



## QUALITY CONTROLLER AND NOTIFICATION SYSTEM FOR CHEMICAL MANUFACTURING PLANT.

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**Abstract :** In recent years there has been rapid development in automation which has made human life easier in several aspects. In manufacturing plant certain chemicals are mixed in a specific proportion and heated to certain degrees of temperature, thus automation is required for human safety in chemical industry. The proposed system is introduced to reduce the components loss and human efforts by using Quality controller and notification system. It improves the accuracy of components. In existing system we don't get exact quality of chemical component. To overcome this problem continuous monitoring of the components is required. Camera is used for continuous monitoring it set to the particular region. Particular color value is stored in MySQL database. In this system pattern matching algorithm is used to detect the stored color value. If the stored value and present value do not match at that time DC motor stop the conveyer belt and also quick Alert generation will takes place and notification is send to respected person by using API package and buzzer is used for send notification. The additional advantage of this system is continuous monitoring of present color value of component at particular region using camera and reduces the product loss. Arduino is used to monitoring the all system.

**IndexTerms:** Alert generation, API Package, Arduino, Buzzer, Camera, Conveyer belt, DC motor, MySQL Database, pattern matching.

### I. INTRODUCTION

API (Application Programming Interface) acts as interface between code you write and our SMS gateway. SMS are sent by making HTTP or HTTPS calls to the API. you can loop through your list of mobile numbers and makes HTTP/s request to send SMS message to them. Generally this API should allow you submit upto about 100 message per second on average to our platform (or faster is required). API is use not only to send the SMS one person to another. Is use for sending the notification for respected person to check color level of mixture in chemical industry. In chemical industry smart system is more useful for chemical color detection and to check the quality of chemical. worker facing the problem to monitoring the system some employee to get the allergy of chemical and facing diseases. To control this problem using smart system. Several standard have been implemented for the quality controller and notification system. there are many existing system which can detect practical and automated component mixture system. A developed system is one which continuous monitoring of system using camera and send notification regarding to the quality of mixture. In addition to color detection and feature and when level of color falls under certain consideration the notification is sent to the manager to check the quality of component. The Internet of things (IoT) is the extension of Internet connectivity into physical devices and everyday objects. Embedded with electronics, Internet connectivity, and other forms of hardware (such as sensors), these devices can communicate and interact with others over the Internet, and they can be remotely monitored and controlled. The definition of the Internet of things has evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded system Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", covering devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers.

## II. LITERATURE SURVEY

This system based on a holistic approach used to monitoring particles in ultra-pure chemicals from supplier all the way to the wafer surface. Using holistic approach and wafer surface it is possible to measure liquid particle counts of similar dimensions to wafer particle metrology. Two particle counters are installed in this system one particle counter is used for measures the liquid particle counts in the chemical. This two particle counters are installed in the gap between our supplier certificate of analysis (COA) and wafer level defects [1]. The system of bottle filling is automated. This system is proposed because the manual handling is time-consuming. PLC based automated liquid mixing and bottle filling system is designed to automate the control and mixing of two different liquids in predefined proportion and fill in the bottle to achieve the quality control. Two DC motors are used for two reservoir tanks. IR sensors are used to sense the bottle is empty or not [2]. Products sorting process is a very difficult in industry. Continuous manual sorting of product creates issues. Working of this paper describe prototype designed for automatic sorting of objects based on the color. Detect the color of the product using TCS230 sensor and the PIC16F628A microcontroller is used to control overall process. The system developed a sorting machine using PIC for automatic color sorting, taking in to consideration three colors [3].

## III.SYSTEM ARCHITECTURE

The proposed system is introduced to quality control and notification system. The chemical Components are put at various locations on conveyer belt the components mixing is takes place at some constant proportion. If this proportion is not match to certain value then whole mixture is rejected. Resulting in great loss, to avoid this continuous monitoring is done by using camera. Camera is set to particular region by using region extraction we get particular region. The quality checking and color detection is done by pattern matching algorithm which interfaced with desktop or android application. The proposed system is made such that it detects the color of Component in chemical industry. When the color of component will not match then alert Notification is send to respected persons. By using pattern matching algorithm we match the color of two mixtures. Accuracy levels of color are stored in database.

