet the needs of different error

W.Turin[4] describe laser scanner reads a bar code by projecting a bright spot of light that moves across the label while a coaxial photodetector converts the time-varying intensity of light backscattered from the label into a corresponding time-varying electrical signal current.

Our ability to read a label depends directly on both the intensity since substantial noise sources are present as are dimensions of the projected spot relative to the bars. Helpful suggestions and remarks of the anonymous reviewers are gratefully acknowledged.

C.Wang[5] approach that using CVB in the indoor navigation system is discussed in paper. And a method for correcting the distortion of CVB data is shown in this paper, which ensured LADAR getting correct information of CVB when sensor could not face CVB vertically. And the working condition of the method is given at the least of this proposed paper. This would be helpful for the design of CVB. The simulation results demonstrate that these methods are correct and reasonable.

T.Gulliver [6] describes the application of Reed- Solomon (RS) error correcting codes to the new Canada Post Corporation bar codes, which are used in the mechanized processing of mail. The use of RS codes provides a capability to detect and correct errors and/or erasures which is a substantial improvement on the single parity check code previously employed. This significantly reduces the incidence of costly machine rejects due to errors in the bar codes, and contributes to improved service.

K.Wang [7] explains bar codes are being widely used in many fields for applications of great commercial value. By encoding a series of characters or symbols, bar codes are able to both carry explicit information and a database key. Nowadays, The availability of imaging phones provides people a mobile platform for decoding bar code rather than the use of the conventional scanner which is lack of mobility. Another point is to obtain more appropriate deformable model of the very-short-distance performance of the phone camera, which will be very helpful for the sample distortion and feature restoration in statistical training process.

S.liu [8] introduces a new cigarette recognition method using the uniqueness of cigarette bar codes was proposed. Firstly, a binary image filtering algorithm based on square adaptive structure element of mathematical morphology (SASEMM) was used to get several potential sub-regions, which could minimize barspace's interference in marking connected areas. Then the article located bar code area based on sub-region screening method. Finally after locating and segmenting readable characters based on projection method, it recognize bar codes digit and complicate cigarette recognition. The results show that the methods in this paper can get rid of the interference from uneven illumination, cigarette surface's characters and patterns.

H.Xuechen [9] Two-dimensional bar code is one of the most basic and key technologies to achieve the process of identifying information technology for the Internet of things. This paper focuses on book management based on two-dimensional bar code through Visual Basic.NET and SQL Server databases It can also achieve a seamless transition from the existing one-dimensional bar code ISBN to two-dimensional bar code ISBN. Using 2D bar code library card, identification readers and books borrowed can be achieved by a 2D bar code system.

M.Hattori[10]Bar code systems are well known recording systems with printed images, which are found in supermarkets, department stores, the factory floor, the military, the health industry, the insurance industry, the publishing industry, and more. The conventional bar code used in supermarkets consists of 11 digits, which represent an identifying number. Finally, it should be noted that unidirectional error-correcting codes are very useful if corruptions are unidirectional, which means the probability of corrupting a written 0 to a 1 is greater (or less) than the probability of corrupting a written 1 to a 0 151.

