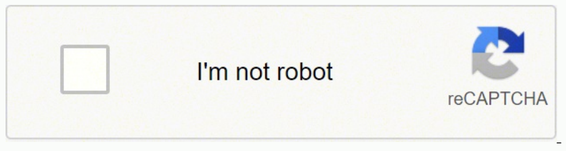

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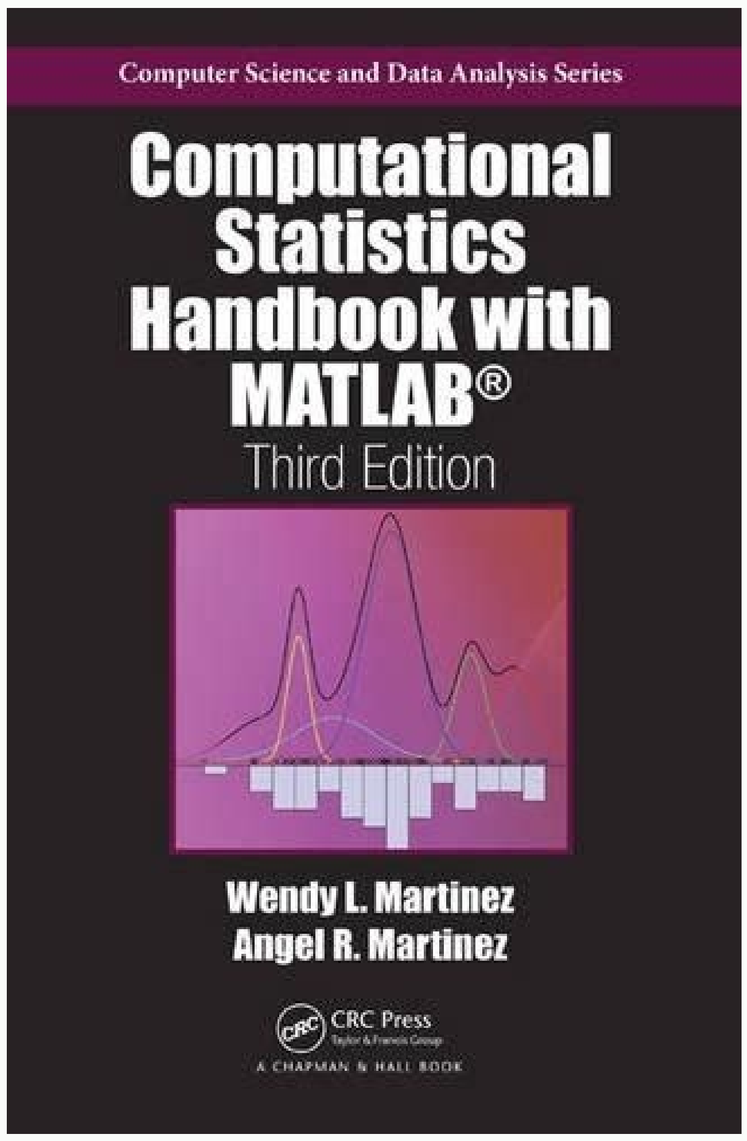
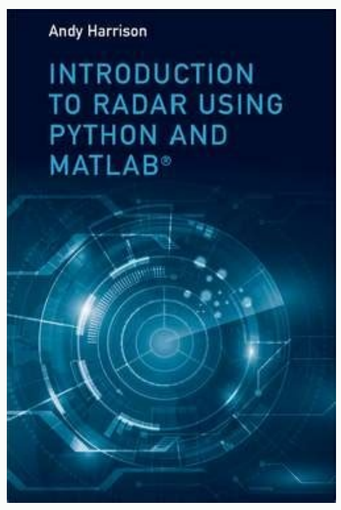
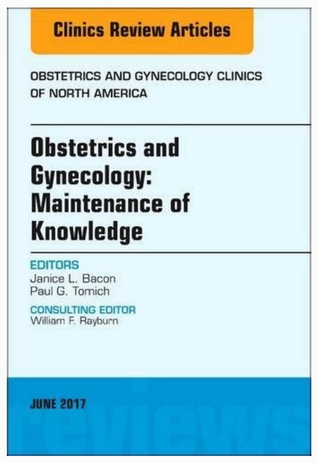
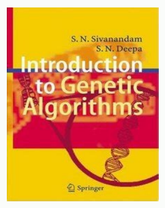
Genetic algorithm implementation using matlab pdf file format using python








```
fh = open('arabicEng.actual.ti.final')
numbers = []
above_threshold_pair = {}
for line in fh:
    l = line.rstrip()
    data_list = l.split()
    threshold = 0.5
    try:
        if float(data_list[2]) > threshold:
            above_threshold_pair[data_list[1]] = float(data_list[2])
    except:
        continue
print above_threshold_pair
```



For such reason, it is preferred to keep the previous best solutions (parents) in the new population. function_inputs = [4,-2,3.5,5,-11,-4.7] desired_output = 44 A very important step is to implement the fitness function that will be used for calculating the fitness value for each solution. That means that the random changes moved towards a better solution. ga_instance = pygad.GA(num_generations=num_generations, num_parents_mating=num_parents_mating, fitness_func=fitness_function, sol_per_pop=sol_per_pop, num_genes=num_genes, init_range_low=init_range_low, init_range_high=init_range_high, parent_selection_type=parent_selection_type, keep_parents=keep_parents, crossover_type=crossover_type, mutation_type=mutation_type, mutation_percent_genes=mutation_percent_genes) After creating the instance, the run() method is called to start the optimization. There are different types of mutation such as bit flip, swap, inverse, uniform, non-uniform, Gaussian, shrink, and others. Currently, PyGAD supports building and training (using genetic algorithm) artificial neural networks for classification problems. This function accepts the parents and the offspring size. It returns the parents selected. The first with indices 0 and 1 are selected at first to produce two offspring. It uses the offspring size to know the number of offspring to produce from such parents. If we are in need of more offspring, then we select the next two parents with indices 2 and 3. If you used PyGAD, please consider citing its paper with the following details: @misc{gad2021pygad, title={PyGAD: An Intuitive Genetic Algorithm Python Library}, author={Ahmed Fawzy Gad}, year={2021}, eprint={2106.06158}, archivePrefix={arXiv}, primaryClass={cs.NE} } Indices and tables¶ This tutorial will implement the genetic algorithm optimization technique in Python based on a simple example in which we are trying to maximize the output of an equation. Using PyGAD, a wide range of problems can be optimized. The cnn module builds convolutional neural networks. Genetic algorithm flowchartFor example, there are different types of representations for genes such as binary, decimal, integer, and others. According to the number of solutions per population, there will be a number of SOPs. As we previously set the number of solutions to 8 in the variable named sol_per_pop, there will be 8 SOPs as shown below:Note that the higher the fitness value the better the solution.After calculating the fitness values for all solutions, next is to select the best of them as parents in the mating pool according to the next function ga.select_mating_pool. Such function accepts the crossover offspring and returns them after applying uniform mutation. The library is under active development and more features added regularly. That is 8 chromosomes and each one has 6 genes, one for each weight. Each type is treated differently. The nn module builds artificial neural networks. Here is one. Let us start implementing GA.At first, let us create a list of the 6 inputs and a variable to hold the number of weights as follows:The next step is to define the initial population. The gann module optimizes neural networks (for classification and regression) using the genetic algorithm. There is a module named GA that holds the implementation of the algorithm.The first step is to find the fitness value of each solution within the population using the ga.cal_pop_fitness function. The mating starts with the crossover operation according to the ga.crossover function. The new population will have its first 4 solutions from the previous parents. PyGAD is an open-source Python library for building the genetic algorithm and optimizing machine learning algorithms. It will be listed in the tutorial too.Here is the implementation of the example:The