The design of the brantas river ecological monitoring is real time with OpenCV

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Abstract. Brantas River is a river that is used by the people of East Java for drinking water sources, irrigation, regulating water discharge, and tourist attractions. At present the state of the Brantas River is very concerned about the large number of people who dispose of garbage and family waste and industrial waste into the Brantas river which results in COD concentrations reaching above 50 mg / l, Phenol often appears with concentrations ranging from 0 and 0.039 mg / l [1].

The habit of people who dispose of garbage in the Brantas river, which causes pollution, and the ecological damage of the Brantas river is getting worse. The community usually throws household waste into the river; most of the waste disposed of in the waste is baby diapers and plastic waste [2].

Some efforts have been made by the East Java government to protect the ecology of the Brantas river, but this method is less effective. The most appropriate way is to provide direct supervision of the point, which is usually a place to dispose of garbage[3][4]. In this study, a system that was able to monitor the Brantas river in real time was made using Open CV[5][6].

One of our efforts to protect the ecology of the Brantas river is to install CCTV at a certain point in the Brantas river flow, which is often used by people to dispose of garbage. With this system, we hope that the ecology of the Brantas river can be saved.

The way this tool works is to record citizen activities in real time; if there are people who throw garbage, the admin system will reprimand the person through loudspeakers. To find out the name of the
garbage disposal system, use the Open CV to identify the faces of the people throwing garbage. Face data is taken from the population ID card data around the Brantas river flow.

This system mengidentifikasi face of people who throw garbage from the front side. From the results of the trial as many as 125 times, the system can recognize someone's face correctly as many as 117 times (93%)

2. Method

In making the Brantas River ecological monitoring system in real time with OpenCV, several steps are needed. The following is the flowchart.

![Flowchart](image.png)

Figure 1. The flowchart design of ecological monitoring of the river basin is a real-time with OpenCV

2.1. Take a picture

This section is the foremost part; this section consists of CCTV cameras that are used to monitor the point that is usually used by people to dispose of garbage. Monitoring of these points is carried out every day.

2.2. Image recognition

The images obtained are then filtered by the admin; in this section, the system still uses the admin, because it is difficult to recognize movements when removing garbage. If the system finds that people who are at the point of disposing of the trash are dumping the garbage. The system will proceed to the next process, which is processing the image so that it can be identified.

2.3. Identify

After the image can be recognized by Open CV. The system will automatically give a warning through the existing speaker. Besides that, the environmental service can give a warning. Because the planning of the face database is taken from the KTP data, so that the environmental service can give a warning easily.

3. Result and Discussion

The Brantas River is a river that flows through a city that has developed in East Java such as Malang, Blitar, Tulungagung, Kediri, Jombang, and Mojokerto. The awareness of the population of this city about the importance of the branches sting is still very lacking. It is vital to have an ecological monitoring system with the aim of protecting the ecology of the Brantas river from pollution. Here is a series of systems.
3.1. The point used to dispose of garbage in the river
At a certain point, the community often throws away garbage, so that garbage piles up, so that it covers up the small water source in the river basin and causes water pollution. This condition is very worrying considering that the Brantas River is a source of life for the people of East Java. Here is a photo of Brantas river pollution.

![Pollution on the Brantas river](https://nationalgeographic.grid.id)

3.2. Use of OpenCV
Every picture taken will be recognized with OpenCV. OpenCV is a library that is used to process images. Using this library, computer-intended researchers can recognize faces precisely the same as human abilities. Shooting is done with CCTV cameras, and the results of the images are processed with OpenCV.

3.2.1. Data Set, face data used as a benchmark for detecting residents who dispose of trash around the Brantas river is taken from ID cards. The purpose of taking photos of ID cards is to make it easier to find information about people who throw garbage in that place. Next, the face data is nailed to the database.

| NUMER | Name          |
|-------|---------------|
| 1     | Risky Aswi    |
| 2     | Didin         |
| 3     | M. Agus       |
| 4     | Yudi Sudarsono|
| 5     | Siti Munawaroh|

3.2.2. Detection results, after data, is obtained, then the photo I got is matched with the existing data set. At this stage, the system can detect faces properly. At this stage, the photo system taken is still just front. The following are the results of image detection performed.
Figure 3. Results of face recognition with OpenCV

The face recognition of each person is 25 times, while the faces of the people who are used as data sets are currently five people. So the system introduces faces to 125 times. From these results, images that can be recognized are 117 images. So the system's success rate is 93%. Which causes the system not to recognize the face because there is less good lighting, the slope of the face, and the distance of the face with the camera.

4. Conclusion

The ecological system of branches river monitoring is very necessary because the Brantas river is a source of life for the East Java community. The monitoring system needs to be installed at the point that the community uses to dispose of the garbage. The workings of this system are taking pictures (recording all activities in the river branches), identifying the faces of the people who are throwing away garbage. Currently, the system can only recognize faces from the front. There needs to be the development from the side and back. The researcher conducted a trial system 125 times, and the recognition was as successful as 117 times. It can be concluded that the level of success of this system is 93%.

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