

# OBJECT TRACKING USING OPENCV

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### **How to use OpenCV to track an object?**

**Can OpenCV do object detection?** Object detection using OpenCV in Python can be performed using several methods, with one of the most common being the use of the Haar Cascade Classifier. This method involves using pre-trained classifiers for detecting objects like faces, eyes, or vehicles.

### **Which algorithm is best for object tracking?**

### **How do you use object tracking?**

**Is object tracking faster than object detection?** Tracking is faster than Detection. Usually tracking algorithms are faster than detection algorithms. The reason is simple. When you are tracking an object that was detected in the previous frame, you know a lot about the appearance of the object.

**Can OpenCV detect shapes?** OpenCV provides a comprehensive set of tools for this task, including contour detection, edge detection, and polygonal approximation. The process typically begins with image preprocessing steps such as grayscale conversion, blurring, and thresholding to enhance shape visibility.

**Which is better OpenCV or TensorFlow for object detection?** Apart from that, it is widely adopted in industry and research for various machine learning tasks. While OpenCV is well-suited for tasks such as object detection and facial recognition, TensorFlow is known for applications like image and speech recognition, natural language processing, and generative modeling.

**How to detect a moving object?** Traditional methods Among all the traditional moving object detection methods, we could categorize them into four major

approaches: Background subtraction, Frame differencing, Temporal Differencing, and Optical Flow.

**What is the best object detection model?**

**What is the fastest object detection algorithm?** The YOLO v7 algorithm achieves the highest accuracy among all other real-time object detection models – while achieving 30 FPS or higher using a GPU V100. Compared to the best-performing Cascade-Mask R-CNN models, YOLOv7 achieves 2% higher accuracy at a dramatically increased inference speed (509% faster).

**Which method is commonly used for object tracking in video?** Popular Object Tracking Algorithms. Convolutional Neural Networks (CNN) remain the most used and reliable network for object tracking. However, multiple architectures and algorithms are being explored as well.

**What is the difference between tracking and detection?** While object detection and object tracking are used to analyze visual data to identify objects' locations, there are key differences between them. Object detection identifies target objects on an image or frame, while object tracking follows a target object's movement across multiple frames.

**How to train an object tracking model?**

**What is the single object tracking algorithm?** SOT is used to track the location of a single object throughout the video feed. These detection-free algorithms depend on the user to provide a bounding box around the target object on the first frame. The algorithm learns to track the position and movement of the object present within the box.

**What is the difference between camera tracking and object tracking?** Motion tracking creates a motion path of an object in the 2D comp space. Camera tracking analyses the visual parallax in a shot to create a 3D scene and camera in the After Effects 3D world space that matches the shot.

**What is an example of object tracking?** In retail, object tracking is often used to track customers and products — an example of this is the Amazon Go stores, where cashierless checkout systems are used to track each customer and their picks,

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allowing the algorithms to determine which products are put into the basket by the customer in real-time and then ...

**Can Yolo be used for object tracking?** Ultralytics YOLO extends its object detection features to provide robust and versatile object tracking: Real-Time Tracking: Seamlessly track objects in high-frame-rate videos. Multiple Tracker Support: Choose from a variety of established tracking algorithms.

**Which language is best for object detection?** Key Takeaway. For machine vision, Python and C++ are the best programming languages. If you're starting out, Python is ideal due to its simplicity and powerful libraries. Python has OpenCV and TensorFlow, which are specifically designed for machine vision and machine learning tasks.

**How accurate is OpenCV Python?** What is the difference between OpenCV's linear SVM and sklearn LinearSVM? The accuracy differs by 10%. sklearn has 89% accuracy and OpenCV has 79% accuracy.

**Is OpenCV good for face detection?** The primary draw of OpenCV's face detection model is its speed. However, its accuracy left something to be desired. While it is incredibly fast when compared to the other GPU models, even its Top 1 accuracy was hardly better than YuNet's overall accuracy.

**Why do we use OpenCV in object detection?** The open-source OpenCV library, known for its comprehensive set of tools for computer vision, provides robust solutions to the detection of moving objects. In this article, we examine a combination of Contour Detection and Background Subtraction that can be used to detect moving objects using OpenCV.

**Is OpenCV still relevant?** Today, there is a tool considered the standard for image processing and computer vision: OpenCV. This software library is used by leading companies worldwide to develop Computer Vision and Deep Learning applications.

**Is there something better than OpenCV?** Alternative 1: Dlib Dlib is a popular C++ toolkit that provides a range of machine learning algorithms and tools for creating complex software. It's especially well-known for its high-quality facial landmark detection and robust machine learning functionalities.