Chapter 3: Proposed Methodology

3.1. Proposed Methodology of solving identified problems

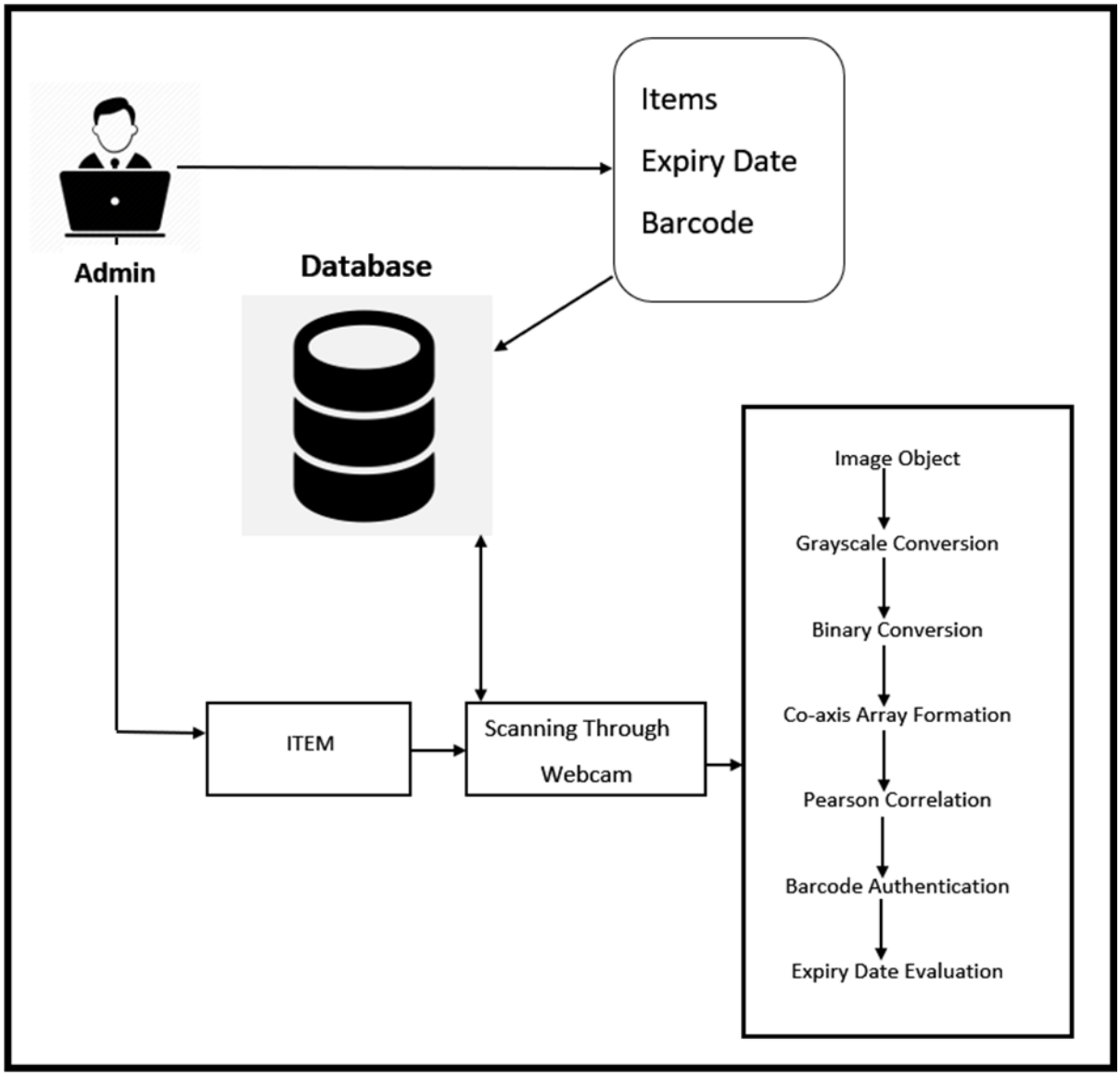

Fig 1. System Overview Design

3.2. Module Description

3.2.1 Module A: Image Object

Input: Item Barcode Image

Process: RGB model

Output: Image Object

3.2.2 Module B: Grayscale Conversion

Input: Image Object

Process: Averaging RGB model

Output: Grayscale conversion

3.2.3 Module C: Binary Conversion