GA module is as follows:LinkedIn: ahmed.f.gad@gmail.com The documentation discusses each of these modules. Each step involved in the GA has some variations.Figure 1. Such function accepts the population, the fitness values, and the number of parents needed. But we could leave it generic so that it can be changed in the code. But the idea we are looking to implement is how to make GA do that its own in order to know that it is better to use positive weight with positive inputs and negative weights with negative inputs. By index 3, we reached the last parent. For example, multiple types of mutation and crossover are implemented in addition to the ability to customize the fitness function to work on any type of problem. The indices of these parents are selected according to these two lines:The parents are selected in a way similar to a ring. PyGAD has the following modules: The main module has the same name as the library which is pygad that builds the genetic algorithm. The point is selected to divide the solution into two equal halves according to this line:Then we need to select the two parents to crossover. The offspring after applying mutation are as follows:Such results are added to the variable offspring_crossover and got returned by the function.At this point, we successfully produced 4 offspring from the 4 selected parents and we are ready to create the new population of the next generation.Note that GA is a random-based optimization technique. It tries to enhance the current solutions by applying some random changes to them. fitness_function = fitness_func num_generations = 50 num_parents_mating = 4 sol_per_pop = 8 num_genes = len(function_inputs) init_range_low = -2 init_range_high = 5 parent_selection_type = "sss" keep_parents = 1 crossover_type = "single_point" mutation_type = "random" mutation_percent_genes = 10 After the parameters are prepared, an instance of the pygad.GA class is created. That function is implemented as follows:It loops through each offspring and adds a uniformly generated random number in the range from -1 to 1 according to this line:Such random number is then added to the gene with index 4 of the offspring according to this line:Note that the index could be changed to any other index. Based on the project, a library named PyGAD is deployed to PyPI where you can install using pip: original code of this tutorial is available under the Tutorial Project directory which is available at this link: 20ProjectGenetic Algorithm Implementation in Python — By Ahmed F. This is GREAT. The fitness value is calculated as the sum of product (SOP) between each input and its corresponding gene (weight) according to our function. We are looking to find the parameters (weights) that maximize such equation. Install PyGAD with the following command: PyGAD is developed in Python 3.7.3 and depends on NumPy for creating and manipulating arrays and Matplotlib for creating figures. This tutorial will not implement all of them but just implements one type of each step involved in GA. The kerasga module to train Keras models using the genetic algorithm. The implementation of such function inside the GA module is as follows:The fitness function accepts both the equation inputs values (x1 to x6) in addition to the population. Also, crossover has different types such as blend, one point, two points, uniform, and others. The next code applies these steps:The current number of generations is 5. After running this code, the population is as follows:Note that it is generated randomly and thus it will definitely change when get run again.After preparing the population, next is to follow the flowchart in figure 1. The equation is shown below:Y = w1x1 + w2x2 + w3x3 + w4x4 + w5x5 + w6x6The equation has 6 inputs (x1 to x6) and 6 weights (w1 to w6) as shown and inputs values are (x1,x2,x3,x4,x5,x6)=(4,-2,7,5,11,1). It is selected to be small for presenting results of all generations within the tutorial. Based on the fitness function, we are going to select the best individuals within the current population as parents for mating. Below are the results of each step for another 4 generations:After the above 5 generations, the best result now has a fitness value equal to 44.8169235189 compared to the best result after the first generation which is 18.24112489.The best solution has the following weights:Complete Python ImplementationThe complete code is available in my GitHub account here: 20Project. After the run() method