**Which algorithm is best for object detection?** On the MS COCO dataset and based on the Average Precision (AP), the best real-time object detection algorithm is YOLOv7, followed by Vision Transformer (ViT) such as Swin and DualSwin, PP-YOLOE, YOLOR, YOLOv4, and EfficientDet.

**How to detect objects in video using OpenCV?**

**How do you track an object in motion?**

**How can you tell if an object has moved?** You can describe the motion of an object by its position, speed, direction, and acceleration. An object is moving if its position relative to a fixed point is changing. Even things that appear to be at rest move.

**How to detect an object in an image?** To perform object recognition using a standard machine learning approach, you start with a collection of images (or video), and select the relevant features in each image. For example, a feature extraction algorithm might extract edge or corner features that can be used to differentiate between classes in your data.

**How do we measure items on a drawing with OpenCV?** to measure object you have to first find its contour. OR use Machine Learning or Deep Network to recognize object on image. You need to get the contours first, then fit a box around them, measure the dimensions of that box. That'll give you the size in pixels.

**How to track an object in video in Python?**

**How to detect objects using OpenCV CascadeClassifier?**

**What is the Python library to detect objects?** ImageAI is a user-friendly Python library that simplifies object detection tasks. It provides a comprehensive set of computer vision algorithms and deep learning methodologies for image recognition, object detection, video analysis, and more.

**What is the best object detection model?**

**Which algorithm is used for object detection?** Popular algorithms used to perform object detection include convolutional neural networks (R-CNN, Region-

Based Convolutional Neural Networks), Fast R-CNN, and YOLO (You Only Look Once). The R-CNNs are in the R-CNN family, while YOLO is part of the single-shot detector family.

**How do we scale and image with OpenCV?**

**How to measure an object in an image?**

**How do you detect and draw contours in images using OpenCV?**

**How to do object tracking?**

**Which of the following is an advanced technique used in OpenCV for object tracking?** The GOTURN tracker is the only detector for deep learning-based object tracking with OpenCV.

**What is an example of object tracking?** In retail, object tracking is often used to track customers and products — an example of this is the Amazon Go stores, where cashierless checkout systems are used to track each customer and their picks, allowing the algorithms to determine which products are put into the basket by the customer in real-time and then ...

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**How to train object detection model using OpenCV?**

**What does OpenCV stand for?** OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products.

**ZIMSEC Computer Studies Notes: Frequently Asked Questions and Answers**

**1. What is the input/output cycle?**

The input/output cycle is a sequence of operations that occur when data is transferred between a computer and an external device. It involves the following steps:

- **Input:** The computer receives data from an input device, such as a keyboard or mouse.
- **Processing:** The computer processes the data according to the instructions in its software.
- **Output:** The processed data is sent to an output device, such as a printer or monitor.

## 2. Explain the difference between primary and secondary storage.

- **Primary storage:** Holds data that is currently being processed by the computer. It is fast but volatile (lost when power supply is cut off).
- **Secondary storage:** Stores data that is not currently being used by the computer. It is slower but non-volatile (data is not lost when power supply is cut off).

## 3. What are the two main types of software?

- **System Software:** Controls the operation of the computer hardware and provides a platform for application software.
- **Application Software:** Performs specific tasks for users, such as word processing, spreadsheet creation, and database management.

## 4. Describe the role of a compiler in the software development process.

A compiler is a program that translates high-level source code into low-level machine code. It converts the programmer's instructions into a form that the computer can execute directly.

## 5. What is a computer network?

A computer network is a collection of computers connected together to share resources and data. Computers on a network can communicate with each other and

access shared resources like printers, files, and applications.

**What is the main idea of *The Watsons Go to Birmingham 1963*?** Also, Joetta is almost involved in the 1963 Birmingham Church Bombing. *The Watsons Go to Birmingham- 1963* has two main ideas; kindness and growing up. The themes of the book are coming of age, family, friendship, race relations, civil rights, and mortality.

**What guided reading level is *The Watsons Go to Birmingham 1963*?** The *Watsons Go to Birmingham* has a Lexile Measure of 920L, Guided Reading Level (GRL) of U, and Developmental Reading Assessment (DRA) Level of 50.

**What is the lesson in *The Watsons Go to Birmingham*?** "The *Watsons Go to Birmingham—1963*" by Christopher Paul Curtis conveys a message of resilience and perseverance through the line "Sometimes you have to keep on steppin." It emphasizes the importance of moving forward in the face of adversity, particularly during the Civil Rights Movement.

