**How To Become a Computer Vision Engineer**

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Computer vision is at the forefront of integrating artificial intelligence (AI) and image processing to develop systems that can interpret and understand visual information. Computer vision holds immense significance in real-world applications, from enabling self-driving cars to improving robotics.

In an era where autonomous driving is on the rise, contributing to a [multi-billion-dollar industry](https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/autonomous-drivings-future-convenient-and-connected), the demand for computer vision engineers is steadily increasing.

Startups and software development companies are actively seeking professionals in this field to innovate and revolutionize industries such as health care, entertainment, and security.

As the world becomes increasingly reliant on visual data, computer vision engineers play a pivotal role in creating cutting-edge solutions that reshape the way we interact with technology and the world around us.

In this article, we’ll examine the roles and responsibilities of a computer vision engineer, outline the necessary steps to become one, and address frequently asked questions in this field.

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**The role of a computer vision engineer**

The role of a computer vision engineer is to collect and apply data to help computers visually identify and process objects, people, and images. They have several responsibilities including:

* **Data collection and preprocessing.**Gathering large datasets of images or videos for training machine learning models. Cleaning and preprocessing data to remove anomalies.
* **Developing algorithms.**Designing and implementing computer vision algorithms, such as object detection, image segmentation, and facial recognition.
* **Machine learning.** Training and fine-tuning neural networks and deep learning models for specific vision tasks.
* **Real-time processing.**Developing real-time image and video processing pipelines for applications like surveillance, augmented reality, and robotics.
* **Testing and debugging.**Rigorous testing and debugging to ensure the reliability of computer vision systems.
* **Collaboration.**Collaborating with cross-functional teams, including software developers, data scientists, and domain experts, to achieve project goals.

**How much does a computer vision engineer make?**

Computer vision engineers typically fall under the category of computer and information research scientists.

While the median annual salary for computer and information research scientists is approximately [$136,620](https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm#tab-1), computer vision engineers may earn more due to their specialized skills in visual processing and analysis.

In addition, the salary for computer vision engineers can vary significantly based on several factors, including experience, education, and industry.

**9 steps to becoming a computer vision engineer**

Below, we’ll detail 9 steps you can take to help you navigate the path toward becoming a successful computer vision engineer.

1. Get the right educational foundation
2. Acquire core skills and knowledge
3. Get hands-on experience
4. Develop soft skills
5. Learn and use frameworks
6. Get certifications
7. Build a strong portfolio
8. Consider various career paths
9. Find work projects on Upwork

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**1. Get the right educational foundation**

Computer science involves the study of computational systems including the design, analysis, and development of software and hardware systems. Electrical engineering is a field of engineering that deals with the study, design, and application of electrical systems and electronics, particularly hardware systems in computers.

A strong foundation in computer science equips you with the necessary software development skills to create computer vision applications like facial recognition and object detection.

Meanwhile, an understanding of electrical engineering enables you to design the hardware systems, including cameras and sensors, required to capture and process visual data effectively.

Earning a bachelor’s degree is typically the starting point for a career in computer vision engineering. A degree in computer science, electrical engineering, or a closely related discipline like data science or computer engineering provides you with the fundamental knowledge and problem-solving skills needed for these roles.

Further education, whether through master’s degrees or online courses, can offer advanced knowledge and specialization. Platforms like [Coursera](https://www.coursera.org/) and [LinkedIn Learning](https://learning.linkedin.com/) provide a plethora of computer courses.

For computer science enthusiasts, courses in AI, machine learning and computer vision are highly relevant. Electrical engineering enthusiasts can explore courses related to hardware design and sensor technologies.

**2. Acquire core skills and knowledge**

Python and Java are fundamental programming languages you might consider learning. Python is known for its simplicity and vast libraries, making it ideal for rapid development and prototyping. Java is valued for its use in applications requiring high performance and reliability in computer vision models.

In addition, mastering algorithms is crucial for optimizing image processing and feature extraction in computer vision tasks. Plus, linear algebra underpins many operations in computer vision, aiding in tasks such as calibration. Proficiency in data science fundamentals also ensures effective data preprocessing and interpretation.

Other skills like machine learning, particularly deep learning and neural networks, enable image classification, object detection, and image generation. Deep learning models, like convolutional neural networks (CNNs), excel in feature extraction and pattern recognition, making them necessary tools for computer vision engineers to acquire.

**3. Get hands-on experience**

Hands-on experience, whether through jobs, internships, collaboration with peers, or personal projects, equips you to tackle real-world challenges effectively.

