

# License Plate Recognition Opencv Code

BUKU 1: Konsep dan Implementasi Pemrograman Python Buku ini merupakan buku teks pemrograman komputer menggunakan Python yang difokuskan untuk pembelajaran efektif. Sengaja dirancang untuk pelbagai tingkat ketertarikan dan kemampuan pembelajar, buku ini cocok untuk siswa SMA/SMK, mahasiswa, insinyur, dan bahkan peneliti dalam berbagai disiplin ilmu. Tidak ada pengalaman pemrograman yang diperlukan, dan hanya sedikit kemampuan aljabar tingkat sekolah menengah atas yang diperlukan. Buku ini memang dirancang untuk mengambil rute tradisional, dengan lebih dahulu menekankan sintaksis-sintaksis dasar, struktur-struktur kendali, fungsi, dekomposisi prosedural, dan struktur data built-in seperti list, set, dan kamus (dictionary). Panduan langkah-demi-langkah di dalamnya diharapkan bisa membantu kepercayaan diri pembaca untuk menjadi programmer yang bisa menyelesaikan permasalahan-permasalahan pemrograman. Sejumlah contoh disediakan untuk mendemonstrasikan bagaimana menerapkan konsep-konsep yang telah disajikan terhadap sejumlah tantangan pemrograman. Pada Bab 1, Anda akan diajari mengenal IDE Spyder untuk memprogram Python dan mengetahui sintaksis dasar dari program sederhana Python. Pada Bab 2, Anda akan belajar: Mendefinisikan dan menggunakan variabel dan konstanta; Memahami sejumlah watak dan keterbatasan bilangan integer (bilangan bulat) dan titik-mengambang (bilangan pecahan); Memahami pentingnya komentar dan tataletak kode; Menulis ekspresi aritmatik dan statemen penugasan; Menciptakan program yang membaca dan memproses masukan, dan menampilkan hasilnya; Bagaimana menggunakan string Python; Menciptakan program grafika menggunakan sejumlah bangun dasar dan teks. Pada

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Bab 3, Anda akan belajar: Mengimplementasikan keputusan menggunakan statemen if; Membandingkan bilangan integer, titik-mengambang, dan string; Menuliskan statemen menggunakan ekspresi Boolean; Memvalidasi masukan user. Pada Bab 4, Anda akan belajar: Mengimplementasikan loop while dan for; Menjadi familiar dengan algoritma-algoritma yang melibatkan loop; Memahami loop bersarang; Memproses string. Pada Bab 5, Anda akan belajar: Bagaimana mengimplementasikan fungsi; Menjadi familiar dengan konsep pelewatan parameter; Mengembangkan strategi pendekomposisian pekerjaan kompleks menjadi pekerjaan-pekerjaan yang lebih mudah; Mampu menentukan skop variabel. Pada Bab 6, Anda akan belajar: Mengumpulkan elemen-elemen menggunakan list; Menggunakan loop for untuk menjelajah list; Menggunakan sejumlah algoritma umum untuk memproses list; Menggunakan list dengan fungsi; Bekerja dengan tabel data. Pada Bab 7, Anda akan belajar: Membangun dan menggunakan kontainer set; Menggunakan operasi-operasi set untuk memproses data; Membangun dan menggunakan kontainer dictionary; Menggunakan dictionary untuk tabel; Menggunakan struktur kompleks. BUKU 2: SINYAL DAN CITRA DIGITAL dengan PYTHON GUI Buku ini merupakan versi bahasa Indonesia dari buku kami yang berjudul “LEARN FROM SCRATCH SIGNAL AND IMAGE PROCESSING WITH PYTHON GUI”. Anda bisa mengaksesnya di Amazon maupun di Google Books. Pada buku ini, Anda akan belajar bagaimana menggunakan OpenCV, NumPy dan sejumlah pustaka lain untuk melakukan pemrosesan sinyal, pemrosesan citra, deteksi objek, dan ekstraksi fitur dengan memanfaatkan Python GUI (PyQt). Anda akan belajar cara memfilter sinyal, mendeteksi tepi dan segmen, dan menekan derau pada citra dengan memanfaatkan PyQt. Anda juga akan belajar cara mendeteksi objek (wajah, mata, dan mulut) menggunakan Haar Cascades dan cara

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mendeteksi fitur pada citra menggunakan Harris Corner Detection, Shi-Tomasi Corner Detector, Scale-Invariant Feature Transform (SIFT), dan Features from Accelerated Uji Segmen (FAST). Pada bab 1, Anda akan mempelajari secara langkah demi langkah: membuat aplikasi gui sederhana; menggunakan tombol radio; mengelompokkan tombol radio; menggunakan widget kotak centang; menggunakan dua grup kotak centang; memahami sinyal dan slot; mengonversi jenis data; menggunakan widget spin box; menggunakan scrollbar dan slider; menggunakan list widget; menggunakan kotak kombo; dan menggunakan widget Table. Pada bab 2, Anda akan mempelajari secara langkah demi langkah: membuat grafik garis sederhana; membuat grafik garis sederhana dengan python gui; membuat grafik garis sederhana dengan python gui: bagian 2; membuat dua atau lebih banyak grafik di sumbu yang sama; membuat dua sumbu dalam satu kanvas; menggunakan dua widget; menggunakan dua widget, masing-masing memiliki dua sumbu; menggunakan sumbu dengan tingkat opacity tertentu; memilih warna garis dari combo box; menghitung fast fourier transform; membuat gui untuk FFT; membuat gui untuk FFT dengan beberapa sinyal input lain; membuat gui untuk sinyal bising; membuat gui untuk penapisan sinyal berderau; dan membuat gui untuk penapisan sinyal wav. Pada bab 3, Anda akan mempelajari secara langkah demi langkah: mengkonversi citra RGB menjadi grayscale; mengubah citra RGB menjadi citra YUV; mengkonversi citra RGB menjadi citra HSV; memfilter citra; menampilkan histogram citra; menampilkan histogram citra tertapis; memfilter citra dengan memanfaatkan opsi pada kotak centang; menerapkan ambang batas citra; dan menerapkan ambang batas citra adaptif. Pada bab 4, Anda akan mempelajari secara langkah demi langkah: membangkitkan dan menampilkan citra berderau; menerapkan deteksi tepj pada citra; menerapkan segmentasi

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citra menggunakan algoritma multiple thresholding dan k-means; dan menerapkan penekanan derau citra. Pada bab 5, Anda akan mempelajari secara langkah demi langkah: mendeteksi wajah, mata, dan mulut menggunakan haar cascades; mendeteksi wajah menggunakan haar cascades dengan pyqt; mendeteksi mata, dan mulut menggunakan haar cascades dengan pyqt; dan mengekstraksi objek yang terdeteksi. Pada bab 6, Anda akan mempelajari secara langkah demi langkah: mendeteksi fitur citra menggunakan deteksi harris corner; mendeteksi fitur citra menggunakan deteksi sudut shi-tomasi; mendeteksi fitur citra menggunakan Scale-Invariant Feature Transform (SIFT); dan mendeteksi fitur citra menggunakan Features from Accelerated Uji Segmen (FAST). BUKU 3: IMPLEMENTASI MACHINE LEARNING DENGAN PYTHON GUI Buku ini merupakan versi bahasa Indonesia dari buku kami yang berjudul "LEARN FROM SCRATCH MACHINE LEARNING WITH PYTHON GUI". Anda bisa mengaksesnya di Amazon maupun di Google Books. Pada buku ini, Anda akan mempelajari cara menggunakan NumPy, Pandas, OpenCV, Scikit-Learn, dan pustaka lain untuk memplot grafik dan memproses citra digital. Kemudian, Anda akan mempelajari cara mengklasifikasikan fitur menggunakan model Perceptron, Adaline, Logistic Regression (LR), Support Vector Machine (SVM), Decision Tree (DT), Random Forest (RF), dan K-Nearest Neighbor (KNN). Anda juga akan belajar cara mengekstraksi fitur menggunakan algoritma Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Kernel Principal Component Analysis (KPCA) dan menggunakannya dalam pembelajaran mesin (machine learning). Pada Bab 1, Anda akan mempelajari dasar-dasar menggunakan Python GUI dengan Qt Designer. Pada Bab 2, Anda akan mempelajari: Langkah-Langkah Menciptakan Grafik Garis Sederhana; Langkah-Langkah Menampilkan Grafik Garis dengan Python GUI: Bagian 1; Langkah-Langkah

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Menampilkan Grafik Garis dengan Python GUI: Bagian 2; Langkah-Langkah Menampilkan Dua atau Lebih Grafik pada Sumbu yang Sama; Langkah-Langkah Menciptakan Dua Sumbu pada Satu Canvas; Langkah-Langkah Menggunakan Dua Widget; Langkah-Langkah Menggunakan Dua Widget, Masing-Masing Memiliki Dua Sumbu; Langkah-Langkah Menggunakan Sumbu dengan Tingkat Keburaman Tertentu; Langkah-Langkah Memilih Warna Garis dari Combo Box; Langkah-Langkah Menghitung Fast Fourier Transform; Langkah-Langkah Menciptakan GUI untuk FFT; Langkah-Langkah Menciptakan GUI untuk FFT atas Sinyal-Sinyal Masukan Lain; Langkah-Langkah Menciptakan GUI untuk Sinyal Berderau; Langkah-Langkah Menciptakan GUI untuk Penapisan Sinyal Berderau; Langkah-Langkah Mencipakan GUI untuk Penapisan Sinyal Wav; Langkah-Langkah Mengkonversi Citra RGB Menjadi Keabuan; Langkah-Langkah Mengkonversi Citra RGB Menjadi Citra YUV; Langkah-Langkah Mengkonversi Citra RGB Menjadi Citra HSV; Langkah-Langkah Menapis Citra; Langkah-Langkah Menampilkan Histogram Citra ; Langkah-Langkah Menampilkan Histogram Citra Tertapis; Langkah-Langkah Menapis Citra: Memanfaatkan CheckBox; Langkah-Langkah Mengimplementasikan Ambang Batas Citra; dan Langkah-Langkah Mengimplementasikan Ambang Batas Adaptif. Pada Bab 3, Anda akan mempelajari: Langkah-Langkah Implementasi Perceptron; Langkah-Langkah Implementasi Perceptron dengan PyQt; Langkah-Langkah Implementasi Adaline (ADaptive LInear NEuron); dan Langkah-Langkah Implementasi Adaline dengan PyQt. Pada Bab 4, Anda akan mempelajari: Langkah-Langkah Implementasi Perceptron Menggunakan Scikit-Learn dengan PyQt; Langkah-Langkah Implementasi Model Logistic Regression (LR); Langkah-Langkah Implementasi Model Logistic Regression dengan PyQt; Langkah-Langkah Implementasi Model Logistic Regression Menggunakan Scikit-Learn