**Is *The Watsons Go to Birmingham* a good book?** The *Watsons Go to Birmingham, 1963*, by Christopher Curtis, is truly a masterpiece in literary fiction.

**What is the summary of *The Watsons*?** The family embarks on a road trip to the Deep South, and while visiting Alabama, they get caught up in a tragic historical event of the Civil Rights Movement. *The Watsons Go to Birmingham – 1963* communicates the realities of racial injustice to both adult and youth audiences.

**Why was *The Watsons Go to Birmingham* banned?** About the book: The ordinary interactions and everyday routines of the Watsons, an African American family living in Flint, Michigan, are drastically changed after they go to visit Grandma in Alabama in the summer of 1963. About the ban: This book has been challenged for "inappropriate language and violence."

**Is *The Watsons Go to Birmingham* a true story?** Answer and Explanation: Christopher Paul Curtis' book *The Watsons Go to Birmingham* is fiction. It is categorized as historical fiction because the story is set in the past, is true to the time period with regard to things like vocabulary, slang, and technology, and recalls real events.

**What is the point of view of the novel The Watsons Go to Birmingham?**

Introduction: Explore Fiction Share that many of the stories in this novel are humorous, but there are very serious and sad moments as well. Say, This novel is written in first-person point of view, from the perspective of ten-year-old Kenny Watson.

**What happens at the end of The Watsons Go to Birmingham 1963?**

All of the Watsons reunite in relief, and head back to Flint together. Once home, Kenny can't get over the bombing, and spends his time behind the couch, where he has seen family pets go when they are sick or injured.

**What is the main problem in The Watsons Go to Birmingham?**

Answer and Explanation: The main conflict of Curtis' The Watsons Go to Birmingham - 1963 is presented to be Byron's devilish and trouble-making nature. However, this is quickly resolved and the novel instead focuses on the racial tensions in 1963 Birmingham, Alabama.

**What is the most important theme in The Watsons Go to Birmingham?**

The overarching theme of this novel is that of family. This is a character-driven story, which gives the reader a slice of family life, through Kenny's eyes, as he comes to understand the power that lies in familial love. The reader can see that love between the Watsons in countless ways throughout the novel.

**What does The Watsons Go to Birmingham symbolize?**

The author uses symbolism to convey the message that maturity comes with time because with impactful events and people, you have to adapt. Curtis uses Joetta Watson as a symbol throughout the book to represent innocence, but one may also think she represents the glue of the family.

**What age is appropriate for The Watsons Go to Birmingham?**

Book Review This historical fiction book by Christopher Paul Curtis is published by Bantam Doubleday Dell Books for Young Readers, a division of the Bantam Doubleday Dell Publishing Group, and is written for kids ages 10 years and up. The age range reflects readability and not necessarily content appropriateness.



**What did Kenny see at the church?** Kenny sees several gravely injured and dead people in the church, and pulls on a shiny black shoe, like the one that Joetta had been wearing. He cannot see anything else because the body is under concrete. He pulls on the shoe, which was attached to a frilly white sock, like the one Joey had been wearing.

**What grade level is *The Watsons Go to Birmingham*?** This book's Lexile measure is 1000L and is frequently taught in the 6th to 8th grade. Students in these grades should be reading texts that have reading demand of 925L through 1185L to be college and career ready by the end of Grade 12.

**What lesson did Kenny learn in *The Watsons go to Birmingham*?** In chapter 13 of the novel *The Watsons Go to Birmingham* 1963, Kenny Watson learns why it is important to listen to adults.

**What is the story of killing Mr Watson?** About Killing Mister Watson Drawn from fragments of historical fact, Matthiessen's masterpiece brilliantly depicts the fortunes and misfortunes of Edgar J. Watson, a real-life entrepreneur and outlaw who appeared in the lawless Florida Everglades around the turn of the century.

**Does *the Watsons go to Birmingham* have bad words?** This book has adult language, sexual innuendos, and violence (bullying, name calling, etc). Definitely a PG 13 rating.

**What is the most important theme in *The Watsons Go to Birmingham*?** The overarching theme of this novel is that of family. This is a character-driven story, which gives the reader a slice of family life, through Kenny's eyes, as he comes to understand the power that lies in familial love. The reader can see that love between the Watsons in countless ways throughout the novel.

**What was the main event in *The Watsons Go to Birmingham*?** Curtis' novel unfolds at a critical juncture in the Civil Rights Movement and culminates with the 16th Street Baptist Church bombing. It is a family story set in Flint and Birmingham—and on the interstate between.