Consider working on projects involving aspects of computer visual engineering, like image segmentation. This is a technique in which images are processed into smaller segments to better identify objects or people. Perhaps you could complete a project where you build an autonomous security camera system that identifies intruders accurately by segmenting and recognizing human faces.

You could also engage in projects involving visual data analysis which can sharpen your skill set. For example, you could develop a tool that automatically categorizes and tags your photos based on their content.

Also, staying updated with research papers can help you implement the latest advancements in computer vision, which improves your problem-solving skills and ensures your expertise remains relevant.

**4. Develop soft skills**

Developing strong communication skills enables effective collaboration and knowledge sharing in any field. Soft skills, like active listening, empathy, and clear articulation, give individuals the opportunity to convey ideas, understand different perspectives, and foster a positive team environment.

Collaboration among various experts, including software developers, data scientists, machine learning engineers, software testers, and more facilitates project updates, ideas, and improvements to computer vision models. These soft skills contribute to the successful execution of projects and the advancement of the field as a whole.

**5. Learn and use frameworks**

Machine learning frameworks are tools that allow engineers to build models without having to complete the basic underlying algorithms.

TensorFlow is an open-source library with pretrained models you can integrate into your projects. TensorFlow is also compatible with Keras, which provides building blocks for deep learning algorithms. PyTorch’s dynamic computation graphs suit complex vision tasks. OpenCV, a computer vision library, streamlines image and video processing.

Learning and using these frameworks provides efficient solutions for complex tasks and significantly expedites software development.

For example, in an architectural project, TensorFlow simplifies the creation of a generative adversarial network (GAN), which is a neural network that generates and evaluates data, for image synthesis. In a computer vision system, OpenCV may aid in real-time object detection in security cameras, enhancing accuracy and efficiency.

**6. Get certifications**

Certifications, such as the IABAC [Certified Computer Vision Expert](https://iabac.org/artificial-intelligence-certification/certified-computer-vision-expert) Certification (CCVE), provide tangible proof of your expertise and dedication in the field. Other certifications can help you specialize in areas related to computer vision engineering, like machine learning, image recognition, AI, or autonomous navigation.

Certifications not only enhance your job prospects but also open doors to valuable networking opportunities within the industry. Moreover, certifications serve as a commitment to ongoing education, showcasing your adaptability and readiness to tackle the ever-changing challenges of the field.

**7. Build a strong portfolio**

Showcasing computer vision projects shows organizations your potential, skills, and expertise in computer vision engineering. You’ll first want to create a well-documented report or webpage that explains the project’s objectives, methodology, and results.

Consider sharing your code on platforms like GitHub to allow others to review and replicate your work. Include visual results, such as images or videos, to showcase the output of your computer vision model.

A great way to link to your work is on [LinkedIn](https://www.linkedin.com/) or Upwork. For example, on Upwork, you can create a professional profile where you showcase your computer vision projects, provide details about your skills and experience, and even include links to your GitHub repositories or personal website to demonstrate your expertise to potential clients and employers.

**8. Consider various career paths**

The computer vision engineer job market is thriving, with careers in computer and information research science projected to [grow by 23%](https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm#tab-6) from 2022 to 2032. Various career paths are available, so you can consider a variety of roles like machine learning engineer, data scientist, and research scientist across industries such as health care, automotive, and entertainment.

In addition, emerging fields like automation and machine vision offer promising avenues for computer vision professionals. Specializing in a specific field within computer vision can enhance your skills, demand, and prospects in this rapidly evolving and high-demand industry.

**9. Find work projects on Upwork**

Upwork offers a user-friendly platform for gaining real-world experience in computer vision engineering. You can find a variety of projects to work on like image generation, object detection, and video analysis, providing opportunities to apply your skills and add to your portfolio.

Here are some tips to increase your chances of securing work on Upwork.

* **Optimize your profile.**Create a compelling Upwork profile that highlights your computer vision skills, experience, and expertise.
* **Start small to build a reputation.** Begin with smaller computer vision projects to establish a positive track record on the platform.
* **Showcase your work.**Create a portfolio showcasing your past computer vision projects. Visual evidence of your skills and accomplishments helps clients trust your abilities.
* **Tailor your proposals.** Customize your project proposals to align with the specific requirements of each job posting. A tailored approach demonstrates your genuine interest and understanding.
* **Communicate effectively.** Respond to inquiries and messages promptly to build trust and establish a strong working relationship.
* **Deliver quality results.**Consistently provide high-quality work in your computer vision projects. Satisfied clients are more likely to offer repeat business, positive reviews, and referrals.

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