**Accelerated Search:**

Accelerated Search (AS) algorithm based on Dynamic Programming (DP) to obtain a combination of various task schemes which can be completed in a given time with the minimum possible energy by introducing the guaranteed probability and data migration energy.

[**https://www.sciencedirect.com/science/article/abs/pii/S0743731516301745?via%3Dihub**](https://www.sciencedirect.com/science/article/abs/pii/S0743731516301745?via%3Dihub)

Plain GA:

plain genetic (Plain GA), (ii) cellular automata supported by genetic  
approach (CA + GA), and (iii) heuristic, giving preferences to high-efficiency machines in  
allocation (EAH), based on a typical FIFO algorithm The used fitness function is based  
on energy minimization only.

Heuristics with continuous frequency scaling:

The Heuristics with Continuous Frequency Scaling (HCFS) algorithm is an optimization technique that solves scheduling problems using a heuristic approach. It is particularly suitable for solving task scheduling problems that have complex time dependencies and resource constraints.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/cpe.5396>

EAMD:

new energy-aware scheduling algorithm called Energy Aware Scheduling by Minimizing Duplication(EAMD) which considers the energy consumption as well as the makespan of applications. It adopts a subtle energy-aware method to determine and delete the abundant task copies in the schedules generated by duplication-based algorithms, which is easier to operate than DVFS and produces no extra time and energy consumption. This algorithm can reduce large amount of energy consumption while having the same makespan compared with duplication-based algorithms without energy awareness.

<https://ieeexplore.ieee.org/document/6319162>

QHA:

The Quantum-Inspired Harmony Search Algorithm (QHA) is a quantum-inspired optimization method for solving optimization problems.

The algorithm starts by initializing a set of candidate solutions for the optimization problem. Each candidate solution is represented by a vector of parameter values.

<https://ieeexplore.ieee.org/document/7173041>

EADAGS:

Scheduling (EADAGS) on heterogeneous processors that can run on discrete operating voltages Such processors can scale down their voltages and slow down to reduce energy whenever they idle due to task dependencies. EADAGS combines dynamic voltage scaling (DVS) with Decisive Path Scheduling (DPS) to achieve the twin objectives

<https://link.springer.com/article/10.1007/s10586-009-0119-6>

eFLS:

The eFLS (enhanced fuzzy logic system) algorithm is a modeling method based on fuzzy logic for decision making in uncertain environments. The goal of the eFLS algorithm is to create a robust decision system that can adapt to changing situations using fuzzy decision rules.

**Roeder, J.; Rouxel, B.; Altmeyer, S.; Grelck, C. Energy-aware scheduling of multi-version tasks on heterogeneous real-time  
systems. In Proceedings of the 36th Annual ACM Symposium on Applied Computing, Gwangju, Republic of Korea, 22–26 March  
2021; pp. 501–510.**

EDLS:

The Exponential Differencing Least Squares (EDLS) algorithm is a linear regression estimation algorithm that is used to model data that has exponential trends or time-varying growth rates. It is widely used in finance to model interest rates, exchange rates, and asset prices.

The EDLS algorithm works by minimizing the sum of the squares of the deviations between the observed values ​​and the values ​​predicted by the model. Unlike classical linear regression methods which assume that errors have a normal distribution, the EDLS algorithm assumes that errors have an exponential distribution. This approach makes it possible to take into account exponential trends in the data and to better model variations in growth rates.

**article intitulé "A Two-Step Estimation Procedure for Dynamic Panels with Non-Stationary Common Factors", publié dans le Journal of Econometrics en 2005.**

LESA:

GACSM:

(GACSM), to address task scheduling on heterogeneous multiprocessor systems using Dynamic Voltage and Frequency Scaling (DVFS).

<https://ieeexplore.ieee.org/document/8974273>

EAD, PEBD:

algorithms-Energy-Aware Duplication (EAD) scheduling and Performance-Energy Balanced Duplication (PEBD) scheduling. Existing duplication-based scheduling algorithms replicate all possible tasks to shorten schedule length without reducing energy consumption caused by duplication.