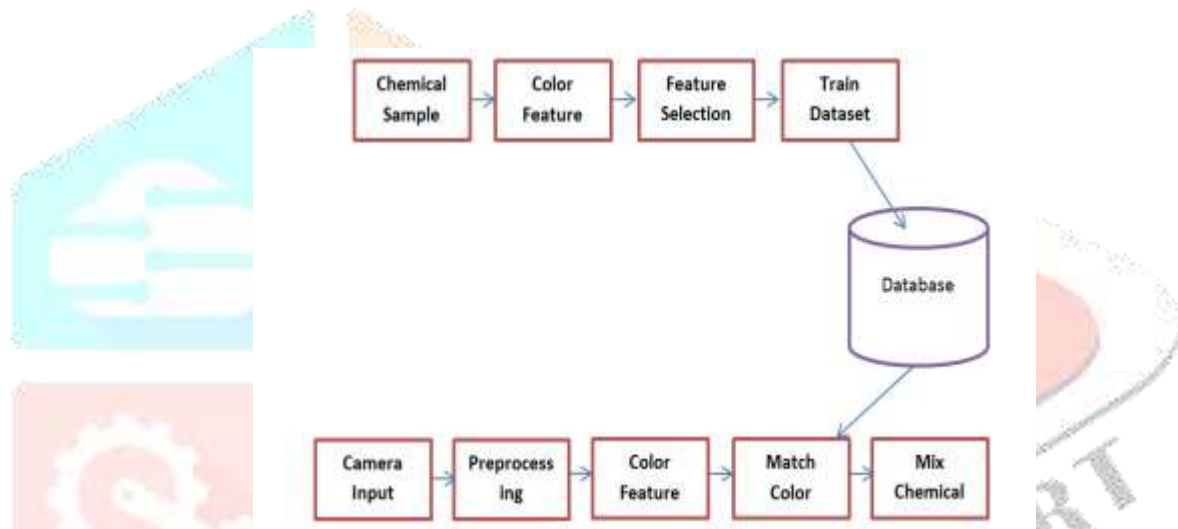


Figure 3.1 System architecture

## IV.IMPLEMENTATION

### 4.1 Particle Detection Algorithm Comparison on AFM Imagery

Automatic Force Microscopy (AFM) offers high resolution descriptions of many biological systems. Threshold and watershed algorithms are used for automatic particle detection but demand manual preprocessing and produce particle boundaries which is user defined parameters. Hessian blob algorithm defines the particle center and boundaries. Blob is a group of connected pixels that share similar properties. The properties like size, shape, color. Blob detection method aim is it detect the regions in a digital image which has properties like brightness, color, etc. The most common method to blob detection is convolution. Blob detection method is used to detect regions in digital images such as brightness or color compared to surroundings.

Two main classes of blob detection:

- Differential methods which is based on position
- Local extrema which is based on finding maxima and minima of the function

The motivation behind this Algorithm:

- It provide complementary information about regions which are not obtain from edge detectors or corner detectors.
- Hessian blob is advanced particle detection algorithm which improve the short comings of common particle detection methods.

