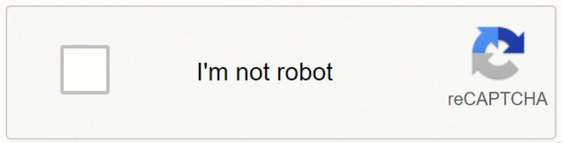

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Free matlab tutorial for beginners

MATLAB CRACK 2018 free download with key Reviewed by Irawen on 15:45 Rating: 5 You clicked a link that corresponds to this MATLAB command: Run the command by entering it in the MATLAB Command Window. Web browsers do not support MATLAB commands. Learning about MATLAB can be tedious. It’s capable of performing many tasks and solving highly complex problems of different domains. If you’ve been learning about MATLAB, you’d surely want to test your skills. The best way to do so is through working on MATLAB project ideas. That’s why in this article, we’ve brought you a detailed list of the same. We have MATLAB projects of multiple skill levels. Whether you’re a beginner or an expert, you’d find a brain-teasing project here. What is MATLAB? MATLAB is a programming platform for scientists and engineers. It uses the MATLAB language, combining matrix and array mathematics with design processes and iterative analysis. By using MATLAB, you can create algorithms, analyze data, build models, and apply them. MATLAB’s apps, built-in functions, and language allow you to use different methods to solve a particular problem. MATLAB finds applications in many areas, including control systems, communications, machine learning, computational biology, and deep learning. Join the ML Courses online from the World’s top Universities – Masters, Executive Post Graduate Programs, and Advanced Certificate Program in ML & AI to fast-track your career. MATLAB Project Ideas The following are some of the most exciting MATLAB projects so that you can test your skills. Let’s get started: 1. Build a Car Parking Indicator Parking a car can be tricky. It requires precision and a lot of practice. You can use MATLAB to make things easier for the driver, however, by building a car parking indicator. You can take inspiration from various parking indicator systems. An automated car parking indicator would alert the driver when the car is too close to an object. This way, the driver can avoid those objects and turn the vehicle accordingly. You can build a car parking indicator for private parking spaces or open spaces. Such a system can have many benefits: The driver would save time and park his/her car more efficiently. Parking spaces would also be used more efficiently. The chances of a vehicle getting damaged would decrease drastically. Your system can guide the driver to a nearby suitable parking space. You can take it a step further and add the functionality of suggesting a parking space only if it’s available. Maybe your system can determine if a car park has open slots or not, and it can indicate a parking space to the driver of the vehicle accordingly. The sensors can co-ordinate and help in guiding the driver to an open and nearby parking slot. Here’s more info on this car parking indicator project. 2. Use Artificial Neural Network for Image Encryption Privacy issues have become highly prevalent in recent years. This is one of the best MATLAB projects for you on this list if you take an interest in cybersecurity and cryptography. You can perform image encryption by taking the help of Artificial Neural Networks (ANNs in short). Image encryption can prevent unauthorized parties from viewing and accessing images. This way, your data can remain safe. In simple terms, image encryption hides its information. In image encryption, you convert the original plaintext into ciphertext (which can seem like a bunch of nonsense). You can save and transmit this ciphertext over your network, and at the receiver’s end, the ciphertext would convert into the original plaintext. Neural Networks are machines that behave similarly to how a human brain functions. You can encrypt images on the sender’s end through one ANN and use another ANN to decrypt the image on the receiver’s end. You can use MATLAB to build a complete image encryption system that uses Artificial Neural Networks. After completing this project, you’d be familiar with cryptography as well. 3. Design and Apply an Electronic Differential System An Electronic Differential System allows vehicles to balance them better while turning or running on curved paths. Automotive manufacturers use this system in place of the mechanical differential. This system provides every driving wheel with the required torque and enables multiple wheel speeds. In a curved path, the vehicle’s inner and outer wheels would have different rotation speeds as the inner wheels would require a smaller radius. An Electronic Differential System uses the motor speed signals and steering wheel command signal to determine the required power for every wheel, so they get the necessary torque. It’s an advanced technology that offers many advantages, which its mechanical counterpart fails in providing. For example, the electronic differential is lighter than mechanical differential in terms of weight. The wheel with the least traction wouldn’t limit the torque as it would with a mechanic differential. These systems respond faster and offer many functionalities unavailable in the other one, such as traction control. You can use MATLAB to design and implement an electronic differential system. You’ll need to create an embedded system design as well for better application. Also try: 13 Exciting IoT Project Ideas & Topics For Beginners 4. Build a MATLAB Based Inspection System with Image Processing In this project, you’ll build a MATLAB-based inspection system. Machine vision is becoming an accessible technology in the manufacturing industry because of its versatility. And one of the most significant areas where machine vision can find use is in the inspection stage of product development. Quality inspection is necessary to make sure the product doesn’t have any defects. You can use MATLAB to create an automated inspection system, and you’ll have to employ image processing. With machine vision image processing, you can perform multiple tasks at once: Counting the number of dark and light pixels Discovering blobs of joined pixels in an image Segmenting a part