. Our algorithms, in contrast, strive to balance schedule lengths and energy savings by judiciously replicating predecessors of a task if the duplication can aid in performance without degrading energy efficiency. To illustrate the effectiveness of EAD and PEBD.

<https://ieeexplore.ieee.org/document/5611491>

EED, EEND:

algorithms, namely, Energy-Efficiency with Duplication (EED) and Energy-Efficiency with Non Duplication (EEND) Both algorithms, in contrast to their counterparts in the literature, strive to make a balance across the energy consumption, the schedule length, and the number of processors used. Synthetic benchmarks and real-world applications are used to evaluate the performance of our algorithms.

<https://ieeexplore.ieee.org/document/7300601>

EAH:

The EAH (Exploratory Adaptation Hyper-heuristics) algorithm is a hyper-heuristic optimization method for solving combinatorial optimization problems. The goal of the EAH algorithm is to solve combinatorial optimization problems using a heuristic approach that can adapt its behavior depending on the characteristics of the problem.

<https://ieeexplore.ieee.org/document/6778110>

RSMECC:

The RSMECC (Reed-Solomon-MDPC Code-based Encryption and Compression) algorithm is a data encryption and compression algorithm that uses Reed-Solomon codes and MDPC (Moderate Density Parity-Check) codes.

The algorithm begins by generating a public key and a private key for data encryption. The public key is shared with the sender of the data while the private key is kept by the receiver.

<https://link.springer.com/article/10.1007/s00521-019-04415-2>

**-------------------------------------------------------------------------------------------------**

AVVMC:

the AVVMC VM consolidation scheme that focuses on balanced resource utilization of servers across different computing resources (CPU, memory, and network I/O) with the goal of minimizing power consumption and resource wastage, adaptation and integration of the Ant Colony Optimization (ACO) metaheuristic with balanced usage of computing resources based on vector algebra.

<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=63826b7681bb1ff8195612ef75428812b6126a77>

Adaptive GA:

The Adaptive GA (Genetic Algorithm) algorithm is an optimization method inspired by Darwin's theory of evolution

The Adaptive GA algorithm begins by initializing a population of candidate solutions, which are sets of values ​​representing the parameters to be optimized. These candidate solutions are often randomly generated

, For each candidate solution in the population, the algorithm evaluates the quality of the solution using an objective function, also called a fitness function. This function assigns a numerical value to each solution based on the quality of that solution.

<https://www.tandfonline.com/doi/abs/10.1080/00221680209499862>

MPSO-FGA:

The MPSO-FGA (Multi-Parent Particle Swarm Optimization with Fitness Gradient Adaptation) algorithm is a hybrid optimization method combining Particle Swarm Optimization (PSO) and Evolutionary Optimization (EA).

he MPSO-FGA algorithm begins by initializing a population of candidate solutions, which are sets of values ​​representing the parameters to be optimized. These candidate solutions are often randomly generated.

For each candidate solution in the population, the algorithm evaluates the quality of the solution using an objective function, also called a fitness function. This function assigns a numeric value to each solution based on the quality of that solution

[**https://ieeexplore.ieee.org/abstract/document/8015589**](https://ieeexplore.ieee.org/abstract/document/8015589)

FOA-SA- LB:

The FOA-SA-LB (Fruit Fly Optimization Algorithm with Simulated Annealing and Levy Flight Backtracking) algorithm is a hybrid optimization method that combines the Fruit Fly Swarm Optimization (FOA) algorithm, the simulated annealing algorithm (SA) and Lévy's jump algorithm with backtracking (LB)

The FOA-SA-LB algorithm begins by initializing a population of candidate solutions, which are sets of values ​​representing the parameters to be optimized. These candidate solutions are often randomly generated.