completes, information about the best solution found by PyGAD can be accessed. According to the selected parameters, it will be of shape (8, 6). solution, solution_fitness, solution_idx = ga_instance.best_solution() print("Parameters of the best solution : {solution}".format(solution=solution)) print("Fitness value of the best solution = {solution_fitness}".format(solution_fitness=solution_fitness)) prediction = numpy.sum(numpy.array(function_inputs)*solution) print("Predicted output based on the best solution : {prediction}".format(prediction=prediction)) Parameters of the best solution : [3.92692328 -0.11554946 2.39873381 3.29579039 -0.74091476 1.05468517] Fitness value of the best solution = 157.37320042925006 Predicted output based on the best solution : 44.00635432206546 There is more to do using PyGAD. PyGAD allows different types of problems to be optimized using the genetic algorithm by customizing the fitness function. Please contact us if you want a feature to be supported. The last 4 solutions come from the offspring created after applying crossover and mutation:By calculating the fitness of all solutions (parents and offspring) of the first generation, their fitness is as follows:The highest fitness previously was 18.24112489 but now it is 31.7328971158. def fitness_func(solution, solution_idx): output = numpy.sum(solution*function_inputs) fitness = 1.0 / numpy.abs(output - desired_output) return fitness Next is to prepare the parameters of PyGAD. If there still remaining offspring to produce, then we select the parent 1 with parent 2 to produce another two offspring. But such results could be enhanced by going through more generations. Logo designed byAsmaa Kabil Besides building the genetic algorithm, it builds and optimizes machine learning algorithms. The library lives a PyPI at this page . The torchga module to train PyTorch models using the genetic algorithm. Next, we create a variable that holds the number of solutions per population, another to hold the size of the population, and finally, a variable that holds the actual initial population:After importing the numpy library, we are able to create the initial population randomly using the numpy.random.uniform function. Because such changes are random, we are not sure that they will produce better solutions. But the question is how many solutions per the population? A quick and simple problem to be optimized using the PyGAD is finding the best set of weights that satisfy the following function: y = f(w1:w6) = w1x1 + w2x2 + w3x3 + w4x4 + w5x5 + 6wx6 where (x1,x2,x3,x4,x5,x6)=(4,-2,3.5,5,-11,-4.7) and y=44 The first step is to prepare the inputs and the outputs of this equation. In the worst case when all the new offspring are worse than such parents, we will continue using such parents. Read its documentation to explore the features of PyGAD. To install PyGAD, simply use pip to download and install the library from PyPI (Python Package Index). There is no fixed value for that and we can select the value that fits well with our problem. Based on the number of weights, each chromosome (solution or individual) in the population will definitely have 6 genes, one gene for each weight. Next is to apply the GA variants (crossover and mutation) to produce the offspring of the next generation, creating the new population by appending both parents and offspring, and repeating such steps for a number of iterations/generations. It works with Keras and PyTorch. The tutorial uses the decimal representation for genes, one point crossover, and uniform mutation. The parents array is returned finally which will be as follows according to our example:Note that these three parents are the best individuals within the current population based on their fitness values which are 18.24112489, 17.0688537, 15.99527402, and 14.40299221, respectively.Next step is to use such selected parents for mating in order to generate the offspring. Its implementation inside the GA module is as follows:Based on the number of parents required as defined in the variable num_parents_mating, the function creates an empty array to hold them as in this line:Looping through the current population, the function gets the index of the highest fitness value because it is the best solution to be selected according to this line:This index is used to retrieve the solution that corresponds to such fitness value using this line:To avoid selecting such solution again, its fitness value is set to a very small value that is