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dengan PyQt; Langkah-Langkah Implementasi Mode Support Vector Machine (SVM) Menggunakan Scikit-Learn; Langkah-Langkah Implementasi Decision Tree (DT) Menggunakan Scikit-Learn; Langkah-Langkah Implementasi Model Random Forest (RF) Menggunakan Scikit-Learn; dan Langkah-Langkah Implementasi Model K-Nearest Neighbor (KNN) Menggunakan Scikit-Learn. Pada Bab 5, Anda akan mempelajari: Langkah-Langkah Implementasi Principal Component Analysis (PCA); Langkah-Langkah Implementasi Principal Component Analysis (PCA); Menggunakan Scikit-Learn; Langkah-Langkah Implementasi Principal Component Analysis (PCA) Menggunakan Scikit-Learn dengan PyQt; Langkah-Langkah Implementasi Linear Discriminant Analysis (LDA); Langkah-Langkah Implementasi Linear Discriminant Analysis (LDA) dengan scikit-learn; Langkah-Langkah Implementasi Linear Discriminant Analysis (LDA); Menggunakan Scikit-Learn dengan PyQt; Langkah-Langkah Implementasi Kernel Principal Component Analysis (KPCA) Menggunakan Scikit-Learn; dan Langkah-Langkah Implementasi Kernel Principal Component Analysis (KPCA) Menggunakan Scikit-Learn dengan PyQt. Pada Bab 6, Anda akan mempelajari: Langkah-Langkah Memuat Dataset MNIST; Langkah-Langkah Memuat Dataset MNIST dengan PyQt; Langkah-Langkah Implementasi Perceptron dengan Ekstraktor Fitur PCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Perceptron dengan Ekstraktor Fitur LDA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Perceptron dengan Ekstraktor Fitur KPCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Logistic Regression (LR) dengan Ekstraktor Fitur PCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Logistic Regression (LR) dengan Ekstraktor Fitur LDA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Logistic

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Regression (LR) dengan Ekstraktor Fitur KPCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Support Vector Machine (SVM) dengan Ekstraktor Fitur PCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Support Vector Machine (SVM) dengan Ekstraktor Fitur LDA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Support Vector Machine (SVM) dengan Ekstraktor Fitur KPCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Decision Tree (DT) dengan Ekstraktor Fitur PCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Decision Tree (DT) dengan Ekstraktor Fitur LDA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Decision Tree (DT) dengan Ekstraktor Fitur KPCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Random Forest (RF) dengan Ekstraktor Fitur PCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Random Forest (RF) dengan Ekstraktor Fitur LDA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi Random Forest (RF) dengan Ekstraktor Fitur KPCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi K-Nearest Neighbor (KNN) dengan Ekstraktor Fitur PCA pada Dataset MNIST Menggunakan PyQt; Langkah-Langkah Implementasi K-Nearest Neighbor (KNN) dengan Ekstraktor Fitur LDA pada Dataset MNIST Menggunakan PyQt; dan Langkah-Langkah Implementasi K-Nearest Neighbor (KNN) dengan Ekstraktor Fitur KPCA pada Dataset MNIST Menggunakan PyQt. Pada Bab 7, Anda akan mempelajari: Langkah-Langkah Membangkitkan dan Menampilkan Citra Berderau; Langkah-Langkah Mengimplementasikan Deteksi Tepi pada Citra; Langkah-Langkah Mengimplementasikan Segmentasi Menggunakan Ambang Batas Jamak dan Algoritma K-Means; Langkah-Langkah Mengimplementasikan Penekanan Derau

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pada Citra; Langkah-Langkah Mendeteksi Wajah, Mata, dan Mulut dengan Haar Cascades; Langkah-Langkah Mendeteksi Wajah Menggunakan Haar Cascades dengan PyQt; Langkah-Langkah Mendeteksi Mata dan Mulut Menggunakan Haar Cascades dengan PyQt; Langkah-Langkah Mengekstraksi Objek-Objek Terdeteksi; Langkah-Langkah Mendeteksi Fitur Citra dengan Harris Corner Detection; Langkah-Langkah Mendeteksi Fitur Citra dengan Shi-Tomasi Corner Detection; Langkah-Langkah Mendeteksi Fitur Citra dengan Scale-Invariant Feature Transform (SIFT) ; dan Langkah-Langkah Mendeteksi Fitur Citra dengan Accelerated Segment Test (FAST). BUKU 4: Implementasi DEEP LEARNING Menggunakan Scikit-Learn, Keras, Dan Tensorflow Dengan Python GUI Buku ini merupakan versi bahasa Indonesia dari buku kami yang berjudul “The Practical Guides On Deep Learning Using SCIKIT-LEARN, KERAS, and TENSORFLOW with Python GUI” yang dapat dilihat di Amazon maupun Google Books. Dalam buku ini, Anda akan mempelajari cara menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy, dan library lainnya untuk mengimplementasikan deep learning dalam mengenali rambu lalu lintas menggunakan dataset GTSRB, mendeteksi tumor otak menggunakan dataset MRI Brain Image, mengklasifikasikan gender, dan mengenali ekspresi wajah menggunakan dataset FER2013. Pada bab 1, Anda akan belajar membuat aplikasi GUI untuk menampilkan grafik garis menggunakan PyQt. Anda juga akan belajar bagaimana mengkonversi citra menjadi keabuan, menjadi ruang warna YUV, dan menjadi ruang warna HSV. Bab ini juga mengajarkan bagaimana menampilkan citra dan histogramnya dan merancang GUI untuk mengimplementasikannya. Pada bab 2, Anda akan belajar menggunakan TensorFlow, Keras, Scikit-Learn, Pandas, NumPy dan sejumlah pustaka lain untuk memprediksi digit-digit tulisan tangan menggunakan dataset MNIST. Pada bab 3, Anda

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akan mempelajari cara menggunakan TensorFlow, Keras, Scikit-Learn, PIL, Pandas, NumPy, dan pustaka lain untuk mengenali rambu lalu lintas menggunakan dataset GTSRB dari Kaggle. Ada beberapa jenis rambu lalu lintas seperti batas kecepatan, dilarang masuk, rambu lalu lintas, belok kiri atau kanan, anak-anak menyeberang, tidak ada kendaraan berat yang lewat, dll. Klasifikasi rambu lalu lintas adalah proses untuk mengidentifikasi kelas rambu lalu lintas tersebut. Pada proyek Python ini, Anda akan membangun model jaringan saraf tiruan (deep neural network) yang dapat mengklasifikasikan rambu lalu lintas dalam citra ke dalam kategori yang berbeda. Dengan model ini, Anda akan dapat membaca dan memahami rambu lalu lintas yang merupakan pekerjaan yang sangat penting bagi semua kendaraan otonom. Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 4, Anda akan mempelajari cara menggunakan TensorFlow, Keras, Scikit-Learn, Pandas, NumPy dan pustaka lainnya untuk melakukan pendeteksian tumor otak menggunakan dataset Brain Image MRI yang disediakan oleh Kaggle (<https://www.kaggle.com/navoneel/brain-mri-images-for-brain-tumor-detection>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 5, Anda akan mempelajari cara menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan library lain untuk melakukan klasifikasi gender menggunakan dataset yang disediakan oleh Kaggle (<https://www.kaggle.com/cashutosh/gender-classification-dataset>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 6, Anda akan mempelajari cara menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan pustaka lain untuk melakukan pengenalan ekspresi wajah menggunakan dataset FER2013 yang disediakan oleh Kaggle (<https://www.kaggle.com/nicolejyt/faceexpressionrecognition>). Anda juga akan membangun sebuah GUI untuk tujuan ini. BUKU 5: Panduan Praktis Deep Learning

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Menggunakan Scikit-Learn, Keras, Dan Tensorflow Dengan Python GUI Buku ini merupakan versi bahasa Indonesia dari buku kami yang berjudul “STEP BY STEP TUTORIALS ON DEEP LEARNING USING SCIKIT-LEARN, KERAS, AND TENSORFLOW WITH PYTHON GUI” yang dapat dilihat di Amazon maupun Google Books. Dalam buku ini, Anda akan mempelajari cara menerapkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy, dan library lainnya untuk mengimplementasikan deteksi wajah, mata, dan mulut menggunakan Haar Cascades, klasifikasi/prediksi buah, klasifikasi/prediksi kucing/anjing, klasifikasi/prediksi mebel, klasifikasi/prediksi mode (fashion). Pada bab 1, Anda akan belajar bagaimana menggunakan pustaka OpenCV, PIL, NumPy dan pustaka lain untuk melakukan deteksi wajah, mata, dan mulut menggunakan Haar Cascades dengan Python GUI (PyQt). Pada bab 2, Anda akan mempelajari bagaimana memanfaatkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan pustaka-pustaka lain untuk mengimplementasikan klasifikasi buah menggunakan dataset Fruits 360 yang disediakan oleh Kaggle (<https://www.kaggle.com/moltean/fruits/code>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 3, Anda akan belajar menerapkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan sejumlah pustaka lain untuk klasifikasi kucing/anjing menggunakan dataset yang disediakan oleh Kaggle (<https://www.kaggle.com/chetankv/dogs-cats-images>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 4, Anda akan belajar menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan pustakan lain untuk mendeteksi atau mengklasifikasi mebel menggunakan dataset Furniture Detector yang disediakan oleh Kaggle (<https://www.kaggle.com/akkithetechie/furniture-detector>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 5, Anda akan memanfaatkan TensorFlow, Keras, Scikit-