**What is the main problem in *The Watsons Go to Birmingham*?** Answer and Explanation: The main conflict of Curtis' *The Watsons Go to Birmingham* - 1963 is

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presented to be Byron's devilish and trouble-making nature. However, this is quickly resolved and the novel instead focuses on the racial tensions in 1963 Birmingham, Alabama.

**What is the point of view of the novel The Watsons Go to Birmingham?**

Introduction: Explore Fiction Share that many of the stories in this novel are humorous, but there are very serious and sad moments as well. Say, This novel is written in first-person point of view, from the perspective of ten-year-old Kenny Watson.

**What are important quotes from The Watsons Go to Birmingham?** There's one good thing about getting in trouble: It seems like you do it in steps. It seems like you don't just end up in trouble but that you kind of ease yourself into it.

**What does The Watsons Go to Birmingham symbolize?** The author uses symbolism to convey the message that maturity comes with time because with impactful events and people, you have to adapt. Curtis uses Joetta Watson as a symbol throughout the book to represent innocence, but one may also think she represents the glue of the family.

**What is the main idea of The Watsons Go to Birmingham Chapter 4?** Summary: Chapter 4 Byron's story about the garbage trucks hauling away frozen bodies is significant because it demonstrates Byron's influence over and ability to manipulate his younger brother and sister while highlighting his intention to protect them.

**Is Watsons Go to Birmingham based on a true story?** Is The Watsons Go to Birmingham - 1963 a true story? No, The Watsons Go to Birmingham is not a non-fiction book. The novel is, however, realistic historical fiction and so it depicts some real-life events (such as the horrific 16th Street Baptist Church bombing in 1963).

**What lesson did Kenny learn in The Watsons Go to Birmingham?** In chapter 13 of the novel The Watsons Go to Birmingham 1963, Kenny Watson learns why it is important to listen to adults.

**What inspired The Watsons Go to Birmingham?** Curtis recalls the idea for the book came from a trip his Flint, Michigan family took to Florida and was fueled by Dudley Randall's poem "The Ballad of Birmingham." He entered the manuscript into

a publishing contest.

**What happens at the end of The Watsons Go to Birmingham - 1963?** All of the Watsons reunite in relief, and head back to Flint together. Once home, Kenny can't get over the bombing, and spends his time behind the couch, where he has seen family pets go when they are sick or injured.

**What bad things did Byron do in The Watsons Go to Birmingham?** Byron hurts other things and people and thinks it is funny. For example, Byron hurts Larry Dunn because he stole Kenny's gloves and kind of laughs about. This shows that Byron is cruel because he beats up Larry Dunn for something kind of petty like stealing his brother's gloves.

**Are there bad words in The Watsons Go to Birmingham?** Profanity & Violence God's name is taken in vain several times. Other profanity includes a—, h— and d—n. Byron flips dirty fingers at Kenny and curses under his breath with an s, although the word isn't spelled out. Name-calling occurs frequently.

## **Springboard English Textual Power Senior: Answers**

### **Question 1: "The Lottery" by Shirley Jackson**

- Explain the significance of the black box in the story.

**Answer:** The black box represents the unspoken and deeply ingrained tradition of violence and scapegoating that permeates the community. It is a symbol of the community's blind adherence to ritual, even when it results in the senseless death of an innocent person.

### **Question 2: "The Veldt" by Ray Bradbury**

- Describe the relationship between George and Lydia Hadley and how it changes throughout the story.

**Answer:** Initially, George and Lydia appear to have a loving and happy marriage. However, as they become increasingly immersed in the virtual reality of their "Veldt," their bond deteriorates. George becomes distant and controlling, while Lydia becomes apathetic and detached.

### Question 3: "All Summer in a Day" by Ray Bradbury

- How does the setting of the story reinforce its themes?

**Answer:** The setting, a planet where the sun only shines for two hours every seven years, emphasizes the importance of light and human connection. It highlights the isolation and loneliness that can result from living in a world devoid of joy and hope.

### Question 4: "The Loneliness of the Long Distance Runner" by Alan Sillitoe

- Analyze the protagonist's transformation throughout the story.

**Answer:** Colin Smith, the protagonist, initially starts out as a rebellious and isolated teenager. However, through his experiences in prison and his participation in long distance running, he undergoes a transformation. He learns the value of discipline and self-sacrifice, and he emerges as a more mature and compassionate individual.

### Question 5: "Sonny's Blues" by James Baldwin

- Discuss the role of music in the story.

**Answer:** Music plays a central role in the story as a means of expression, catharsis, and connection. It allows Sonny, the protagonist, to process his experiences of racism, poverty, and loss. Through music, he is able to find solace and a sense of purpose in a world that can be cruel and unforgiving.

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