likely to not be selected again which is -99999999999. PyGAD supports different types of crossover, mutation, and parent selection operators. GadGenetic Algorithm OverviewFlowchart of the genetic algorithm (GA) is shown in figure 1. The idea of maximizing such equation seems simple. The positive input is to be multiplied by the largest possible positive number and the negative number is to be multiplied by the smallest possible negative number. If not, please read this article titled “Introduction to Optimization with Genetic Algorithm” found in these links:LinkedIn: ExampleThe tutorial starts by presenting the equation that we are going to implement. The Reader should have an understanding of how GA works. If we need to produce more offspring, then we select parent with index 3 and go back to the parent with index 0, and so on.The solutions after applying the crossover operation to the parents are stored into the offspring variable and they are as follows:Next is to apply the second GA variant, mutation, to the results of the crossover stored in the offspring variable using the ga.mutation function inside the GA module. Such a function is implemented as follows inside the GA module:The function starts by creating an empty array based on the offspring size as in this line:Because we are using single point crossover, we need to specify the point at which crossover takes place. The gacnn module optimizes convolutional neural networks using the genetic algorithm. As a result, we guarantee that the new generation will at least preserve the previous good results and will not go worse. The exact NumPy version used in developing PyGAD is 1.16.4. For Matplotlib, the version is 3.1.0. To get started with PyGAD, simply import it.

Here is an example for a set of parameters. The tutorial uses the decimal representation for genes, one point crossover, and uniform mutation.5 May 2020 NoteThe GitHub project of this tutorial is updated where major changes to the project are made to support multiple features: br>
Packages Community packages. These packages are maintained by a community of Octave Forge and Octave developers in a spirit of collaboration. The main repository for development is located at SourceForge.Community packages are coordinated between each other and with Octave regarding compatibility, naming of functions, and location of individual functions or ... 28/11/2018 · Accessing the Dataset. We will be using Dimitrios Kotzias's Sentiment Labelled Sentences Data Set, which you can download and extract from here here.Alternatively, you can get the dataset from Kaggle.com here. The dataset consists of 3000 samples of customer reviews from yelp.com, imdb.com, and amazon.com. Half of them are positive reviews, while the other ... We can write, proofread, paraphrase, format, edit or rewrite your any paper, whether it’s a review or a term paper. High Quality. All the papers we deliver to clients are based on credible sources and are quality-approved by our editors. Fast Turnaround. 7/8/2015 · A file format for exchanging computational models in systems biology. ... JGAP is a Genetic Algorithms and Genetic Programming package written in Java. ... Two versions of the algorithms are included, a CPU- and a GPU- (using CUDA) based implementation. 4 Reviews Downloads: 29 This Week Last Update: 2018-05-21. 6/5/2022 · From Ray to Chronos: Build end-to-end AI use cases using BigDL on top of Ray Article N 26 Apr 2022 by Wesley Du, Junwei Deng, Kai_Huang, Shan_Yu, Shane Huang In this blog, we will introduce some of the core components in BigDL and showcase how BigDL takes advantage of Ray and its native libraries to build out the underlying infrastructure (such as RayOnSpark, ... 5/7/2021 · In a classroom, there are six students. Take input of their role is. Sort their ids using a merge sort algorithm. column wise and row wise sorted matrix; genetic algorithm example Julia; opslist = {operator.add: “+”, operator.sub: “-”, operator.mul: “x”} how to calculate the time complexity of a recursive function; leetcoe 88 Web Scraping Using Python What is Web Scraping? Web Scraping is a technique to extract a large amount of data from several websites. The term "scraping" refers to obtaining the information from another source (webpages) and saving it into a local file. For example: Suppose you are working on a project called "Phone comparing website," where you require the price of mobile ...

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