**Computer Vision for Assembly Line**

**(CVAL)**

**Requirement Analysis Document**

**1. Introduction**



**1.1 Purpose**  
  
The results of the requirements elicitation and the analysis activities are documented in the Requirements Analysis Document (RAD). This document completely describes the system in terms of functional and non functional requirements and serves as a contractual basis between the customer and the developer.   
The RAD is written in the language of the customer's domain of business/expertise such that it is simple for the customer to understand/interpret.

**1.2 Scope of the project**

This software system will be providing computer vision to an assembly line in the die manufacturing unit of client’s company. However, the system provided can be considered general and will be implementable in the assembly line for any other manufacturing unit. This system is designed to maximize the productivity of the client’s manufactures by providing a tool to detect defects in the manufactured goods on the assembly line which would otherwise have to be performed manually.

**1.3. Definitions, acronyms and abbreviations**

|  |  |
| --- | --- |
| RAD | Requirements Analysis Document |
| Operator | The person responsible for removing the defected objects |
| Products | The manufactured goods that come out of the assembly line |
| CVAL | Computer Vision for Assembly Line (i.e., our software product) |

**1.4. References**

* A concise Introduction to Software Engineering, Pankaj Jalote
* Wikipedia([www.wikipedia.com](http://www.wikipedia.com/))
* IEEE([www.ieee.org](http://www.ieee.org))

**2. Current system**



CVAL focuses on replacing the current system of manually detecting defect in the manufactured products.  
By introducing CVAL in the manufacturing setup it not only cuts down manual labor but it also promotes efficiency at a much lower cost. Thus saving time and money of our clients

**3. Proposed system**



This proposed system will be designed to set up a connection with a camera placed as a part of the assembly line which will be clicking pictures of the manufactured products. The pictures would then be compared with the pictures of the ideal manufactured product. If the relative error is higher, the manufactured product can be discarded else it is safe to go on. The scope of this software however is limited to scanning only the parts of the product which can be captured by the camera for errors. The parts of the product like the bottom surface kept on the conveyor cannot be scanned. An automated mechanical system can be utilized for discarding the defected product or else the process can be manual too.

**3.1. Functional Requirements**

**3.1.1 Cameras shall take the pictures**  
Camera shall capture photos of the product from different angles one by one. The clicked pictures are sent to a memory buffer in the computer from where the pictures are transferred to the product analysing module of the program.

**3.1.2 Detection of defects**  
CVAL shall analyze the images for defects. The defected product’s information will be displayed on the output screen.

**3.1.3 Discarding the defected products**

The operator shall observe the output screen for information about the defected products. Operator shall discard the defected products as per the information provided by CVAL. In case the whole batch is displayed as defected, the operator shall inform the concerned person to check for a major fault in manufacturing.

**3.2. Non-Functional Requirements**

**3.2.1 Reliability**Algorithm used in the software for matching the images of products from the ideal product yield reliable results in every test case. Hence CVAL shall provide reliability at all times.

**3.2.2. Security**

CVAL although utilizes no cryptographic techniques but no such techniques are even needed to secure the data as apart from the log files no other data is saved on the PC which could be tampered with.

**3.2.3. Maintainability**Maintenance for CVAL is not a tough job as the functionality is limited and simple. The errors that might occur will be countable because of the limited functionalities provided and hence would be very easy to sort out.

**3.2.4 Portability**CVAL is very portable as it is platform independent as well as written in a proven portable language.

**3.2.5 Installability**The software is installable at almost every platform including Windows or UNIX on account of usage of general purpose compilers available in every operating system readily.