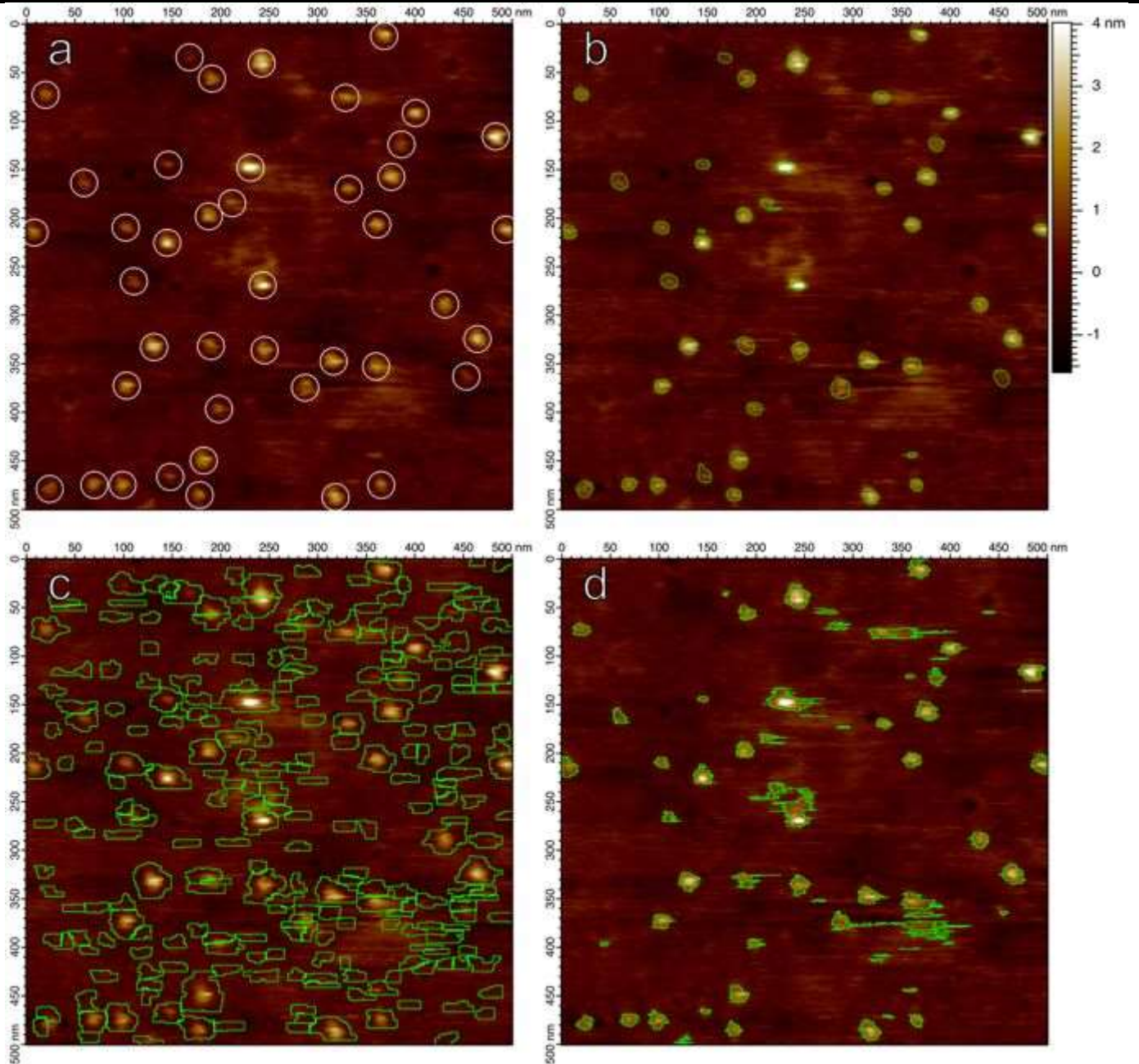
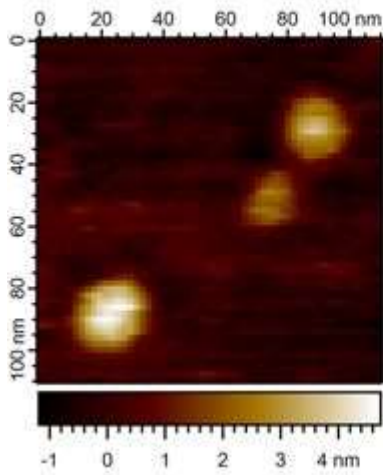