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Learn, OpenCV, Pandas, NumPy dan sejumlah modul lain untuk melakukan klasifikasi terhadap citra-citra mode menggunakan dataset Fashion MNIST yang disediakan oleh Kaggle (<https://www.kaggle.com/zalando-research/fashionmnist/code>). Anda juga akan membangun sebuah GUI untuk tujuan ini. BUKU 6: Tutorial Langkah Demi Langkah DEEP LEARNING Menggunakan Scikit-Learn, Keras, Dan TensorFlow Dengan Python GUI Buku ini merupakan versi bahasa Indonesia dari buku kami yang berjudul “Step by Step Tutorials Image Classification Using Scikit-Learn, Keras, and Tensorflow with Python GUI” yang dapat dilihat di Amazon maupun Google Books. Pada bab 1, Anda akan belajar dasar-dasar penggunaan PyQt untuk pemrosesan citra digital. Sejumlah projek Python GUI yang diimplementasikan di sini adalah mengkonversi citra RGB menjadi keabuan, mengkonversi citra RGB menjadi citra YUV, mengkonversi citra RGB menjadi citra HSV, menapis citra, menampilkan histogram citra, menampilkan histogram citra tertapis, dan memanfaatkan widget checkbox untuk penapisan citra, dan menerapkan ambang batas citra. Pada bab 2, Anda akan memanfaatkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan sejumlah pustaka lain untuk mengklasifikasi spesies monyet menggunakan dataset 10 Monkey Species yang disediakan oleh Kaggle (<https://www.kaggle.com/slothkong/10-monkey-species/download>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 3, Pada tutorial ini, Anda akan belajar menerapkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan sejumlah pustakan lain untuk mengklasifikasi batu, kertas, dan gunting menggunakan dataset yang disediakan oleh Kaggle (<https://www.kaggle.com/sanikamal/rock-paper-scissors-dataset/download>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 4, Anda akan belajar menerapkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy

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dan sejumlah pustaka lain untuk mengklasifikasi pesawat, mobil, dan kapal menggunakan dataset Multiclass-image-dataset-airplane-car-ship yang disediakan oleh Kaggle (<https://www.kaggle.com/abtabm/multiclassimagedatasetairplanecar>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada bab 5, Anda akan belajar menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan sejumlah pustaka lain untuk mendeteksi face mask menggunakan dataset Face Mask Detection Dataset yang disediakan oleh Kaggle (<https://www.kaggle.com/omkargurav/face-mask-dataset/download>). Anda juga akan membangun sebuah GUI untuk tujuan ini. BUKU 7: Klasifikasi Citra Berbasis Deep Learning Menggunakan Scikit-Learn, Tensorflow, Dan Keras Dengan Python GUI Buku ini merupakan versi bahasa Indonesia dari buku kami yang berjudul “Project-Based Approach On DEEP LEARNING Using Scikit-Learn, Keras, and Tensorflow with Python GUI” yang dapat dilihat di Amazon maupun Google Books. Dalam buku ini, Anda akan mempelajari cara menerapkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy, dan library lainnya untuk mengimplementasikan klasifikasi citra. Pada Bab 1, Anda akan menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy danb sejumlah pustaka lain untuk klasifikasi cuaca menggunakan dataset Multi-class Weather Dataset yang disediakan oleh Kaggle (<https://www.kaggle.com/pratik2901/multiclass-weather-dataset/download>). Pada Bab 2, Anda akan menerapkan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan sejumlah pustaka lain untuk mengenali jenis bunga menggunakan dataset Flowers Recognition dataset yang disediakan oleh Kaggle (<https://www.kaggle.com/alxmamaev/flowers-recognition/download>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada Bab 3, Anda akan menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan

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sejumlah pustaka lain untuk mendeteksi plat nomor kendaraan menggunakan dataset Car License Plate Detection yang disediakan oleh Kaggle (<https://www.kaggle.com/andrewmvd/car-plate-detection/download>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada Bab 4, Anda akan belajar bagaimana menggunakan TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan sejumlah pustaka lain untuk melakukan pengenalan bahasa isyarat menggunakan Sign Language Digits Dataset yang disediakan oleh Kaggle (<https://www.kaggle.com/ardamavi/sign-language-digits-dataset/download>). Anda juga akan membangun sebuah GUI untuk tujuan ini. Pada Bab 5, Anda akan belajar bagaimana menerapkan pustaka TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy dan sejumlah pustaka lain untuk mendeteksi keretakan permukaan beton menggunakan dataset Surface Crack Detection yang disediakan oleh Kaggle (<https://www.kaggle.com/arunrk7/surface-crack-detection/download>). Anda juga akan membangun sebuah GUI untuk tujuan ini.

A project-based approach to learning Python programming for beginners. Intriguing projects teach you how to tackle challenging problems with code. You've mastered the basics. Now you're ready to explore some of Python's more powerful tools. Real-World Python will show you how. Through a series of hands-on projects, you'll investigate and solve real-world problems using sophisticated computer vision, machine learning, data analysis, and language processing tools. You'll be introduced to important modules like OpenCV, NumPy, Pandas, NLTK, Bokeh, Beautiful Soup, Requests, HoloViews, Tkinter, turtle, matplotlib, and more. You'll create complete, working programs and think through intriguing projects that show you how to:

- Save shipwrecked sailors with an algorithm designed to prove the existence of God
- Detect

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asteroids and comets moving against a starfield • Program a sentry gun to shoot your enemies and spare your friends • Select landing sites for a Mars probe using real NASA maps • Send unbreakable messages based on a book code • Survive a zombie outbreak using data science • Discover exoplanets and alien megastructures orbiting distant stars • Test the hypothesis that we're all living in a computer simulation • And more! If you're tired of learning the bare essentials of Python Programming with isolated snippets of code, you'll relish the relevant and geeky fun of Real-World Python!

WORKSHOP 1: In this workshop, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to implement deep learning on recognizing traffic signs using GTSRB dataset, detecting brain tumor using Brain Image MRI dataset, classifying gender, and recognizing facial expression using FER2013 dataset In Chapter 1, you will learn to create GUI applications to display line graph using PyQt. You will also learn how to display image and its histogram. In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, Pandas, NumPy and other libraries to perform prediction on handwritten digits using MNIST dataset with PyQt. You will build a GUI application for this purpose. In Chapter 3, you will learn how to perform recognizing traffic signs using GTSRB dataset from Kaggle. There are several different types of traffic signs like speed limits, no entry, traffic signals, turn left or right, children crossing, no passing of heavy vehicles, etc. Traffic signs classification is the process of identifying which class a traffic sign belongs to. In this Python project, you will build a deep neural network model that can classify traffic signs in image into different categories. With this model, you will be able to read and understand traffic signs which are a very important task for all autonomous vehicles. You will build a GUI application for this purpose. In

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Chapter 4, you will learn how to perform detecting brain tumor using Brain Image MRI dataset provided by Kaggle (<https://www.kaggle.com/navoneel/brain-mri-images-for-brain-tumor-detection>) using CNN model. You will build a GUI application for this purpose. In Chapter 5, you will learn how to perform classifying gender using dataset provided by Kaggle (<https://www.kaggle.com/cashutosh/gender-classification-dataset>) using MobileNetV2 and CNN models. You will build a GUI application for this purpose. In Chapter 6, you will learn how to perform recognizing facial expression using FER2013 dataset provided by Kaggle (<https://www.kaggle.com/nicolejyt/facialexpressionrecognition>) using CNN model. You will also build a GUI application for this purpose. WORKSHOP 2: In this workshop, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to implement deep learning on classifying fruits, classifying cats/dogs, detecting furnitures, and classifying fashion. In Chapter 1, you will learn to create GUI applications to display line graph using PyQt. You will also learn how to display image and its histogram. Then, you will learn how to use OpenCV, NumPy, and other libraries to perform feature extraction with Python GUI (PyQt). The feature detection techniques used in this chapter are Harris Corner Detection, Shi-Tomasi Corner Detector, and Scale-Invariant Feature Transform (SIFT). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying fruits using Fruits 360 dataset provided by Kaggle (<https://www.kaggle.com/moltean/fruits/code>) using Transfer Learning and CNN models. You will build a GUI application for this purpose. In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying cats/dogs using dataset provided by Kaggle

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(<https://www.kaggle.com/chetankv/dogs-cats-images>) using Using CNN with Data Generator. You will build a GUI application for this purpose. In Chapter 4, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting furnitures using Furniture Detector dataset provided by Kaggle (<https://www.kaggle.com/akkithetechie/furniture-detector>) using VGG16 model. You will build a GUI application for this purpose. In Chapter 5, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying fashion using Fashion MNIST dataset provided by Kaggle (<https://www.kaggle.com/zalando-research/fashionmnist/code>) using CNN model. You will build a GUI application for this purpose. WORKSHOP 3: In this workshop, you will implement deep learning on detecting vehicle license plates, recognizing sign language, and detecting surface crack using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting vehicle license plates using Car License Plate Detection dataset provided by Kaggle (<https://www.kaggle.com/andrewmvd/car-plate-detection/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform sign language recognition using Sign Language Digits Dataset provided by Kaggle (<https://www.kaggle.com/ardamavi/sign-language-digits-dataset/download>). In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting surface crack using Surface Crack Detection provided by Kaggle (<https://www.kaggle.com/arunrk7/surface-crack-detection/download>). WORKSHOP 4: In this workshop, implement deep learning-based image

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classification on detecting face mask, classifying weather, and recognizing flower using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting face mask using Face Mask Detection Dataset provided by Kaggle (<https://www.kaggle.com/omkargurav/face-mask-dataset/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to classify weather using Multi-class Weather Dataset provided by Kaggle (<https://www.kaggle.com/pratik2901/multiclass-weather-dataset/download>).

WORKSHOP 5: In this workshop, implement deep learning-based image classification on classifying monkey species, recognizing rock, paper, and scissor, and classify airplane, car, and ship using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to classify monkey species using 10 Monkey Species dataset provided by Kaggle (<https://www.kaggle.com/slothkong/10-monkey-species/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to recognize rock, paper, and scissor using 10 Monkey Species dataset provided by Kaggle (<https://www.kaggle.com/sanikamal/rock-paper-scissors-dataset/download>). WORKSHOP 6: In this worksshop, you will implement two data science projects using Scikit-Learn, Scipy, and other libraries with Python GUI. In Chapter 1, you will learn how to use Scikit-Learn, Scipy, and other libraries to perform how to predict traffic (number of vehicles) in four different junctions using Traffic Prediction Dataset provided by Kaggle

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(<https://www.kaggle.com/fedesoriano/traffic-prediction-dataset/download>). This dataset contains 48.1k (48120) observations of the number of vehicles each hour in four different junctions: 1) DateTime; 2) Junction; 3) Vehicles; and 4) ID. In Chapter 2, you will learn how to use Scikit-Learn, NumPy, Pandas, and other libraries to perform how to analyze and predict heart attack using Heart Attack Analysis & Prediction Dataset provided by Kaggle (<https://www.kaggle.com/rashikrahmanpritom/heart-attack-analysis-prediction-dataset/download>).

