

JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY

MINOR PROJECT



REAL TIME OBJECT TRACKING

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PROJECT DESCRIPTION

In our project we are tracking object with the help of webcam in real time by using cam shift algorithm, it uses hue based object tracking. we are building this project on python and using openCV and Numpy libraries. we can use the program to control the arrows key and mouse.

PROBLEM STATEMENT

Track the movement of an object by using webcam. Device a method to detect the object accurately.

TECHNOLOGY USED

1. python
2. openCV
3. Numpy
4. cam shift Algorithm

RESEARCH

1. Color-based object recognition

Theo Gevers , Arnold W.M. Smeulders

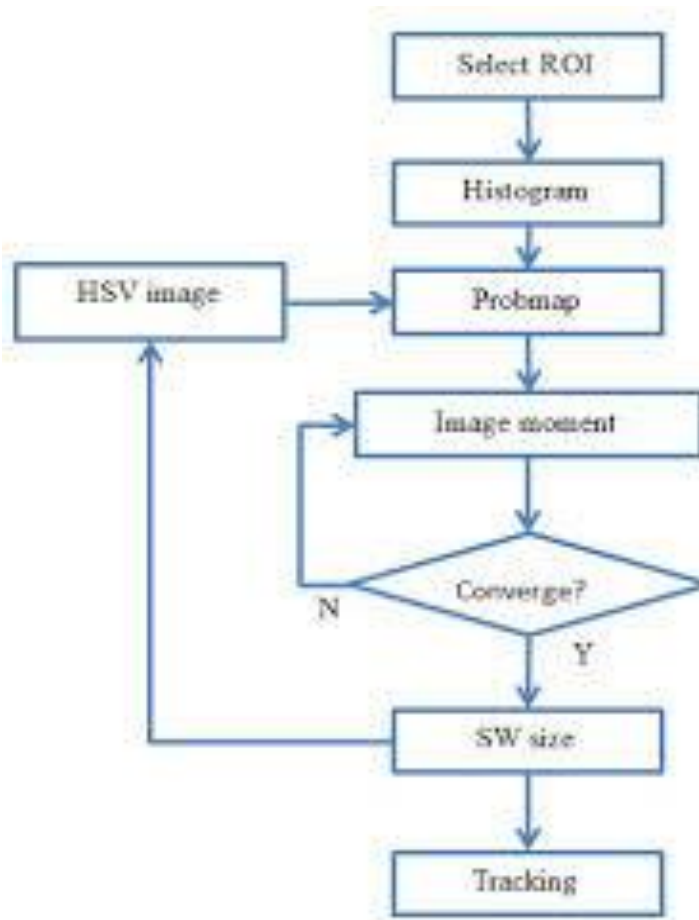
2. Object Tracking Using CamShift Algorithm and Multiple Quantized Feature Space

John G. Allen, Richard Y. D. Xu, Jesse S. Jin

3. Rapid Object Detection using a Boosted Cascade of Simple Features

Paul Viola , Michael Jones

CAM SHIFT ALGORITHM



THE CAMSHIFT ALGORITHM CAN BE SUMMARIZED IN THE FOLLOWING STEPS

1. Set the region of interest (ROI) of the probability distribution image to the entire image.
2. Select an initial location of the Mean Shift search window. The selected location is the target distribution to be tracked.
3. Calculate a color probability distribution of the region centered at the Mean Shift search window.
4. Iterate Mean Shift algorithm to find the centroid of the probability image. Store the zeroth moment (distribution area) and centroid location.
5. For the following frame, center the search window at the mean location found in Step 4 and set the window size to a function of the zeroth moment. Go to Step 3.

COMPARISON BETWEEN DIFFERENT MODELS

MODEL NAME	ADVANTAGES	DISADVANTAGES
Swain and Ballard	They proposed Color recognition usage which provides powerful information for object recognition, robust, efficient indexing into a large database of models on the basis of color histogram.	When the illumination circumstances are not equal, the object recognition accuracy degrades significantly.
Cam Shift	Doesn't rely only on one object (e.g. hand etc.). Can identify any trackable object.	If the surrounding object also consist the same color as the trackable object, it finds it difficult to track the right object. Instead it started to track the surrounding object.
Illumination Independent	They are all based on low computational demanding operations. Furthermore, the method does not require an image database taken under a known light source for calibration as is necessary for more complex color constancy methods .	Derived illumination-invariant surface descriptors are negatively affected by rapid changes in surface orientation of the object (i.e. the geometry of the object).

REFERENCES

- [1]. <https://staff.fnwi.uva.nl/th.gevers/pub/GeversPR99.pdf>
- [2]. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.90.4741&rep=rep1&type=pdf>
- [3]. <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=990517>