Input: Grayscale Image

Process: Threshold handling

Output: Binary Image

3.2.4 Module D: Co-Axis Array Formation

Input: Binary Image

Process: Bit Array Formation

Output: Axis Array

3.2.5Module E: Pearson Correlation

Input: Axis Array

Process: Correlation Estimation

Output: Barcode authentication and expiry date identification

3.3 Proposed Methodology With Relevant Diagrams And Figures

3.3.1 Data Flow Diagrams

3.3.1.1 DFD level 0

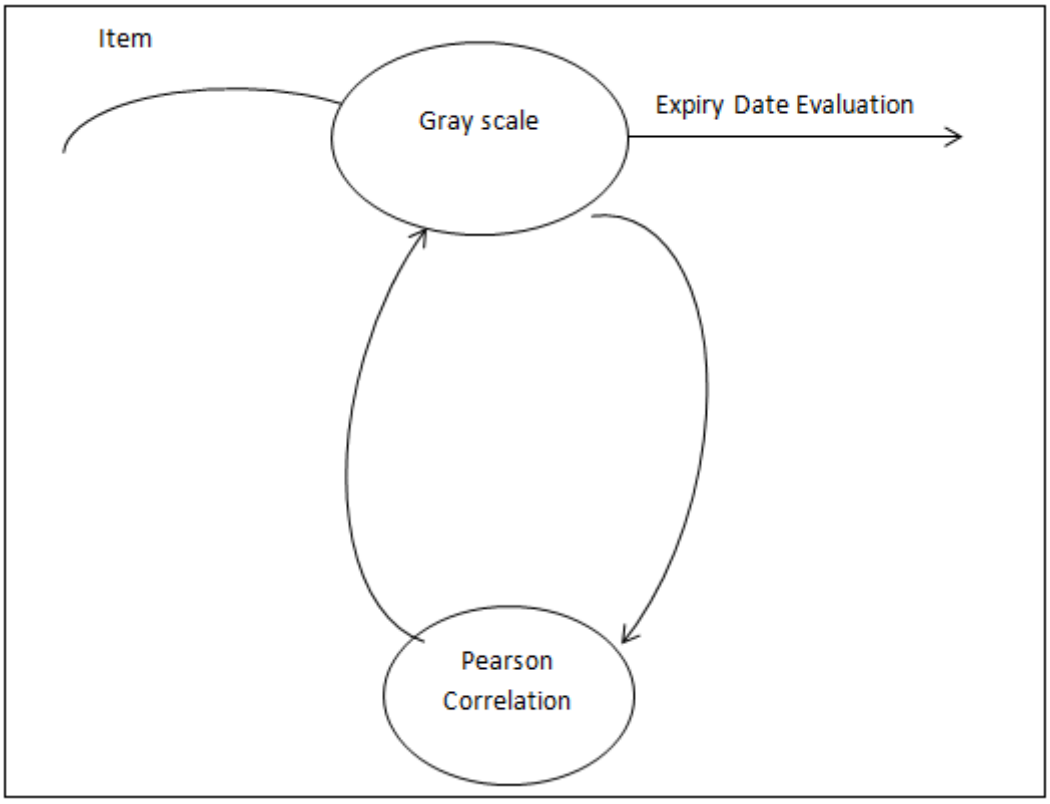

Fig 2. DFD level 0

3.3.1.2 DFD level 1

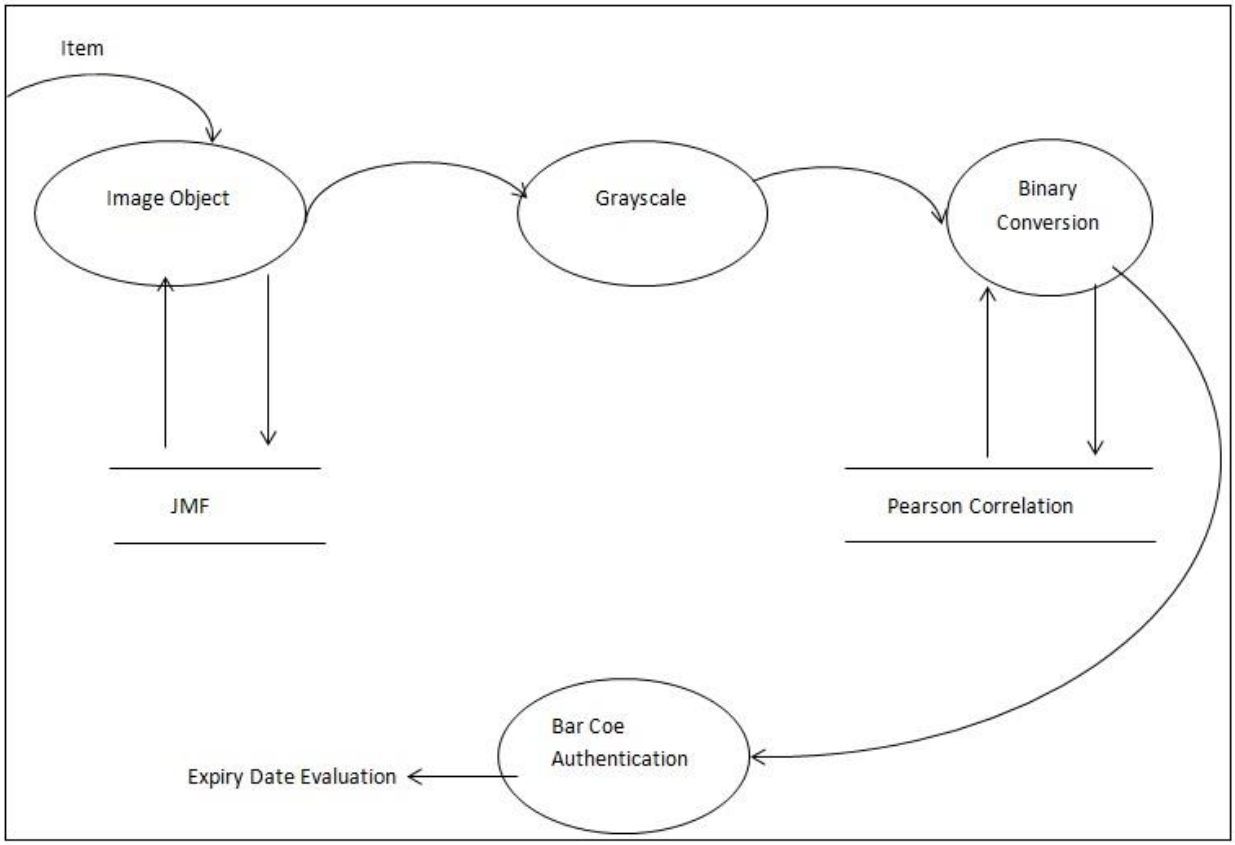

Fig 3. DFD level 1

3.3.1.3 DFD level 2

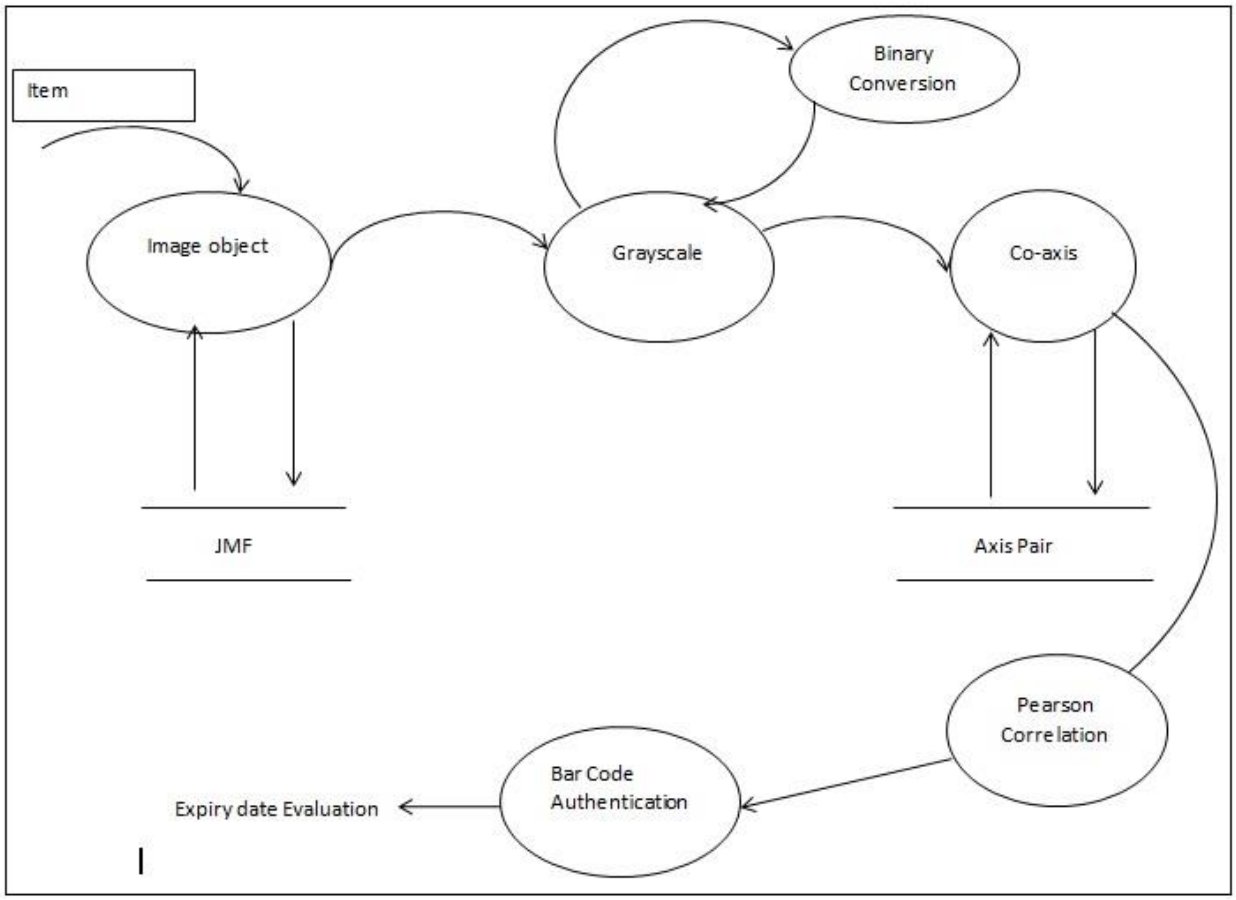

Fig 4. DFD level 2

3.3.2Activity Diagram

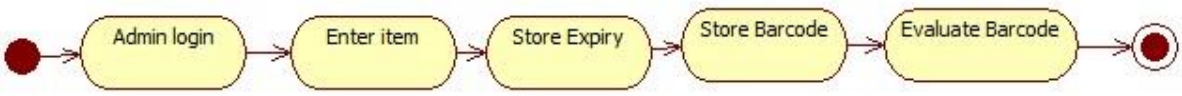

Fig 5. Activity Diagram

3.3.3 Usecase Diagram

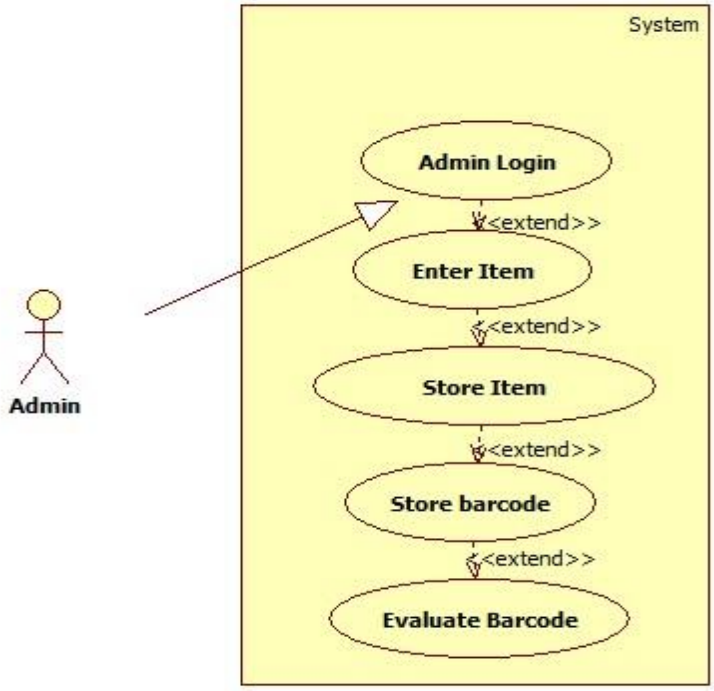