WORKSHOP 7: In this workshop, you will implement two data science projects using Scikit-Learn, Scipy, and other libraries with Python GUI. In Project 1, you will learn how to use Scikit-Learn, NumPy, Pandas, Seaborn, and other libraries to perform how to predict early stage diabetes using Early Stage Diabetes Risk Prediction Dataset provided by Kaggle (<https://www.kaggle.com/ishandutta/early-stage-diabetes-risk-prediction-dataset/download>). This dataset contains the sign and symptpom data of newly diabetic or would be diabetic patient. This has been collected using direct questionnaires from the patients of Sylhet Diabetes Hospital in Sylhet, Bangladesh and approved by a doctor. You will develop a GUI using PyQt5 to plot distribution of features, feature importance, cross validation score, and prediced values versus true values. The machine learning models used in this project are Adaboost, Random Forest, Gradient Boosting, Logistic Regression, and Support Vector Machine. In Project 2, you will learn how to use Scikit-Learn, NumPy, Pandas, and other libraries to perform how to analyze and predict breast cancer using Breast Cancer Prediction Dataset provided by Kaggle (<https://www.kaggle.com/merishnasuwal/breast-cancer-prediction-dataset/download>). Worldwide, breast cancer is the most common type of cancer in women and the second highest in terms of mortality rates.Diagnosis of breast cancer is performed

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when an abnormal lump is found (from self-examination or x-ray) or a tiny speck of calcium is seen (on an x-ray). After a suspicious lump is found, the doctor will conduct a diagnosis to determine whether it is cancerous and, if so, whether it has spread to other parts of the body. This breast cancer dataset was obtained from the University of Wisconsin Hospitals, Madison from Dr. William H. Wolberg. You will develop a GUI using PyQt5 to plot distribution of features, pairwise relationship, test scores, predicted values versus true values, confusion matrix, and decision boundary. The machine learning models used in this project are K-Nearest Neighbor, Random Forest, Naive Bayes, Logistic Regression, Decision Tree, and Support Vector Machine. WORKSHOP 8: In this workshop, you will learn how to use Scikit-Learn, TensorFlow, Keras, NumPy, Pandas, Seaborn, and other libraries to implement brain tumor classification and detection with machine learning using Brain Tumor dataset provided by Kaggle. This dataset contains five first order features: Mean (the contribution of individual pixel intensity for the entire image), Variance (used to find how each pixel varies from the neighboring pixel), Standard Deviation (the deviation of measured values or the data from its mean), Skewness (measures of symmetry), and Kurtosis (describes the peak of e.g. a frequency distribution). It also contains eight second order features: Contrast, Energy, ASM (Angular second moment), Entropy, Homogeneity, Dissimilarity, Correlation, and Coarseness. The machine learning models used in this project are K-Nearest Neighbor, Random Forest, Naive Bayes, Logistic Regression, Decision Tree, and Support Vector Machine. The deep learning models used in this project are MobileNet and ResNet50. In this project, you will develop a GUI using PyQt5 to plot boundary decision, ROC, distribution of features, feature importance, cross validation score, and predicted values versus true values, confusion matrix,

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training loss, and training accuracy. WORKSHOP 9: In this workshop, you will learn how to use Scikit-Learn, Keras, TensorFlow, NumPy, Pandas, Seaborn, and other libraries to perform COVID-19 Epitope Prediction using COVID-19/SARS B-cell Epitope Prediction dataset provided in Kaggle. All of three datasets consists of information of protein and peptide: parent\_protein\_id : parent protein ID; protein\_seq : parent protein sequence; start\_position : start position of peptide; end\_position : end position of peptide; peptide\_seq : peptide sequence; chou\_fasman : peptide feature; emini : peptide feature, relative surface accessibility; kolaskar\_tongaonkar : peptide feature, antigenicity; parker : peptide feature, hydrophobicity; isoelectric\_point : protein feature; aromacity: protein feature; hydrophobicity : protein feature; stability : protein feature; and target : antibody valence (target value). The machine learning models used in this project are K-Nearest Neighbor, Random Forest, Naive Bayes, Logistic Regression, Decision Tree, Support Vector Machine, Adaboost, Gradient Boosting, XGB classifier, and MLP classifier. Then, you will learn how to use sequential CNN and VGG16 models to detect and predict Covid-19 X-RAY using COVID-19 Xray Dataset (Train & Test Sets) provided in Kaggle. The folder itself consists of two subfolders: test and train. Finally, you will develop a GUI using PyQt5 to plot boundary decision, ROC, distribution of features, feature importance, cross validation score, and predicted values versus true values, confusion matrix, training loss, and training accuracy. WORKSHOP 10: In this workshop, you will learn how to use Scikit-Learn, Keras, TensorFlow, NumPy, Pandas, Seaborn, and other libraries to perform analyzing and predicting stroke using dataset provided in Kaggle. The dataset consists of attribute information: id: unique identifier; gender: "Male", "Female" or "Other"; age: age of the patient; hypertension: 0 if the patient doesn't have

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hypertension, 1 if the patient has hypertension; heart\_disease: 0 if the patient doesn't have any heart diseases, 1 if the patient has a heart disease; ever\_married: "No" or "Yes"; work\_type: "children", "Govt\_jov", "Never\_worked", "Private" or "Self-employed"; Residence\_type: "Rural" or "Urban"; avg\_glucose\_level: average glucose level in blood; bmi: body mass index; smoking\_status: "formerly smoked", "never smoked", "smokes" or "Unknown"; and stroke: 1 if the patient had a stroke or 0 if not. The models used in this project are K-Nearest Neighbor, Random Forest, Naive Bayes, Logistic Regression, Decision Tree, Support Vector Machine, Adaboost, LGBM classifier, Gradient Boosting, XGB classifier, MLP classifier, and CNN 1D. Finally, you will develop a GUI using PyQt5 to plot boundary decision, ROC, distribution of features, feature importance, cross validation score, and predicted values versus true values, confusion matrix, learning curve, performance of the model, scalability of the model, training loss, and training accuracy.

**WORKSHOP 11:** In this workshop, you will learn how to use Scikit-Learn, Keras, TensorFlow, NumPy, Pandas, Seaborn, and other libraries to perform classifying and predicting Hepatitis C using dataset provided by UCI Machine Learning Repository. All attributes in dataset except Category and Sex are numerical. Attributes 1 to 4 refer to the data of the patient: X (Patient ID/No.), Category (diagnosis) (values: '0=Blood Donor', '0s=suspect Blood Donor', '1=Hepatitis', '2=Fibrosis', '3=Cirrhosis'), Age (in years), Sex (f,m), ALB, ALP, ALT, AST, BIL, CHE, CHOL, CREA, GGT, and PROT. The target attribute for classification is Category (2): blood donors vs. Hepatitis C patients (including its progress ('just' Hepatitis C, Fibrosis, Cirrhosis)). The models used in this project are K-Nearest Neighbor, Random Forest, Naive Bayes, Logistic Regression, Decision Tree, Support Vector Machine, Adaboost, LGBM classifier, Gradient Boosting, XGB classifier, MLP classifier, and ANN 1D. Finally, you will

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develop a GUI using PyQt5 to plot boundary decision, ROC, distribution of features, feature importance, cross validation score, and predicted values versus true values, confusion matrix, learning curve, performance of the model, scalability of the model, training loss, and training accuracy.

This book includes the outcomes of the 59th Symposium “Modelowanie w Mechanice” (Engineering Modelling in Mechanics) held in Ustroń from 22 February to 26 February 2020. The International Conference has an over 58-year-old history and is organized by the Department of Theoretical and Applied Mechanics of Silesian University of Technology under the patronage of the Polish Society of Theoretical and Applied Mechanics, Gliwice Branch. Subjects of the conference are modelling of mechatronic systems, machinery dynamics, control systems, sensitivity analysis and optimization, numerical modelling and experimental methods in mechanics, biomechanics, heat flow analysis, fluid mechanics, etc. The papers are dealing with interdisciplinary problems in which mechanical phenomena are of decisive importance. The potential reader of this book will find their set of papers concentrated on the use of computer-aided design, virtual modelling, numerical simulations, fast prototyping and experimental tests of mechanical systems. It is an area of versatile and interdisciplinary research trends with one of the mainstreams focusing on applied mechanics.

In this book, you will implement deep learning on detecting vehicle license plates, recognizing sign language, and detecting surface crack using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting vehicle license plates using Car License Plate Detection dataset provided by Kaggle

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(<https://www.kaggle.com/andrewmvd/car-plate-detection/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform sign language recognition using Sign Language Digits Dataset provided by Kaggle (<https://www.kaggle.com/ardamavi/sign-language-digits-dataset/download>). In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting surface crack using Surface Crack Detection provided by Kaggle (<https://www.kaggle.com/arunrk7/surface-crack-detection/download>).

This book concentrates on intelligent technologies as it relates to engineering systems. The book covers the following topics: networking, signal processing, artificial intelligence, control and software engineering, intelligent electronic circuits and systems, communications, and materials and mechanical engineering. The book is a collection of original papers that have been reviewed by technical editors. These papers were presented at the International Conference on Intelligent Technologies and Engineering Systems, held Dec. 13-15, 2012. This book constitutes the refereed proceedings of the 6th International Conference on Convergence and Hybrid Information Technology, ICHIT 2012, held in Daejeon, Korea, in August 2012. The 102 revised full papers presented were carefully reviewed and selected from 196 submissions. The papers are organized in topical sections on communications and networking; soft computing and intelligent systems; medical information and bioinformatics; security and safety systems; HCI and data mining; software and hardware engineering; image processing and pattern recognition; robotics and RFID technologies; convergence in information technology; workshop on advanced smart convergence (IWASC).

This book presents the peer-reviewed proceedings of the 2nd International Conference on

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Computational and Bioengineering (CBE 2020) jointly organized in virtual mode by the Department of Computer Science and the Department of BioScience & Sericulture, Sri Padmavati Mahila Visvavidyalayam (Women's University), Tirupati, Andhra Pradesh, India, during 4–5 December 2020. The book includes the latest research on advanced computational methodologies such as artificial intelligence, data mining and data warehousing, cloud computing, computational intelligence, soft computing, image processing, Internet of things, cognitive computing, wireless networks, social networks, big data analytics, machine learning, network security, computer networks and communications, bioinformatics, biocomputing/biometrics, computational biology, biomaterials, bioengineering, and medical and biomedical informatics.