of an image or change the representation Recognizing patterns in an image by matching templates Reading barcode and 2D code. You can perform many other tasks with machine vision. Your automated inspection system would have to determine whether to accept the final product or reject it. It will make the manufacturing process far more efficient and effective. Read : 5 Ways Intelligent Automation Helps Your Business Grow 5. Perform Image Encryption and Verification with Chaotic Maps The project is a little different from the one we’ve discussed previously. In this project, you’ll use chaotic maps to encrypt images on the block and steam levels. There is n number of chaotic maps present that generate keys for encryption, so there would be n number of equations involved. Every equation can have n number of constants. All of these constants would have specific values (random numbers). You can use a neural network to produce a particular series of numbers for image encryption. For image authentication, you’d have to create a simple algorithm to ensure that the sender and receivers are the right people. Chaos maps would make the encryption secure through substituting the image with the cover image and encrypting the former n times. Such secure encryption would ensure that your end product remains free from brute force attacks and differential attacks. Also try: Python Project Ideas and Topics 6. Measure an Object’s Diameter in an Image by using MATLAB Computer vision is a prominent field of study. It finds applications in many areas due to its unique utility. You can use MATLAB to measure an object’s diameter in an image. This application can find uses in many areas where you can’t find the diameter of an object physically. For example, suppose you need to measure the size of a building. In this case, the physical measurement would be nearly impossible, so you’ll need to use computer vision. Your MATLAB script should first import the image, separate the required object from the background, and in the end, use MATLAB functions to find the object’s diameter. While this project might seem quite simple, it will help you showcase your image processing skills while also highlighting your knowledge of multiple MATLAB functions. 7. Use MATLAB to Automate Certificate Generation This project is also among the beginner-level MATLAB project ideas. In this project, you’ll create an automated certificate generator by using MATLAB. Many institutions certify companies according to their performance and achievements. Educational institutions also generate report cards and certificates for their students. You can create an automated certificate generator, which will make this process efficient and straightforward. This project idea might seem too simple, but you can make it complicated by adding the functionality of generating detailed reports for large datasets. 8. Create Light Animations with MATLAB and Arduino This is one of the beginner level MATLAB projects on our list. In this project, you’ll use MATLAB and Arduino to create a graphical user interface to control the lighting patterns of multiple lights. By controlling their lighting pattern, you can create various light animations. Using a GUI will allow you to perform many other tasks while running the animation. We recommend using Arduino Uno for this project. It’d be the hardware of this project, and the software would be the Arduino IDE. You can connect the Arduino Uno board with the required lights. After you’ve connected Arduino Uno with MATLAB, you’ll be able to create simple light animations with the same. It’s an easy project, but it’ll surely help you explore real-life MATLAB applications and help you realize its versatility. After you’ve made simple light animations, you can take this project a step further and add more lights to create more complex animations. 9. Log Sensor Data in MS Excel This project requires you to use Arduino Uno with MATLAB to log sensor data in MS Excel. You can add LM35 (a temperature sensor) to your Arduino interface, which would connect to MATLAB through ArduinoIO. Once you’ve connected Arduino with MATLAB, you’ll need to create a program that transmits the sensor’s data into an Excel sheet. You’ll need to have MS Excel installed on your PC to complete this project. Once you’ve finished this project, you’d have a graphic user interface that allows you to see the logs of the sensor data. To take it a step further, you can add more sensors and log their data into the same excel file (or in multiple different files). This project will give you plenty of experience in using GUI with MATLAB. 10. Simulate an Artificial Neural Network Artificial Neural Networks are machines that imitate the functioning of a human brain. Their purpose is to mimic the behavior of a mind and act accordingly. In this project, you can simulate an ANN by creating models and training them. Before you work on this project, you should be familiar with the basic concepts of artificial intelligence and machine learning. You’ll first need to create a data model that takes particular input and generates a particular output. First, you’ll need to train the model by giving it a list of inputs and outputs. Once you’ve prepared the model, you’d give the model a data list with no outputs. After completing this project, you’d be familiar with artificial intelligence, machine learning, and relevant technologies. 11. Analyze and Design an Antenna While everything is becoming wireless, their connectivity relies largely on antennas. An antenna’s design can have a significant impact on its connection, power consumption, and data retention capabilities. The design should make the antenna compact while allowing it to have a substantial beam width to perform information transmission without any loss. It’s an excellent project for anyone interested in electronics and communications. You should be familiar with the workings of antennas before you work on this project, however. For example, you should know about the ideal antenna pattern and how a real antenna works. You should also be familiar with the Yagi-Uda antenna, which is the most common TV antenna you see on rooftops. You can estimate (approximately) the operating frequency of such an antenna by viewing its length. You can build a MATLAB program that can perform such estimation with high accuracy and give you the required results. 