Fig 5. Usecase Diagram

3.3.4 Sequence Diagram

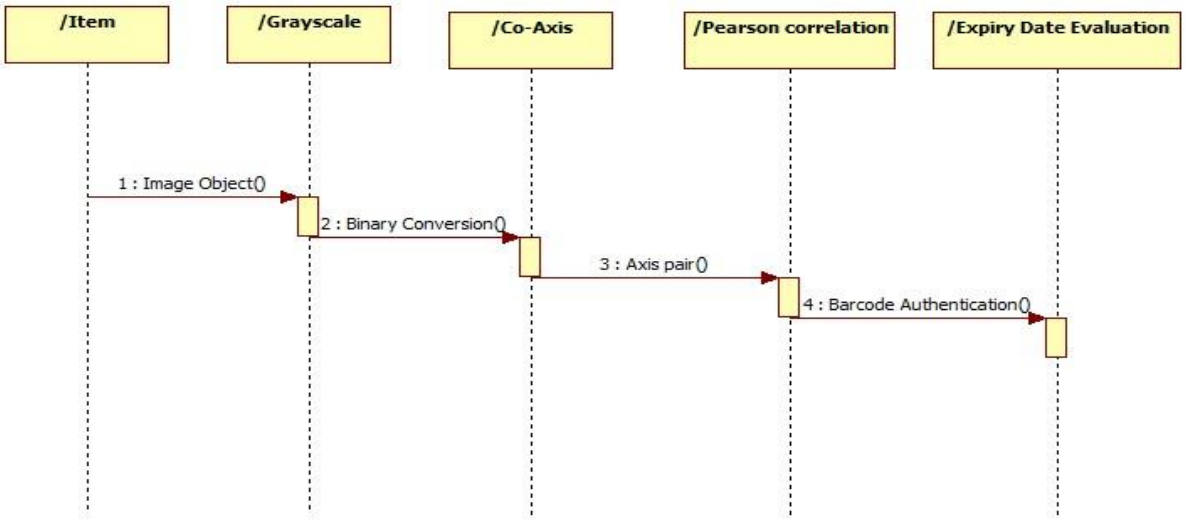

Fig 6 Sequence Diagram

3.3.5 Component Diagram

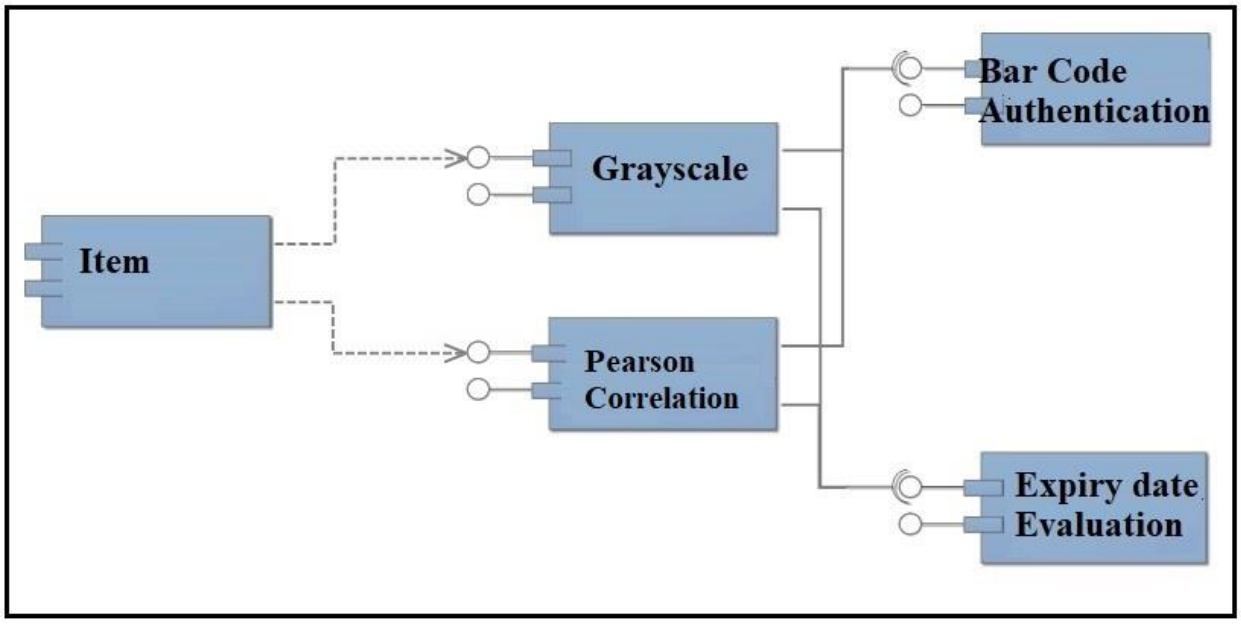

Fig 7. Component Diagram

3.3.6 Deployment Diagram

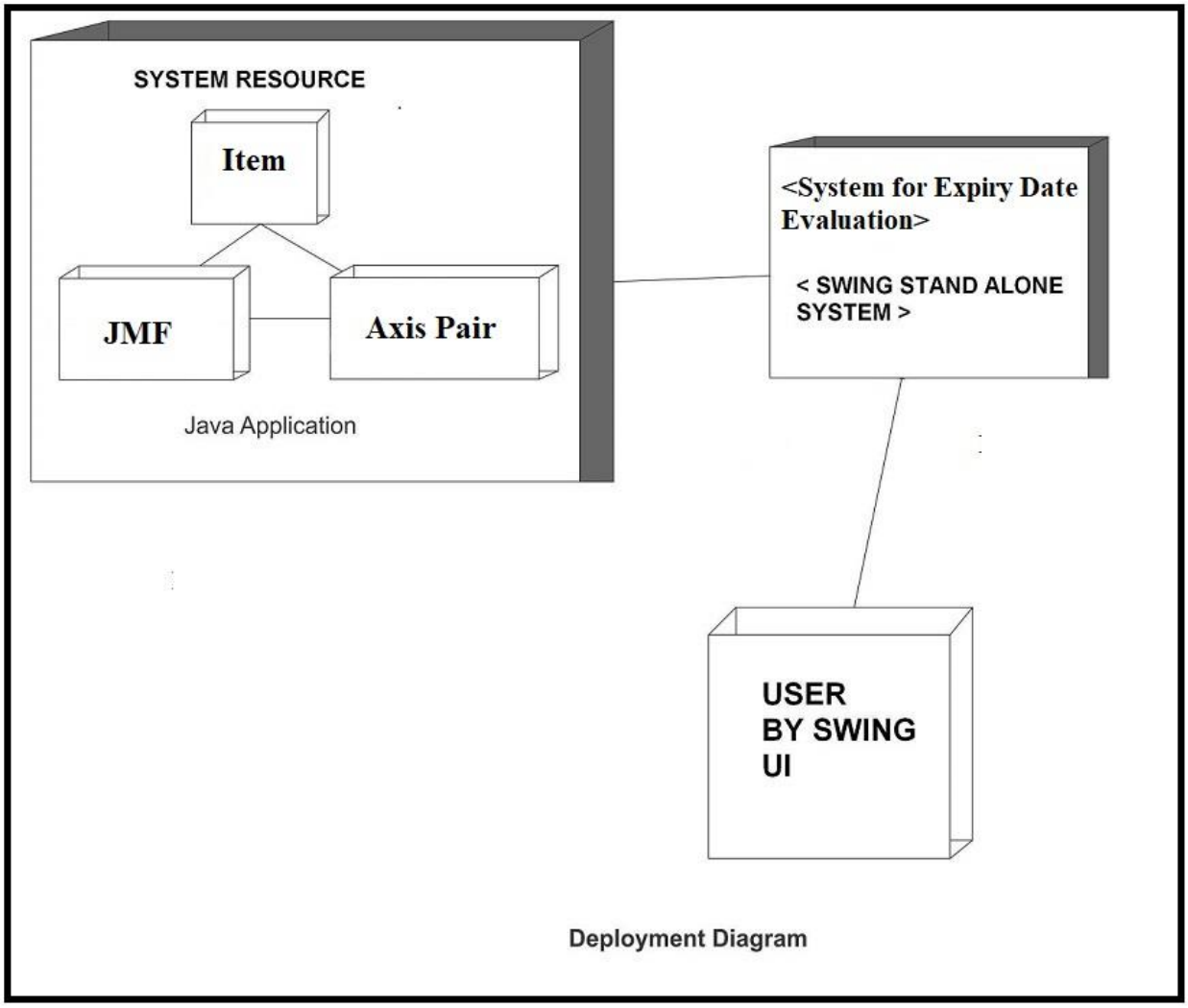

Fig 8. Deployment Diagram

3.3.7 Package Diagram

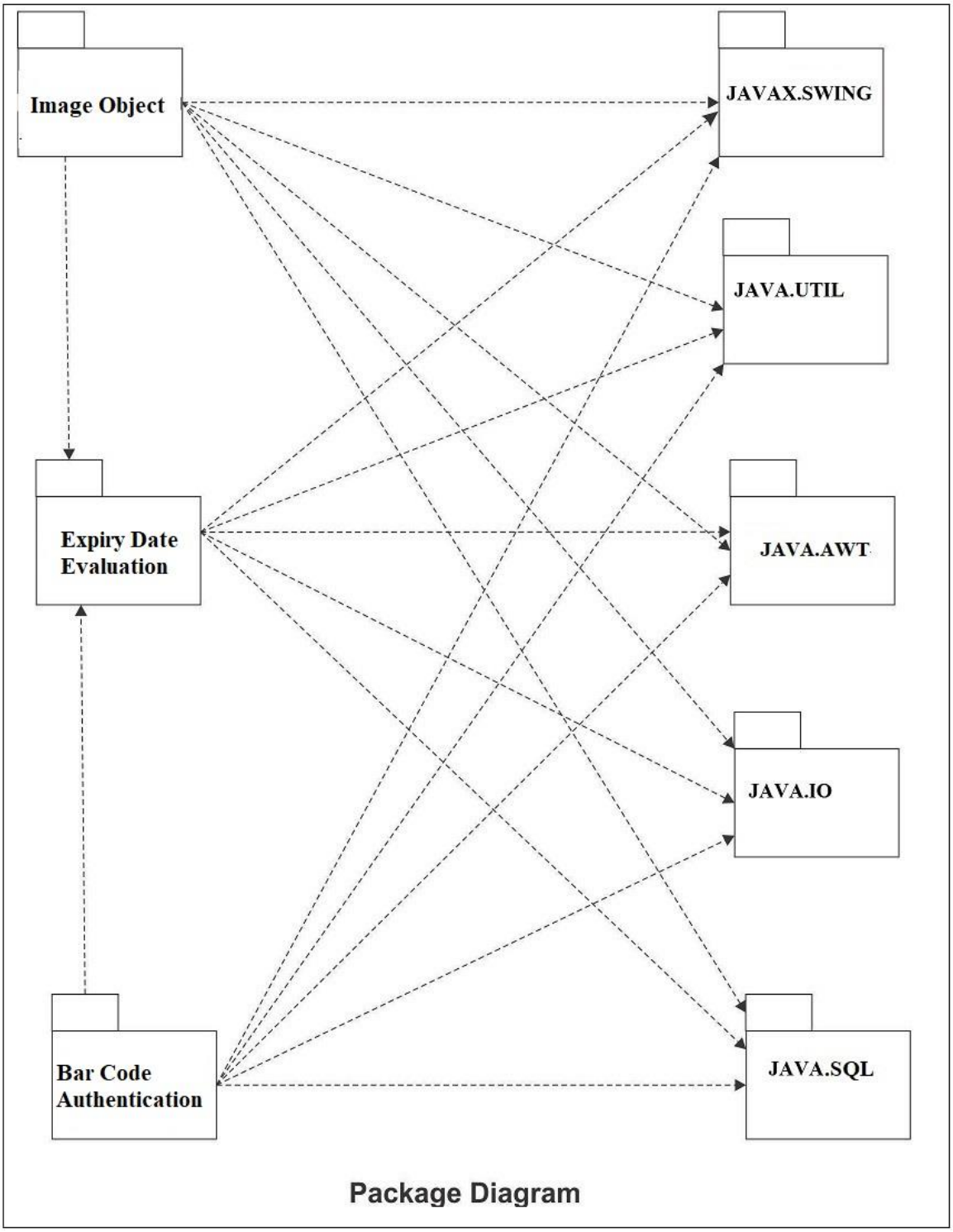

Fig 9. Package Diagram

3.3.8 State Transition Diagram