“With futuristic homes on the rise, learn to control and automate the living space with intriguing IoT projects.” About This Book Build exciting (six) end-to-end home automation projects with Raspberry Pi 3, Seamlessly communicate and control your existing devices and build your own home automation system, Automate tasks in your home through projects that are reliable and fun Who This Book Is For This book is for all those who are excited about building home automation systems with Raspberry Pi 3. It's also for electronic hobbyists and developers with some knowledge of electronics and programming. What You Will Learn Integrate different embedded microcontrollers and development boards like Arduino, ESP8266, Particle Photon and Raspberry Pi 3, creating real life

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solutions for day to day tasks and home automation Create your own magic mirror that lights up with useful information as you walk up to it Create a system that intelligently decides when to water your garden and then goes ahead and waters it for you Use the Wi-fi enabled Adafruit ESP8266 Huzzah to create your own networked festive display lights Create a simple machine learning application and build a parking automation system using Raspberry Pi Learn how to work with AWS cloud services and connect your home automation to the cloud Learn how to work with Windows IoT in Raspberry Pi 3 and build your own Windows IoT Face Recognition door locking system In Detail Raspberry Pi 3 Home Automation Projects addresses the challenge of applying real-world projects to automate your house using Raspberry Pi 3 and Arduino. You will learn how to customize and program the Raspberry Pi 3 and Arduino-based boards in several home automation projects around your house, in order to develop home devices that will really rejuvenate your home. This book aims to help you integrate different microcontrollers like Arduino, ESP8266 Wi-Fi module, Particle Photon and Raspberry Pi 3 into the real world, taking the best of these boards to develop some exciting home automation projects. You will be able to use these projects in everyday tasks, thus making life easier and comfortable. We will start with an interesting project creating a Raspberry Pi-Powered smart mirror and

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move on to Automated Gardening System, which will help you build a simple smart gardening system with plant-sensor devices and Arduino to keep your garden healthy with minimal effort. You will also learn to build projects such as CheerLights into a holiday display, a project to erase parking headaches with OpenCV and Raspberry Pi 3, create Netflix's "The Switch" for the living room and lock down your house like Fort Knox with a Windows IoT face recognition-based door lock system. By the end of the book, you will be able to build and automate the living space with intriguing IoT projects and bring a new degree of interconnectivity to your world. Style and approach End to end home automation projects with Raspberry Pi 3.

The book focuses on soft computing and its applications to solve real-world problems in different domains, ranging from medicine and health care, to supply chain management, image processing and cryptanalysis. It includes high-quality papers presented at the International Conference on Soft Computing: Theories and Applications (SoCTA 2018), organized by Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab, India. Offering significant insights into soft computing for teachers and researchers alike, the book inspires more researchers to work in the field of soft computing.

Classification, Parameter Estimation and State Estimation is a practical guide for

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data analysts and designers of measurement systems and postgraduates students that are interested in advanced measurement systems using MATLAB. 'Prtools' is a powerful MATLAB toolbox for pattern recognition and is written and owned by one of the co-authors, B. Duin of the Delft University of Technology. After an introductory chapter, the book provides the theoretical construction for classification, estimation and state estimation. The book also deals with the skills required to bring the theoretical concepts to practical systems, and how to evaluate these systems. Together with the many examples in the chapters, the book is accompanied by a MATLAB toolbox for pattern recognition and classification. The appendix provides the necessary documentation for this toolbox as well as an overview of the most useful functions from these toolboxes. With its integrated and unified approach to classification, parameter estimation and state estimation, this book is a suitable practical supplement in existing university courses in pattern classification, optimal estimation and data analysis. Covers all contemporary main methods for classification and estimation. Integrated approach to classification, parameter estimation and state estimation Highlights the practical deployment of theoretical issues. Provides a concise and practical approach supported by MATLAB toolbox. Offers exercises at the end of each chapter and numerous worked out examples. PRtools toolbox (MATLAB)

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and code of worked out examples available from the internet Many examples showing implementations in MATLAB Enables students to practice their skills using a MATLAB environment

This dissertation presents improved Automated License Plate Recognition (ALPR) system based on Single Pass Connected Component Labeling (CCL) [1] and Smart License Plate Character Detection algorithm [2]. This research describes an improved ALPR system which is capable of distinguishing license plate characters under various conditions, such as distance from the camera, rotation angle between camera and vehicles ( $\pm 25$  degree) and poor illumination contrast condition (different weather and lighting condition and physical tilted or damaged of license plate). In proposed method, improved ALPR system has three main steps: 1) Image Enhancement, 2) Character Segmentation (Based on Single pass CCL and new designed Smart License Plate Character Detection algorithm) and 3) Character recognition. In the image enhancement stage after contrast improvement, we have proposed and designed Multi-Scale Adaptive NICK thresholding method to achieve all character candidates as an objects in the binary image, accuracy of this method is very important because extraction of license plate characters from input image depends on accuracy of image enhancement and thresholding method. After Image enhancement and

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thresholding by applying Single Pass Connected Components labelling, put the label on detected objects then proposed new designed algorithm called Smart License Plate Character Detection that finds the license plate characters regardless of location, size, shape and background color of license plate. So we eliminate the License Plate Extraction (LPE) [28-29] as complex and time consuming individual stage [1]. Finally by applying Optical Character Recognition method based on Intelligent Template Matching, license plate characters will be recognized and saved as text file in the database for further processing. Improved Automated License Plate Recognition (ALPR) system simulated and modeled on Matlab 2014a. The computation time of proposed improved ALPR system steps calculated and compared with well-known ALPR methods on latest state-of-the-art reference [1-2].

This book constitutes the refereed proceedings of the 18th Scandinavian Conference on Image Analysis, SCIA 2013, held in Espoo, Finland, in June 2013. The 67 revised full papers presented were carefully reviewed and selected from 132 submissions. The papers are organized in topical sections on feature extraction and segmentation, pattern recognition and machine learning, medical and biomedical image analysis, faces and gestures, object and scene recognition, matching, registration, and alignment, 3D vision, color and

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multispectral image analysis, motion analysis, systems and applications, human-centered computing, and video and multimedia analysis.

In last couple of decades, the number of vehicles has increased drastically. With this increase, it is becoming difficult to keep track of each vehicle for purpose of law enforcement and traffic management. License Plate Recognition is used increasingly nowadays for automatic toll collection, maintaining traffic activities and law enforcement. Many techniques have been proposed for plate detection, each having its own advantages and disadvantages. The basic step in License Plate Detection is localization of number plate. The approach mentioned in this project is a histogram based approach. This approach has an advantage of being simple and thus faster. Initially, license plate localization is implemented using MATLAB and verified for its functionality. Once the functionality is verified, the algorithm is implemented on EVM320DM6437 Texas Instrument (TI) Digital Video Development Starter Kit (DVDSK). By implementing this algorithm on a kit, we eliminate need of computers and thus think of portable implementation of such application. In this approach, a digital camera is used to capture video and feed it to the kit. The kit processes each frame individually and provides the coordinates of location with maximum probability of having a number plate. Later, this information is used for recognizing actual number of the license plate. The

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plate detection algorithm is implemented in C, compiled and debugged using Code Composer Studio (CCS), an IDE provided by TI. Successful demonstrations were given by downloading the algorithm onto TI's EVM320DM6437 DVDSK.

This book constitutes the refereed conference proceedings of the 8th International Conference on Image and Graphics, ICIG 2015 held in Tianjin, China, in August 2015. The 164 revised full papers and 6 special issue papers were carefully reviewed and selected from 339 submissions. The papers focus on various advances of theory, techniques and algorithms in the fields of images and graphics.

This book presents high-quality research in the field of 3D imaging technology. The second edition of International Conference on 3D Imaging Technology (3DDIT-MSP&DL) continues the good traditions already established by the first 3DIT conference (IC3DIT2019) to provide a wide scientific forum for researchers, academia and practitioners to exchange newest ideas and recent achievements in all aspects of image processing and analysis, together with their contemporary applications. The conference proceedings are published in 2 volumes. The main topics of the papers comprise famous trends as: 3D image representation, 3D image technology, 3D images and graphics, and computing and 3D information

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technology. In these proceedings, special attention is paid at the 3D tensor image representation, the 3D content generation technologies, big data analysis, and also deep learning, artificial intelligence, the 3D image analysis and video understanding, the 3D virtual and augmented reality, and many related areas. The first volume contains papers in 3D image processing, transforms and technologies. The second volume is about computing and information technologies, computer images and graphics and related applications. The two volumes of the book cover a wide area of the aspects of the contemporary multidimensional imaging and the related future trends from data acquisition to real-world applications based on various techniques and theoretical approaches. This book constitutes the refereed proceedings of the 19th Iberoamerican Congress on Pattern Recognition, CIARP 2014, held in Puerto Vallarta, Jalisco, Mexico, in November 2014. The 115 papers presented were carefully reviewed and selected from 160 submissions. The papers are organized in topical sections on image coding, processing and analysis; segmentation, analysis of shape and texture; analysis of signal, speech and language; document processing and recognition; feature extraction, clustering and classification; pattern recognition and machine learning; neural networks for pattern recognition; computer vision and robot vision; video segmentation and tracking.

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up with automated systems for assessment of road condition. For example, Haas et al (1997) developed an automated algorithm for detecting cracks and joints con- tion. Smith and Lin (1997) developed a fuzzy logic classification scheme for pavement distress condition. Oh et al (1997) developed iterative algorithm for overcoming noisy images of roads due to shadows and low light conditions. Koustsopoulos and Mishalani (1997) presented a model for distress assessment in a local (microscopic) and global (macroscopic) level using captured images of pavement. Lee (1993) presented a comparison between 15 different imaging alrithms used in crack detection. Ground Penetration Radar (GPR) has also been used for pavement assessment. Special computer algorithms were developed for quick analysis of GPR data (Adeli & Hung 1993 and Maser 1996). Heiler and McNeil (1997) proposed a modified system for analyzing the GPR data using an artificial neural network (ANN).

### 2.3.2 Traffic Analysis and Control

Currently imaging systems provide essential data for transportation and traffic engineering planning (Anon 1999). Machine vision techniques were introduced to intersection traffic signal control in the late 1970's (Chou and Sethi 1993). No- days, many systems have been developed all over the world for traffic analysis and control applications, in addition to image based systems for traffic violations. Nallamathu and Wang (1997) developed one of the first automated systems for license plate

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recognition using character recognition algorithm for the use in monitoring violators at toll stations and many other traffic applications.

The Car License Plate Recognition (CLPR) system is one of the important factors in the intelligent traffic engineering field. There are many researches on this topic whether handwritten character recognition, typewritten character recognition or other pattern recognition. CLPR is developed to recognise the car license plate with the implementation of Digital Image Processing (DIP) and Template Matching Algorithm (TMA) approach by using the MATLAB software. This project works on the offline input images collected by using digital camera. The method of this project is based on template matching where a character is identified by analysing its shape and the current input character is compared to each template to find either an exact match, or the template with the closest representation of the input character. Experimental results have shown the relatively high accuracy of the develop CLPR on a 100 sample image of car license plate.

