Arduino Computer Vision Programming

By Ozen Ozkaya, Giray Yillikci

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Design and develop real-world computer vision applications with the powerful combination of OpenCV and Arduino

About This Book

- Load and run the applications in Arduino to develop intelligent systems
- Design and implement detection, classification, and recognition algorithms for computer vision applications
- Explore the best practices of computer vision development including state of the art algorithms and hands-on example projects

Who This Book Is For

If you are a consumer and hobbyist who has familiarity with the basics of Arduino and wish to learn computer vision programming with Arduino to create intelligent systems, then this book is for you. No knowledge of computer vision programming is required.

What You Will Learn

- Understand the design blocks and the generic architecture of computer vision systems by learning an efficient approach to modelling
- Build up your skill set of computer vision system design using OpenCV by learning fundamentals, camera selection, data acquisition, filtering, processing, feature extraction and recognition for any specific problem
- Learn the wired and wireless communication capabilities of Arduino and comprehensive best practices to connect it to the OpenCV environment in a platform-independent way
- Discover how to use Arduino to elegantly interact with real life via physical actions
- Solidify everything you've learnt by designing and building a computer vision-enabled practical robot from scratch

In Detail

Most technologies are developed with an inspiration of human capabilities. Most of the time, the hardest to implement capability is vision. Development of highly capable computer vision applications in an easy way requires a generic approach. In this approach, Arduino is a perfect tool for interaction with the real world. Moreover, the combination of OpenCV and Arduino boosts the level and quality of practical computer vision applications.

Computer vision is the next level of sensing the environment. The purpose of this book is to teach you how to develop Arduino-supported computer vision systems that can interact with real life by seeing it.

This book will combine the powers of Arduino and computer vision in a generalized, well-defined, and applicable way. The practices and approaches in the book can be used for any related problems and on any platforms. At the end of the book, you should be able to solve any types of real life vision problems with all its components by using the presented approach. Each component will extend your vision with the best practices on the topic.

In each chapter, you will find interesting real life practical application examples about the topics in the chapter. To make it grounded, we will build a vision-enabled robot step by step towards the end of the book. You will observe that, even though the contexts of the problems are very different, the approaches to solve them are the same and very easy!

Style and approach

This book is a step-by-step guide that explains each topic sequentially by using best practices and useful tips to build computer-vision applications with OpenCV and Arduino. All the information in the book is combined in a real life all-in-one example application.

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Arduino Computer Vision Programming By Ozen Ozkaya, Giray Yillikci Bibliography

- Sales Rank: #1216191 in Books
- Published on: 2015-09-01
- Released on: 2015-08-28
- Original language: English
- Number of items: 1
- Dimensions: 9.25" h x .50" w x 7.50" l, .86 pounds
- Binding: Paperback
- 190 pages

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Editorial Review

About the Author

Ozen Ozkaya

Ozen Ozkaya is an embedded systems engineer who has been involved in the design, development, and verification of various applications of computer vision and embedded systems for more than 6 years. He strongly believes in the power of sharing knowledge and continuously extending the computer vision. After earning 6 years of experience in the profession, he is now working for Siemens as a senior development engineer, where he is involved in the research and development of industrial control devices and industrial communication processors. He also contributes to software quality assurance projects in Siemens. He has a total of eight patent applications up to now, and all of his applications are still in progress. He completed a bachelor's program in electronics engineering from Istanbul Technical University (ITU) in 3 years with high honor certificates. He holds a master's degree in electronics engineering from ITU and is currently pursuing a PhD in electronics engineering there. During his academic studies, he worked in various laboratories, such as the medical system design lab, control and avionics lab, robotics lab, pattern recognition and signal processing lab, industrial automation lab, and finally, the embedded systems lab. In addition to his academic studies, he is now a mentor in the embedded systems laboratory at ITU. Ozen can be reached directly via e-mail at ozenozkaya@gmail.com or contact@ozenozkaya.com. If you want to learn more about him, visit his website at http://www.ozenozkaya.com.

Giray Yillikci

Giray Yillikci is focuses on embedded systems, computer vision, and robotics. He has been contributing to these areas in both the industrial and academic fields. He enjoys sharing his knowledge and experiences of the field with juniors. He believes that sharing information is the true way of proceeding in life. Giray is currently working as a senior research engineer at Design Lab, Koc University, where he is coordinating the technical process of projects. He is responsible for designing industrial-level proof of concepts for studies at Design Lab. In addition, he manages technical research engineers. His six patent applications are in progress. He has a bachelor's degree in physics from Koc University. Now, he is currently working on his MS thesis for a graduation program in satellite communication and remote sensing at Istanbul Technical University. More about him can be found at his website http://www.girayyillikci.com. He can be contacted via gyillikci@gmail.com or gyillikci@ku.edu.tr.

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From reader reviews:

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