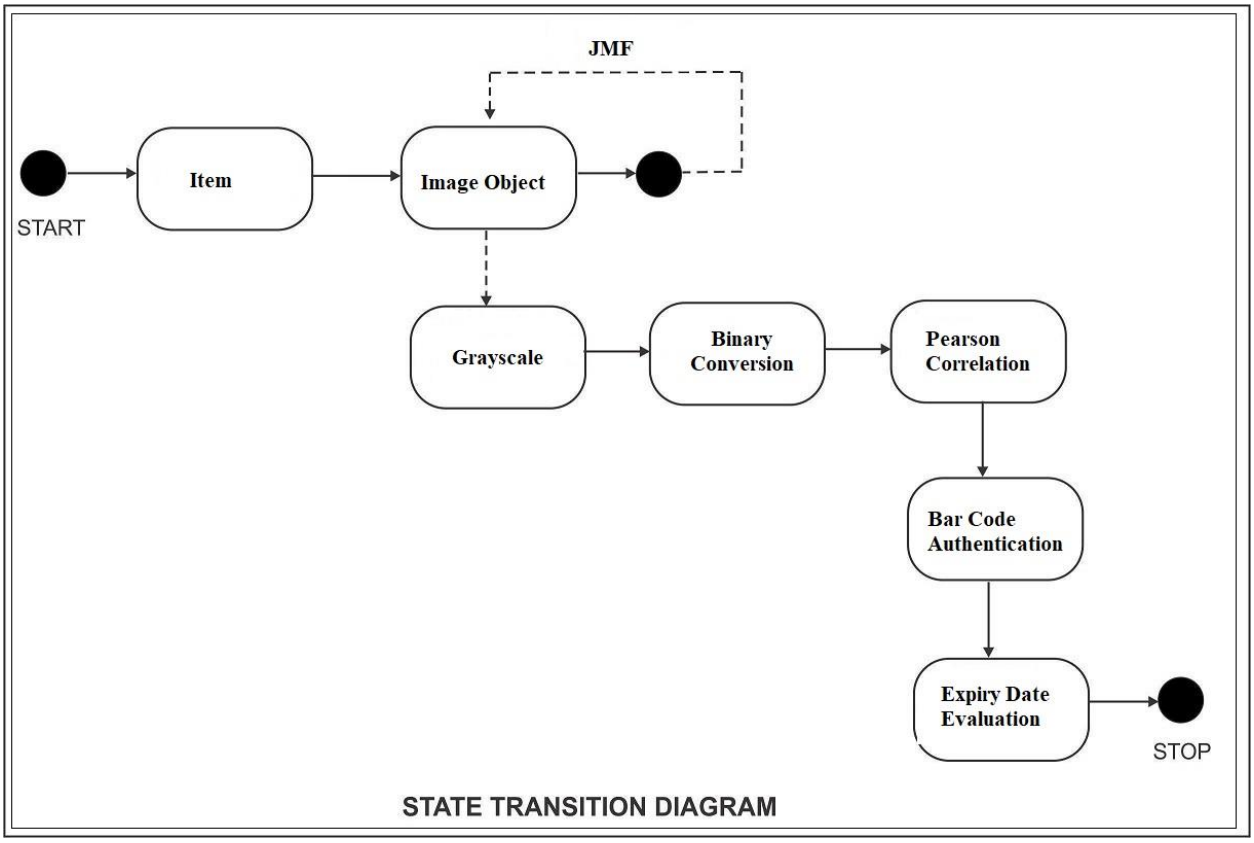

Fig 10. State Transitions Diagram

3.4 Action Plan

Sr.no	Activity	Jun	Jul	Aug	Sep	Oct	Nov	Dic	Jan	Feb
1.	Group Formation									
2.	Topic Discussion									
3.	Problem Definition									
4.	Literature Review of Linear solver case									
5.	Abstract & Synopsis Submission									
6.	Scheme of Implementation									
7.	Performance profiling to identify bottlenecks									
8.	Study the Behaviour of solver									
9.	Layout & Design setup									
10.	Detailed Problem definition, SRS,Platform									
11.	Modify & Optimize the nottlenecks									
12.	Detailed Design Document & Methodology									
13.	Experimental Result									
14.	Analysis, Validation of Result & Conclusion									
15.	Report Document of entire work									

Fig 11. Action plan Table

Chapter 4: Software Requirement Specification

4.1 Minimum Hardware Specification:

- CPU : 2.9 Ghz (C2D)
- RAM: DDR 1 GB
- HDD: 100 GB
- Motherboard: Intel 945 GLX
- Monitor, Key Board, Mouse, UPS, DVD Writer
- Camera: Webcam

4.2 Software Specification:

- Coding Language: Java
- Development Kit: JDK 1.6, JRE.
- Front End: Java Swing
- Development IDE: NetBeans 6.9.1,
- DataBase: My SQL 5.0
- External API: MySQL Connector

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