This accessible textbook/reference reviews the fundamental concepts and practical issues involved in designing digital surveillance systems that fully exploit the power of intelligent computing techniques. The book presents comprehensive coverage of all aspects of such systems, from camera calibration and data capture, to the secure transmission of surveillance data. In addition to the

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detection and recognition of objects and biometric features, the text also examines the automated observation of surveillance events, and how this can be enhanced through the use of deep learning methods and supercomputing technology. This updated new edition features extended coverage on face detection, pedestrian detection and privacy preservation for intelligent surveillance. Topics and features: contains review questions and exercises in every chapter, together with a glossary; describes the essentials of implementing an intelligent surveillance system and analyzing surveillance data, including a range of biometric characteristics; examines the importance of network security and digital forensics in the communication of surveillance data, as well as issues of privacy and ethics; discusses the Viola-Jones object detection method, and the HOG algorithm for pedestrian and human behavior recognition; reviews the use of artificial intelligence for automated monitoring of surveillance events, and decision-making approaches to determine the need for human intervention; presents a case study on a system that triggers an alarm when a vehicle fails to stop at a red light, and identifies the vehicle's license plate number; investigates the use of cutting-edge supercomputing technologies for digital surveillance, such as FPGA, GPU and parallel computing. This concise, classroom-tested textbook is ideal for undergraduate and postgraduate-level

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courses on intelligent surveillance. Researchers interested in entering this area will also find the book suitable as a helpful self-study reference.

Practical Computer Vision Projects About This Book Updated for OpenCV 3, this book covers new features that will help you unlock the full potential of OpenCV 3 Written by a team of 7 experts, each chapter explores a new aspect of OpenCV to help you make amazing computer-vision aware applications Project-based approach with each chapter being a complete tutorial, showing you how to apply OpenCV to solve complete problems Who This Book Is For This book is for those who have a basic knowledge of OpenCV and are competent C++ programmers.

You need to have an understanding of some of the more theoretical/mathematical concepts, as we move quite quickly throughout the book. What You Will Learn Execute basic image processing operations and cartoonify an image Build an OpenCV project natively with Raspberry Pi and cross-compile it for Raspberry Pi.text Extend the natural feature tracking algorithm to support the tracking of multiple image targets on a video Use OpenCV 3's new 3D visualization framework to illustrate the 3D scene geometry Create an application for Automatic Number Plate Recognition (ANPR) using a support vector machine and Artificial Neural Networks Train and predict pattern-recognition algorithms to decide whether an image is a number plate Use POSIT

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for the six degrees of freedom head pose Train a face recognition database using deep learning and recognize faces from that database In Detail As we become more capable of handling data in every kind, we are becoming more reliant on visual input and what we can do with those self-driving cars, face recognition, and even augmented reality applications and games. This is all powered by Computer Vision. This book will put you straight to work in creating powerful and unique computer vision applications. Each chapter is structured around a central project and deep dives into an important aspect of OpenCV such as facial recognition, image target tracking, making augmented reality applications, the 3D visualization framework, and machine learning. You'll learn how to make AI that can remember and use neural networks to help your applications learn. By the end of the book, you will have created various working prototypes with the projects in the book and will be well versed with the new features of OpenCV3. Style and approach This book takes a project-based approach and helps you learn about the new features by putting them to work by implementing them in your own projects.

Analysis of big data is becoming a hot stuff for engineers, researchers and business enterprises now a days. It refers to the process of collecting, organizing and analyzing large sets of data to discover hidden patterns and other useful

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information. Not solely can massive information analytics assist to know the knowledge contained inside the information, however it will additionally facilitate to determine the information that is most significant to the business and future business choices. Cloud computing is the type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications. Cloud computing aims at applying traditional supercomputing, or high-performance computing power to perform tens of trillions of computations per second, in consumer-oriented applications such as financial portfolios, to deliver personalized information, to provide data storage etc. Since big data places on networks, storage and servers, requirements arise to analyse this huge amount data on the cloud. Even cloud providers also welcome this new business opportunity of supporting big data analysis in the cloud. But in the same time they are facing various, architectural and technical hurdles. Therefore, big data analysis in cloud attracting many researchers now a days. The National Conference on Communication, Cloud and Big Data (CCB) 2014 organized by Department of Information Technology, SMIT has received keen response from researchers across the country. Each paper went through reviews process and finally, 30 papers were selected for presentation. The papers are an even mix of research topics from the fields of Communication,

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Cloud and Big Data and its applications in various fields of engineering and science.

Mastering OpenCV with Practical Computer Vision Projects Packt Publishing Ltd

This book constitutes the proceedings of the 11th Mexican Conference on Pattern Recognition, MCPR 2019, held in Querétaro, Mexico, in June 2019. The 40 papers presented in this volume were carefully reviewed and selected from 86 submissions. They were organized in topical sections named: artificial intelligence techniques and recognition; computer vision; industrial and medical applications of pattern recognition; image processing and analysis; pattern recognition techniques; signal processing and analysis; natural language, and processing and recognition.

Explains the theory behind basic computer vision and provides a bridge from the theory to practical implementation using the industry standard OpenCV libraries. Computer Vision is a rapidly expanding area and it is becoming progressively easier for developers to make use of this field due to the ready availability of high quality libraries (such as OpenCV2). This text is intended to facilitate the practical use of computer vision with the goal being to bridge the gap between the theory and the practical implementation of computer vision. The book will explain how to use the relevant OpenCV library routines and will be accompanied by a full

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working program including the code snippets from the text. This textbook is a heavily illustrated, practical introduction to an exciting field, the applications of which are becoming almost ubiquitous. We are now surrounded by cameras, for example cameras on computers & tablets/ cameras built into our mobile phones/ cameras in games consoles; cameras imaging difficult modalities (such as ultrasound, X-ray, MRI) in hospitals, and surveillance cameras. This book is concerned with helping the next generation of computer developers to make use of all these images in order to develop systems which are more intuitive and interact with us in more intelligent ways. Explains the theory behind basic computer vision and provides a bridge from the theory to practical implementation using the industry standard OpenCV libraries Offers an introduction to computer vision, with enough theory to make clear how the various algorithms work but with an emphasis on practical programming issues Provides enough material for a one semester course in computer vision at senior undergraduate and Masters levels Includes the basics of cameras and images and image processing to remove noise, before moving on to topics such as image histogramming; binary imaging; video processing to detect and model moving objects; geometric operations & camera models; edge detection; features detection; recognition in images Contains a large number of vision application problems to provide students with

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the opportunity to solve real problems. Images or videos for these problems are provided in the resources associated with this book which include an enhanced eBook

Gain a working knowledge of advanced machine learning and explore Python's powerful tools for extracting data from images and videos

**Key Features**  
Implement image classification and object detection using machine learning and deep learning

Perform image classification, object detection, image segmentation, and other Computer Vision tasks

Crisp content with a practical approach to solving real-world problems in Computer Vision

**Book Description**  
Python is the ideal programming language for rapidly prototyping and developing production-grade codes for image processing and Computer Vision with its robust syntax and wealth of powerful libraries.

This book will help you design and develop production-grade Computer Vision projects tackling real-world problems. With the help of this book, you will learn how to set up Anaconda and Python for the major OSes with cutting-edge third-party libraries for Computer Vision.

You'll learn state-of-the-art techniques for classifying images, finding and identifying human postures, and detecting faces within videos.

You will use powerful machine learning tools such as OpenCV, Dlib, and TensorFlow to build exciting projects such as classifying handwritten digits, detecting facial features, and much

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more. The book also covers some advanced projects, such as reading text from license plates from real-world images using Google's Tesseract software, and tracking human body poses using DeeperCut within TensorFlow. By the end of this book, you will have the expertise required to build your own Computer Vision projects using Python and its associated libraries. What you will learn

- Install and run major Computer Vision packages within Python
- Apply powerful support vector machines for simple digit classification
- Understand deep learning with TensorFlow
- Build a deep learning classifier for general images
- Use LSTMs for automated image captioning
- Read text from real-world images
- Extract human pose data from images

Who this book is for Python programmers and machine learning developers who wish to build exciting Computer Vision projects using the power of machine learning and OpenCV will find this book useful. The only prerequisite for this book is that you should have a sound knowledge of Python programming.

"This book focuses on new and original research ideas and findings in three broad areas: computing, analytics, and networking and their potential applications in the various domains of engineering - an emerging, interdisciplinary area in which a wide range of theories and methodologies are being investigated and developed to tackle complex and challenging real-world

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problems. The book also features keynote presentations and papers from the International Conference on Computing Analytics and Networking (ICCAN 2019), which offers an open forum for scientists, researchers and technocrats in academia and industry from around the globe to present and share state-of-the-art concepts, prototypes, and innovative research ideas in diverse fields.

Providing inspiration for postgraduate students and young researchers working in the field of computer science & engineering, the book also discusses hardware technologies and future communication technologies, making it useful for those in the field of electronics." -- Prové de l'editor.

Over the last decade, the number of vehicles is growing day by day. This increases the problems for traffic police such as red light violations, parking problems, wrong lane violations and toll booth violations. This research will be helpful for traffic police to control these traffic violations. Moreover, it will also be helpful for the other character recognition applications. I propose to do research on car registration license recognition. This research will be able to recognize alphanumeric characters in a given image. The final output will be stored in a text file. This file will have complete information such as image path, date and time of the generated file, total number of characters and extracted characters. This technology will be fast, cost effective and highly accurate. In this research I will

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try various recognition algorithms and fuzzy logics in MATLAB and find best one to process the recognition of each character.

Morphology based Approach to Recognize License Plates in India studies the problems that are being faced to recognize Vehicle License Plates (VLP) in Indian conditions. This work provides in depth knowledge about the causes of failure of other VLP recognition methods in Indian conditions. This work is based on mathematical operations called Morphological operations such as Dilation, Erosion etc.. Morphology is a technique in which the shape of the image is to be taken care of. Everything revolves around the shape of the image on which operations are to be performed. Some previous studies for character recognition were also referred and a working MATLAB ( MATLAB by Mathworks ) Program has been created that extracts License plate regions only and displays the actual Characters (Vehicle Registration Number or License plate characters)

Practical Computer Vision Projects About This Book\* Updated for OpenCV 3, this book covers new features that will help you unlock the full potential of OpenCV 3\* Written by a team of 7 experts, each chapter explores a new aspect of OpenCV to help you make amazing computer-vision aware applications\* Project-based approach with each chapter being a complete tutorial, showing you how to apply OpenCV to solve complete problems Who This Book Is For This book is for those

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who have a basic knowledge of OpenCV and are competent C++ programmers. You need to have an understanding of some of the more theoretical/mathematical concepts, as we move quite quickly throughout the book.