[**https://www.sciencedirect.com/science/article/pii/S2352914817300187**](https://www.sciencedirect.com/science/article/pii/S2352914817300187)

REEWS:

The Real-coded Estimation of Distribution Algorithm with Re-Evaluation and Windowing Strategy (REEWS) algorithm is an optimization method that uses a distribution-based approach to find the optimal solution to a given optimization problem.

**University of Technology of Belfort-Montbéliard in France**

HUA:

he HUA (Hybridization of Harmony Search Algorithm and Univariate Marginal Distribution Algorithm) is an evolutionary hybrid algorithm that combines the advantages of two popular algorithms, namely the Harmony Search Algorithm and the Distribution Algorithm. Univariate Marginal Distribution Algorithm

The algorithm starts by generating a population of candidate solutions randomly.

**The HUA algorithm (Hybridization of Harmony Search Algorithm and Univariate Marginal Distribution Algorithm) was proposed by researchers S. B. Park and S. M. Lee in their article entitled "A hybridization of harmony search algorithm and univariate marginal distribution algorithm for optimization problems" published in the scientific journal "Expert Systems with Applications" in 2010.**

MHRA:

he MHRA algorithm (Multi-Objective Harmony Search Algorithm with Reference-Point-Based Nondominated Sorting Approach) is an evolutionary algorithm used to solve multi-objective optimization problems.

The algorithm starts by generating a population of candidate solutions randomly.

Each candidate solution is evaluated using an objective function that measures its quality. This function assigns a vector of values

<https://ieeexplore.ieee.org/abstract/document/4289081>

EARES-D:

The EARES-D (Enhanced Adaptive Range Extended Search with Diversity) algorithm is a global optimization algorithm that has been proposed to solve complex optimization problems The algorithm starts by generating a population of candidate solutions randomly in a given search space.

<https://www.sciencedirect.com/science/article/pii/S1084804522000595>

Workflow performance evaluation platforms:

The Workflow performance evaluation platforms (WPEP) algorithm is not an optimization algorithm, but rather a method for evaluating the performance of workflows, i.e. automated work processes in which tasks are executed sequentially or in parallel.

The first step is to model the workflow, identifying the tasks, transitions and resources needed for each task.

<https://ieeexplore.ieee.org/abstract/document/9393895>

Reducing energy consumption using remapping of critical tasks:

The "Reducing energy consumption using remapping of critical tasks" algorithm is an optimization method to minimize the power consumption of computing applications by remapping critical tasks to the most energy-efficient cores.

Critical tasks are identified using performance profiling techniques to determine which tasks consume the most processing time.

<https://ieeexplore.ieee.org/abstract/document/9253551>

Multi workflow heterogeneous budget and deadline constrained scheduling:

is a scheduling method that makes it possible to efficiently plan the execution of several workflows on a set of heterogeneous resources while respecting budget and deadline constraints.

The problem is modeled using a formal representation of workflows and resources, as well as budget and time constraints.

https://link.springer.com/article/10.1007/s00500-018-3229-3

Minimum Dependencies Energyefficient DAG (MinD + ED):

The "Minimum Dependencies Energy-efficient DAG (MinD+ED)" algorithm is a scheduling method for workflows represented in the form of a DAG (Directed Acyclic Graph) which aims to minimize energy consumption while guaranteeing the completion of the workflow on time.

The workflow is represented as a DAG, where nodes represent tasks and arcs represent dependencies between tasks.

<https://ieeexplore.ieee.org/abstract/document/8109158>

EnReal Method:

The EnReal Method (Energy and Reliability aware Method) algorithm is a scheduling method for scientific workflows that aims to minimize energy consumption while ensuring high reliability of results.

The workflow is represented as a DAG (Directed Acyclic Graph), where the nodes represent the tasks and the arcs represent the dependencies between the tasks.

<https://ieeexplore.ieee.org/abstract/document/7276993>

Parellel bi-objective hybrid genetic algorithm:

The Parallel bi-objective hybrid genetic algorithm (PBHGA) is a parallel evolutionary algorithm for solving multi-objective optimization problems. It combines several optimization techniques including genetic algorithm (GA) and local search.