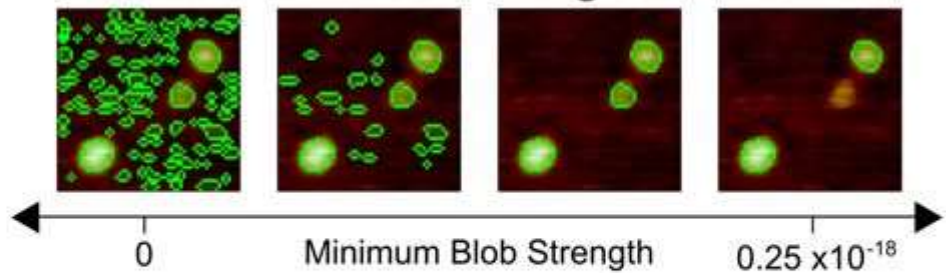
Figure 3.2 Hessian Blob

The first image in the SecYEG set of data. Particles identified by the Hessian blob algorithm, with the minimum blob strength set such that all candidate particles were identified while minimizing false positive detections. Watershed algorithm, with the minimum pixel parameter set in the same manner. Height threshold particles, with the height threshold parameter set in the same manner.

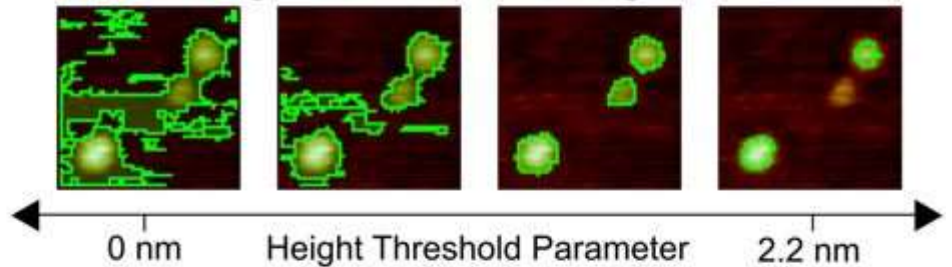
## Input AFM Image



## Hessian Blob Algorithm



## Height Threshold Algorithm



## Watershed Algorithm

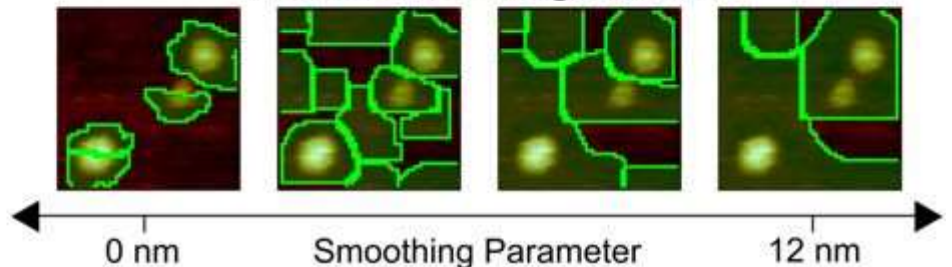


Figure 3.3 AFM Imagery

- First figure show that hessian blob computed at a single pixel resolution. The initial strength of blob is zero and increase to the right.
- Second figure is used to show the threshold parameters, the particle boundaries deform to include close particles and noise at threshold.
- Watershed algorithm are used to show the width.

## 4.2 Euclidean Distance

Distance is a numerical measurement of how far apart objects or points are. In mathematics, the Euclidean distance or Euclidean metric is that the "ordinary" straight-line distance between two points in Euclidean space. With this distance, Euclidean space becomes a metric space. The associated norm is called the Euclidean norm. Older literature refers to the metric because the Pythagorean metric. Euclidean distance define: One dimension, two dimension, three dimension and n dimension distance.

## V.CONCLUSIONS

The efficient algorithms are used to design the modules. The proposed system will be a smart and intelligent system that will monitor, analyze and will take decision according to the steps mention in proposed system the performance of proposed system is more associated with correct training set and classification method, the feature of object are identified and determined for training the classifier.

## VI. REFERENCES

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