**What You Will Learn\***

- Execute basic image processing operations and cartoonify an image\*
- Build an OpenCV project natively with Raspberry Pi and cross-compile it for Raspberry Pi.
- Extend the natural feature tracking algorithm to support the tracking of multiple image targets on a video\*
- Use OpenCV 3's new 3D visualization framework to illustrate the 3D scene geometry\*
- Create an application for Automatic Number Plate Recognition (ANPR) using a support vector machine and Artificial Neural Networks\*
- Train and predict pattern-recognition algorithms to decide whether an image is a number plate\*
- Use POSIT for the six degrees of freedom head pose\*
- Train a face recognition database using deep learning and recognize faces from that database

In Detail

As we become more capable of handling data in every kind, we are becoming more reliant on visual input and what we can do with those self-driving cars, face recognition, and even augmented reality applications and games. This is all powered by Computer Vision. This book will put you straight to work in creating powerful and unique computer vision applications. Each chapter is structured around a central project and deep dives into an important aspect of OpenCV

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such as facial recognition, image target tracking, making augmented reality applications, the 3D visualization framework, and machine learning. You'll learn how to make AI that can remember and use neural networks to help your applications learn. By the end of the book, you will have created various working prototypes with the projects in the book and will be well versed with the new features of OpenCV3. Style and approach This book takes a project-based approach and helps you learn about the new features by putting them to work by implementing them in your own projects.

**BOOK 1: THE PRACTICAL GUIDES ON DEEP LEARNING USING SCIKIT-LEARN, KERAS, AND TENSORFLOW WITH PYTHON GUI** In this book, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to implement deep learning on recognizing traffic signs using GTSRB dataset, detecting brain tumor using Brain Image MRI dataset, classifying gender, and recognizing facial expression using FER2013 dataset In Chapter 1, you will learn to create GUI applications to display line graph using PyQt. You will also learn how to display image and its histogram. In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, Pandas, NumPy and other libraries to perform prediction on handwritten digits using MNIST dataset with PyQt. You will build a GUI application for this purpose. In Chapter 3, you will

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learn how to perform recognizing traffic signs using GTSRB dataset from Kaggle. There are several different types of traffic signs like speed limits, no entry, traffic signals, turn left or right, children crossing, no passing of heavy vehicles, etc. Traffic signs classification is the process of identifying which class a traffic sign belongs to. In this Python project, you will build a deep neural network model that can classify traffic signs in image into different categories. With this model, you will be able to read and understand traffic signs which are a very important task for all autonomous vehicles. You will build a GUI application for this purpose. In Chapter 4, you will learn how to perform detecting brain tumor using Brain Image MRI dataset provided by Kaggle (<https://www.kaggle.com/navoneel/brain-mri-images-for-brain-tumor-detection>) using CNN model. You will build a GUI application for this purpose. In Chapter 5, you will learn how to perform classifying gender using dataset provided by Kaggle (<https://www.kaggle.com/cashutosh/gender-classification-dataset>) using MobileNetV2 and CNN models. You will build a GUI application for this purpose. In Chapter 6, you will learn how to perform recognizing facial expression using FER2013 dataset provided by Kaggle (<https://www.kaggle.com/nicolejyt/facialexpressionrecognition>) using CNN model. You will also build a GUI application for this purpose. BOOK 2: STEP BY STEP

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TUTORIALS ON DEEP LEARNING USING SCIKIT-LEARN, KERAS, AND TENSORFLOW WITH PYTHON GUI In this book, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to implement deep learning on classifying fruits, classifying cats/dogs, detecting furnitures, and classifying fashion. In Chapter 1, you will learn to create GUI applications to display line graph using PyQt. You will also learn how to display image and its histogram. Then, you will learn how to use OpenCV, NumPy, and other libraries to perform feature extraction with Python GUI (PyQt). The feature detection techniques used in this chapter are Harris Corner Detection, Shi-Tomasi Corner Detector, and Scale-Invariant Feature Transform (SIFT). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying fruits using Fruits 360 dataset provided by Kaggle (<https://www.kaggle.com/moltean/fruits/code>) using Transfer Learning and CNN models. You will build a GUI application for this purpose. In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying cats/dogs using dataset provided by Kaggle (<https://www.kaggle.com/chetankv/dogs-cats-images>) using Using CNN with Data Generator. You will build a GUI application for this purpose. In Chapter 4, you will learn how to use TensorFlow, Keras, Scikit-

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Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting furnitures using Furniture Detector dataset provided by Kaggle (<https://www.kaggle.com/akkithetechie/furniture-detector>) using VGG16 model. You will build a GUI application for this purpose. In Chapter 5, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying fashion using Fashion MNIST dataset provided by Kaggle (<https://www.kaggle.com/zalando-research/fashionmnist/code>) using CNN model. You will build a GUI application for this purpose. BOOK 3: PROJECT-BASED APPROACH ON DEEP LEARNING USING SCIKIT-LEARN, KERAS, AND TENSORFLOW WITH PYTHON GUI In this book, implement deep learning on detecting vehicle license plates, recognizing sign language, and detecting surface crack using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting vehicle license plates using Car License Plate Detection dataset provided by Kaggle (<https://www.kaggle.com/andrewmvd/car-plate-detection/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform sign language recognition using Sign Language Digits Dataset provided by Kaggle

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(<https://www.kaggle.com/ardamavi/sign-language-digits-dataset/download>). In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting surface crack using Surface Crack Detection provided by Kaggle

(<https://www.kaggle.com/arunrk7/surface-crack-detection/download>).

### BOOK 1: LEARN FROM SCRATCH MACHINE LEARNING WITH PYTHON GUI

In this book, you will learn how to use NumPy, Pandas, OpenCV, Scikit-Learn and other libraries to how to plot graph and to process digital image. Then, you will learn how to classify features using Perceptron, Adaline, Logistic Regression (LR), Support Vector Machine (SVM), Decision Tree (DT), Random Forest (RF), and K-Nearest Neighbor (KNN) models. You will also learn how to extract features using Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Kernel Principal Component Analysis (KPCA) algorithms and use them in machine learning. In Chapter 1, you will learn: Tutorial Steps To Create A Simple GUI Application, Tutorial Steps to Use Radio Button, Tutorial Steps to Group Radio Buttons, Tutorial Steps to Use CheckBox Widget, Tutorial Steps to Use Two CheckBox Groups, Tutorial Steps to Understand Signals and Slots, Tutorial Steps to Convert Data Types, Tutorial Steps to Use Spin Box Widget, Tutorial Steps to Use ScrollBar and Slider, Tutorial Steps to Use List Widget, Tutorial

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Steps to Select Multiple List Items in One List Widget and Display It in Another List Widget, Tutorial Steps to Insert Item into List Widget, Tutorial Steps to Use Operations on Widget List, Tutorial Steps to Use Combo Box, Tutorial Steps to Use Calendar Widget and Date Edit, and Tutorial Steps to Use Table Widget. In Chapter 2, you will learn: Tutorial Steps To Create A Simple Line Graph, Tutorial Steps To Create A Simple Line Graph in Python GUI, Tutorial Steps To Create A Simple Line Graph in Python GUI: Part 2, Tutorial Steps To Create Two or More Graphs in the Same Axis, Tutorial Steps To Create Two Axes in One Canvas, Tutorial Steps To Use Two Widgets, Tutorial Steps To Use Two Widgets, Each of Which Has Two Axes, Tutorial Steps To Use Axes With Certain Opacity Levels, Tutorial Steps To Choose Line Color From Combo Box, Tutorial Steps To Calculate Fast Fourier Transform, Tutorial Steps To Create GUI For FFT, Tutorial Steps To Create GUI For FFT With Some Other Input Signals, Tutorial Steps To Create GUI For Noisy Signal, Tutorial Steps To Create GUI For Noisy Signal Filtering, and Tutorial Steps To Create GUI For Wav Signal Filtering. In Chapter 3, you will learn: Tutorial Steps To Convert RGB Image Into Grayscale, Tutorial Steps To Convert RGB Image Into YUV Image, Tutorial Steps To Convert RGB Image Into HSV Image, Tutorial Steps To Filter Image, Tutorial Steps To Display Image Histogram, Tutorial Steps To Display Filtered Image Histogram, Tutorial

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Steps To Filter Image With CheckBoxes, Tutorial Steps To Implement Image Thresholding, and Tutorial Steps To Implement Adaptive Image Thresholding. You will also learn: Tutorial Steps To Generate And Display Noisy Image, Tutorial Steps To Implement Edge Detection On Image, Tutorial Steps To Implement Image Segmentation Using Multiple Thresholding and K-Means Algorithm, Tutorial Steps To Implement Image Denoising, Tutorial Steps To Detect Face, Eye, and Mouth Using Haar Cascades, Tutorial Steps To Detect Face Using Haar Cascades with PyQt, Tutorial Steps To Detect Eye, and Mouth Using Haar Cascades with PyQt, Tutorial Steps To Extract Detected Objects, Tutorial Steps To Detect Image Features Using Harris Corner Detection, Tutorial Steps To Detect Image Features Using Shi-Tomasi Corner Detection, Tutorial Steps To Detect Features Using Scale-Invariant Feature Transform (SIFT), and Tutorial Steps To Detect Features Using Features from Accelerated Segment Test (FAST). In Chapter 4, In this tutorial, you will learn how to use Pandas, NumPy and other libraries to perform simple classification using perceptron and Adaline (adaptive linear neuron). The dataset used is Iris dataset directly from the UCI Machine Learning Repository. You will learn: Tutorial Steps To Implement Perceptron, Tutorial Steps To Implement Perceptron with PyQt, Tutorial Steps To Implement Adaline (ADaptive LInear NEuron), and Tutorial Steps To Implement