12. Build a Circuit Design Calculator To build a circuit, you must calculate the component values by using the circuit theory and its formulae. Circuit theory is among the oldest and essential branches of electrical engineering. And its calculations take a lot of time and effort. You can create a MATLAB program that can perform those calculations and help an engineer design a better circuit. Not only will such a system save the user a lot of time, but it will also enhance the accuracy of circuit analysis by minimizing human error. Your program can analyze and figure out circuit design with inductors, transistors, diodes, capacitors, and other critical components. The program can design highly complex circuits and solve problems accordingly. 13. Compress Images without Loss Modern cameras have become capable of taking highly detailed images. But an increase in an image’s level of detail also leads to a rise in its size. That’s why image compression technologies have become prevalent. You can use MATLAB to perform image compression as well. In this project, you would aim to compress an image without compromising its quality. In other words, you’ll have to perform lossless image compression. To do so, you can use the discrete cosine transform algorithm. To find out how much loss took place while compressing the image, you can derive the mean-square error (also known as MSE) of your process. To implement these algorithms in MATLAB, you’ll have to use the required functions. 14. Perform Real-Time Face Detection with MATLAB Face detection can find applications in many areas. You can use face detection capabilities for image enhancement, security, as well as surveillance. While it’s quite natural for us humans to detect faces, we can’t say the same about computers. A simple change in lighting can cause various intra-class variations, that’s why it’s a complicated issue for machines. You can build a MATLAB-based face detection system, and you can use the Viola-Jones algorithm. There are many other facial recognition algorithms, but we have chosen the viola-jones algorithm for this project. It first creates a detector object, then takes the primary image, finds the necessary features, and annotates them. This project will give you experience working with facial recognition technology, which has gained popularity in many fields. Know more: TensorFlow Object Detection Tutorial For Beginners 15. Build Laser Guidance for a Vehicle In this project, you’d develop a program that can use lasers to inform the vehicle of upcoming road conditions. This technology can be really helpful for harsh terrains (such as snowy roads, dirt roads, etc.). You’d need to develop an algorithm in MATLAB that converts the scan sequences into readable data so the user can see what kind of terrain is up ahead. This way, the driver can prepare him or herself accordingly and drive safely. An autonomous vehicle can use this technology, as well. This project will help you get familiar with the application of MATLAB in automotive engineering. It’ll also help you understand how autonomous vehicles work. You can learn more about this project here. Also Read: Machine Learning Project Ideas Learn More About MATLAB We hope you liked our list of MATLAB project ideas. We’ve kept it as accessible as possible. You can bookmark it for future reference. This list would’ve also shown how versatile and powerful this technology is. From electronics to AI, you can use it in various industries for multiple applications. If you’re interested to learn more about MATLAB, machine learning, and its relevant topics, check out IIIT-B & upGrad’s Executive PG Programme in Machine Learning & AI which is designed for working professionals and offers 450+ hours of rigorous training, 30+ case studies & assignments, IIIT-B Alumni status, 5+ practical hands-on capstone projects & job assistance with top firms. You’ll find plenty of valuable resources to answer your questions. MathWorks developed MATLAB, a multi-paradigm computer program and numeric computing environment. Matrix operations, function and data visualization, algorithm implementation, user interface building, and interfacing with programs written in other languages are all possible with MATLAB. Although MATLAB is primarily designed for numerical computations, an optional toolbox employs the MuPAD symbolic engine to provide symbolic computing capabilities. Simulink, a separate software, brings graphical inter simulation & model-based design for embedded systems to the mix. MATLAB is a computer language that engineers and scientists use to study and build systems and products that change the world. The MATLAB language, a matrix-based language that allows the most natural expression of mathematics and computer science, is at the heart of MATLAB. In industry and academia, MATLAB is used by millions of engineers and scientists for a variety of applications, including machine learning and artificial intelligence, remote sensing and communication systems, computer vision, control mechanisms, instrumentation, computational finance, and biomedical engineering. A symbol called an operator instructs the compiler to do different numerical or logical operations. MATLAB is primarily designed to work with complete matrices and arrays. As a result, MATLAB functions may work with both scalar as well as non-scalar data. To cope with variables, functions, and mathematical operations, MATLAB has a variety of operators, symbols, as well as special characters. Simple mathematical calculations like add, subtract, multiply, division, and power are made easier by arithmetic operators. Value comparison procedures are performed via relational operators. Logical operators carry out logical functions and give an output as true or false in the Boolean state using the digits 1 and 0.

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