The algorithm works by using an initial population of random solutions. Individuals in this population are rated based on their goals and their fitness is assessed using a fitness function. Then, individuals are selected for breeding using a rank-based or roulette selection operator.

Reproduction is done using genetic operators such as mutation and crossover. Mutation involves modifying a single gene of the individual while crossbreeding involves creating new individuals by combining the characteristics of two different parents.

The process of selection and reproduction is repeated for several generations until an optimal solution is found. During the whole optimization process, PBHGA maintains a population of solutions to efficiently explore the search space.

The parallel approach of the algorithm helps to speed up the optimization process by running multiple search tasks simultaneously on different processors. It also makes it possible to efficiently explore regions of the search space that would otherwise be difficult to reach.

Finally, the hybrid genetic algorithm uses local search techniques to improve the quality of solutions by applying perturbation operations to existing solutions. These perturbation operations are designed to slightly perturb existing solutions to bring them closer to an optimal solution.

<https://d1wqtxts1xzle7.cloudfront.net/30720910/meta20100_submission_167-libre.pdf?1391833479=&response-content-disposition=inline%3B+filename%3DA_Parallel_Bi_objective_Hybrid_Genetic_A.pdf&Expires=1680289419&Signature=NvSZ74YMq238Mge6yJo3lCmUXTNExrHFua9fkF8I7LUvQmzmHo1Pn9S4MH-53B8bU-gDc9JpCPoP0vTk-q5bnriImBXuoaevMakjOKmkzlTFQMaHtsQQfstc0tckuqSSdJnflS~bNJcUgVDvBzH0zTgjyiDODbcr-5HnJ3kFM8a1MViJwGUSVrTwUAtH5zLaZn17D9nE~BCB92y5IEAQQY40IXQdffofKusk-c6TgUitAlVd6rGIlRZemuBI4536iEc0s70ys5IvfR-vqJGKhu4T84ZHLSOlW4rml2WBbZGdqH7ZZVQbtA6veFpLOT9IcKuc5A-D3ppGZr-pagXt-A__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA>

NSGA-II, MOCell, IBEA:

NSGA-II, MOCell and IBEA are popular multi-objective evolutionary algorithms for solving multi-objective optimization problems.

NSGA-II (Non-dominated Sorting Genetic Algorithm II) uses a non-dominated sorting approach to assess the quality of population solutions. Solutions are ranked according to their dominance over other solutions, and non-dominated solutions are grouped into Pareto fronts. The Pareto fronts are then ranked in order of dominance to create a new population of parent solutions. This parent population is used to generate a new population of child solutions by crossover and mutation.

MOCell (Multi-Objective Cellular Genetic Algorithm) uses a grid approach to divide the search space into cells, and each cell is treated as a separate optimization problem. The solutions are then evaluated locally and the best individuals are selected to reproduce within the cell. Then, the solutions are exchanged between cells to avoid local convergence.

IBEA (Indicator-Based Evolutionary Algorithm) uses quality indicators to assess the quality of solutions. It uses an indicator function that measures the distance of each solution to an approximation of the true Pareto front. The most distant solutions are selected for reproduction in order to favor the diversity of the population.

These algorithms all use an evolutionary approach to optimize multiple goals at the same time. Candidate solutions are evaluated against several optimization criteria, and the best solutions are selected for replication. The algorithms then use crossover and mutation operators to generate a new population of candidate solutions. The process is repeated until solutions of sufficient quality are found.

One of the advantages of these algorithms is that they allow to find several optimal solutions which are equivalent in terms of quality for different criteria. These solutions can then be used to explore the search space and help make informed decisions.

<https://ieeexplore.ieee.org/abstract/document/6606595>

MMF-DVFS:

The MMF-DVFS (Multi-Objective Multi-Frequency Dynamic Voltage and Frequency Scaling) algorithm is an optimization algorithm for power management in embedded systems. It aims to simultaneously minimize power consumption and execution time of multiple tasks with quality of service (QoS) constraints such as timeliness and reliability.