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Adaline with PyQt. In Chapter 5, you will learn how to use the scikit-learn machine learning library, which provides a wide variety of machine learning algorithms via a user-friendly Python API and to perform classification using perceptron, Adaline (adaptive linear neuron), and other models. The dataset used is Iris dataset directly from the UCI Machine Learning Repository. You will learn: Tutorial Steps To Implement Perceptron Using Scikit-Learn, Tutorial Steps To Implement Perceptron Using Scikit-Learn with PyQt, Tutorial Steps To Implement Logistic Regression Model, Tutorial Steps To Implement Logistic Regression Model with PyQt, Tutorial Steps To Implement Logistic Regression Model Using Scikit-Learn with PyQt, Tutorial Steps To Implement Support Vector Machine (SVM) Using Scikit-Learn, Tutorial Steps To Implement Decision Tree (DT) Using Scikit-Learn, Tutorial Steps To Implement Random Forest (RF) Using Scikit-Learn, and Tutorial Steps To Implement K-Nearest Neighbor (KNN) Using Scikit-Learn. In Chapter 6, you will learn how to use Pandas, NumPy, Scikit-Learn, and other libraries to implement different approaches for reducing the dimensionality of a dataset using different feature selection techniques. You will learn about three fundamental techniques that will help us to summarize the information content of a dataset by transforming it onto a new feature subspace of lower dimensionality than the original one. Data compression is an important

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topic in machine learning, and it helps us to store and analyze the increasing amounts of data that are produced and collected in the modern age of technology. You will learn the following topics: Principal Component Analysis (PCA) for unsupervised data compression, Linear Discriminant Analysis (LDA) as a supervised dimensionality reduction technique for maximizing class separability, Nonlinear dimensionality reduction via Kernel Principal Component Analysis (KPCA). You will learn: Tutorial Steps To Implement Principal Component Analysis (PCA), Tutorial Steps To Implement Principal Component Analysis (PCA) Using Scikit-Learn, Tutorial Steps To Implement Principal Component Analysis (PCA) Using Scikit-Learn with PyQt, Tutorial Steps To Implement Linear Discriminant Analysis (LDA), Tutorial Steps To Implement Linear Discriminant Analysis (LDA) with Scikit-Learn, Tutorial Steps To Implement Linear Discriminant Analysis (LDA) Using Scikit-Learn with PyQt, Tutorial Steps To Implement Kernel Principal Component Analysis (KPCA) Using Scikit-Learn, and Tutorial Steps To Implement Kernel Principal Component Analysis (KPCA) Using Scikit-Learn with PyQt. In Chapter 7, you will learn how to use Keras, Scikit-Learn, Pandas, NumPy and other libraries to perform prediction on handwritten digits using MNIST dataset. You will learn: Tutorial Steps To Load MNIST Dataset, Tutorial Steps To Load MNIST Dataset with PyQt, Tutorial Steps

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To Implement Perceptron With PCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Perceptron With LDA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Perceptron With KPCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Logistic Regression (LR) Model With PCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Logistic Regression (LR) Model With LDA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Logistic Regression (LR) Model With KPCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement , Tutorial Steps To Implement Support Vector Machine (SVM) Model With LDA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Support Vector Machine (SVM) Model With KPCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Decision Tree (DT) Model With PCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Decision Tree (DT) Model With LDA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Decision Tree (DT) Model With KPCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Random Forest (RF) Model With PCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Random Forest (RF) Model With LDA Feature

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Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement Random Forest (RF) Model With KPCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement K-Nearest Neighbor (KNN) Model With PCA Feature Extractor on MNIST Dataset Using PyQt, Tutorial Steps To Implement K-Nearest Neighbor (KNN) Model With LDA Feature Extractor on MNIST Dataset Using PyQt, and Tutorial Steps To Implement K-Nearest Neighbor (KNN) Model With KPCA Feature Extractor on MNIST Dataset Using PyQt. BOOK 2: THE PRACTICAL GUIDES ON DEEP LEARNING USING SCIKIT-LEARN, KERAS, AND TENSORFLOW WITH PYTHON GUI In this book, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to implement deep learning on recognizing traffic signs using GTSRB dataset, detecting brain tumor using Brain Image MRI dataset, classifying gender, and recognizing facial expression using FER2013 dataset In Chapter 1, you will learn to create GUI applications to display line graph using PyQt. You will also learn how to display image and its histogram. In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, Pandas, NumPy and other libraries to perform prediction on handwritten digits using MNIST dataset with PyQt. You will build a GUI application for this purpose. In Chapter 3, you will learn how to perform recognizing traffic signs using GTSRB dataset from Kaggle. There are several

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different types of traffic signs like speed limits, no entry, traffic signals, turn left or right, children crossing, no passing of heavy vehicles, etc. Traffic signs classification is the process of identifying which class a traffic sign belongs to. In this Python project, you will build a deep neural network model that can classify traffic signs in image into different categories. With this model, you will be able to read and understand traffic signs which are a very important task for all autonomous vehicles. You will build a GUI application for this purpose. In Chapter 4, you will learn how to perform detecting brain tumor using Brain Image MRI dataset provided by Kaggle (<https://www.kaggle.com/navoneel/brain-mri-images-for-brain-tumor-detection>) using CNN model. You will build a GUI application for this purpose. In Chapter 5, you will learn how to perform classifying gender using dataset provided by Kaggle (<https://www.kaggle.com/cashutosh/gender-classification-dataset>) using MobileNetV2 and CNN models. You will build a GUI application for this purpose. In Chapter 6, you will learn how to perform recognizing facial expression using FER2013 dataset provided by Kaggle (<https://www.kaggle.com/nicolejyt/facialexpressionrecognition>) using CNN model. You will also build a GUI application for this purpose. BOOK 3: STEP BY STEP TUTORIALS ON DEEP LEARNING USING SCIKIT-LEARN, KERAS, AND

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TENSORFLOW WITH PYTHON GUI In this book, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to implement deep learning on classifying fruits, classifying cats/dogs, detecting furnitures, and classifying fashion. In Chapter 1, you will learn to create GUI applications to display line graph using PyQt. You will also learn how to display image and its histogram. Then, you will learn how to use OpenCV, NumPy, and other libraries to perform feature extraction with Python GUI (PyQt). The feature detection techniques used in this chapter are Harris Corner Detection, Shi-Tomasi Corner Detector, and Scale-Invariant Feature Transform (SIFT). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying fruits using Fruits 360 dataset provided by Kaggle (<https://www.kaggle.com/moltean/fruits/code>) using Transfer Learning and CNN models. You will build a GUI application for this purpose. In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying cats/dogs using dataset provided by Kaggle (<https://www.kaggle.com/chetankv/dogs-cats-images>) using Using CNN with Data Generator. You will build a GUI application for this purpose. In Chapter 4, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting

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furnitures using Furniture Detector dataset provided by Kaggle (<https://www.kaggle.com/akkithetechie/furniture-detector>) using VGG16 model. You will build a GUI application for this purpose. In Chapter 5, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform classifying fashion using Fashion MNIST dataset provided by Kaggle (<https://www.kaggle.com/zalando-research/fashionmnist/code>) using CNN model. You will build a GUI application for this purpose. BOOK 4: Project-Based Approach On DEEP LEARNING Using Scikit-Learn, Keras, And TensorFlow with Python GUI In this book, implement deep learning on detecting vehicle license plates, recognizing sign language, and detecting surface crack using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting vehicle license plates using Car License Plate Detection dataset provided by Kaggle (<https://www.kaggle.com/andrewmvd/car-plate-detection/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform sign language recognition using Sign Language Digits Dataset provided by Kaggle (<https://www.kaggle.com/ardamavi/sign-language-digits-dataset/download>). In

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Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting surface crack using Surface Crack Detection provided by Kaggle

(<https://www.kaggle.com/arunrk7/surface-crack-detection/download>). BOOK 5: Hands-On Guide To IMAGE CLASSIFICATION Using Scikit-Learn, Keras, And TensorFlow with PYTHON GUI In this book, implement deep learning-based image classification on detecting face mask, classifying weather, and recognizing flower using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform detecting face mask using Face Mask Detection Dataset provided by Kaggle

(<https://www.kaggle.com/omkargurav/face-mask-dataset/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to classify weather using Multi-class Weather Dataset provided by Kaggle

(<https://www.kaggle.com/pratik2901/multiclass-weather-dataset/download>). In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to recognize flower using Flowers Recognition dataset provided by Kaggle

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(<https://www.kaggle.com/alxmamaev/flowers-recognition/download>). BOOK 6: Step by Step Tutorial IMAGE CLASSIFICATION Using Scikit-Learn, Keras, And TensorFlow with PYTHON GUI In this book, implement deep learning-based image classification on classifying monkey species, recognizing rock, paper, and scissor, and classify airplane, car, and ship using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries. In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to classify monkey species using 10 Monkey Species dataset provided by Kaggle (<https://www.kaggle.com/slothkong/10-monkey-species/download>). In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to recognize rock, paper, and scissor using 10 Monkey Species dataset provided by Kaggle (<https://www.kaggle.com/sanikamal/rock-paper-scissors-dataset/download>). In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to classify airplane, car, and ship using Multiclass-image-dataset-airplane-car-ship dataset provided by Kaggle (<https://www.kaggle.com/abtabm/multiclassimagedatasetairplanecar>).

This book is for programmers who want to expand their skills by building fun, smart,

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and useful systems with OpenCV. The projects are ideal in helping you to think creatively about the uses of computer vision, natural user interfaces, and ubiquitous computers (in your home, car, and hand).

Each chapter in the book is an individual project and each project is constructed with step-by-step instructions, clearly explained code, and includes the necessary screenshots. You should have basic OpenCV and C/C++ programming experience before reading this book, as it is aimed at Computer Science graduates, researchers, and computer vision experts widening their expertise.

This book highlights recent advances and emerging technologies that utilize computational intelligence in signal processing, computing, imaging science, artificial intelligence, and their applications. It covers all branches of artificial intelligence and machine learning that are based on computation at some level, e.g. artificial neural networks, evolutionary algorithms, fuzzy systems, and automatic medical identification systems. Exploring recent trends in research and applications, the book offers a valuable resource for professors, researchers, and engineers alike.

Annotation Computer Vision is fast becoming an important technology and is used in Mars robots, national security systems, automated factories, driver-less cars, and medical image analysis to new forms of human-computer interaction. OpenCV is the most common library for computer vision, providing hundreds of complex and fast algorithms. But it has a steep learning curve and limited in-depth tutorials. Mastering

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OpenCV with Practical Computer Vision Projects is the perfect book for developers with just basic OpenCV skills who want to try practical computer vision projects, as well as the seasoned OpenCV experts who want to add more Computer Vision topics to their skill set or gain more experience with OpenCV's new C++ interface before migrating from the C API to the C++ API. Each chapter is a separate project including the necessary background knowledge, so try them all one-by-one or jump straight to the projects you're most interested in. Create working prototypes from this book including real-time mobile apps, Augmented Reality, 3D shape from video, or track faces & eyes, fluid wall using Kinect, number plate recognition and so on. Mastering OpenCV with Practical Computer Vision Projects gives you rapid training in nine computer vision areas with useful projects.

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