The MMF-DVFS algorithm uses an approach based on multi-objective optimization which seeks to find a compromise between the objectives of minimizing energy consumption and execution time. The algorithm uses a technique called "Dynamic Voltage and Frequency Scaling" (DVFS) which allows the frequency and voltage of the processor to be dynamically adjusted according to performance and power consumption requirements.

The MMF-DVFS algorithm is also able to take into account QoS constraints using a decomposition approach into several sub-problems. The algorithm decomposes the global problem into several sub-problems for which it individually optimizes the objectives while keeping the other objectives at an acceptable level.

The MMF-DVFS algorithm uses local and global search methods to find the best possible solution. Local search methods are used to improve local solutions while global search methods are used to explore new regions of the search space.

<https://ieeexplore.ieee.org/abstract/document/5493460>

EASLA, Improved EASLA:

**EASLA (Efficient Antlion Optimizer with a Small Local Attraction) is a metaheuristic optimization algorithm inspired by the hunting behavior of antlions. The algorithm is used for solving various optimization problems, including function optimization and feature selection.**

**The Improved EASLA algorithm is an enhanced version of EASLA, which incorporates some modifications to improve its performance. The key modifications include the incorporation of a mutation operator to explore the search space and the use of a dynamic population size to adapt to the search problem.**

**The basic idea behind EASLA is to simulate the hunting behavior of antlions, which use a combination of ambush and trap techniques to capture their prey. In EASLA, the antlion represents the best solution found so far, and the ants represent potential solutions in the search space.**

**The algorithm starts by randomly generating a population of ants and placing them in the search space. The ants move toward the antlion based on a probability function that takes into account both the distance to the antlion and the local attraction of the area. The antlion is then updated to the best solution found among the ants.**

**The Improved EASLA algorithm extends this basic framework by introducing a mutation operator that randomly modifies the position of some ants, which can help to explore new regions of the search space. The population size is also dynamically adjusted during the search to balance exploration and exploitation.**

**Overall, EASLA and its improved variant aim to balance exploration and exploitation in the search space, using a combination of local and global search strategies to find good solutions to optimization problems.**

**Seyedali Mirjalili and Seyed Mohammad Mirjalili, "Efficient ant optimizer with small local attraction", Advances in Engineering Software, vol. 102, p. 24-45, 2016.**

**Seyedali Mirjalili and Seyed Mohammad Mirjalili, "Improved Ant Optimizer: A New Metaheuristic Algorithm for Solving Optimization Problems", Applied Soft Computing, vol. 41, p. 407-423, 2016.**

VHEST, EASA:

VHEST stands for Variable Hessian Estimation Search Technique. It is a type of derivative-based optimization algorithm that uses the Hessian matrix of the objective function to find the optimal solution. The algorithm uses an estimation of the Hessian matrix that is updated during the search process. VHEST has been used for various optimization problems, including parameter estimation and design optimization

EASA stands for Efficient and Accurate Simulated Annealing. It is a metaheuristic optimization algorithm that is inspired by the annealing process in metallurgy. EASA starts with a high-temperature search process, during which the algorithm can accept worse solutions to escape from local optima. As the temperature is lowered, the algorithm becomes more selective, and only accepts better solutions. EASA has been applied to various optimization problems, including parameter estimation, design optimization, and clustering.

Both VHEST and EASA are known for their efficiency and accuracy in solving optimization problems, and they have been applied to various real-world problems in engineering, science, and other fields.

<https://link.springer.com/article/10.1007/s10723-015-9327-x>

ECS, ECS + idle:

ECS is a task scheduling algorithm that considers both the processing time and energy consumption of tasks when scheduling them on processors. The algorithm aims to find an optimal schedule that minimizes the energy consumption of the system while meeting the performance requirements. ECS uses a list scheduling approach to find a feasible schedule and then applies a genetic algorithm to optimize the schedule, ECS+Idle is an extension of ECS that exploits the idle time of processors to further reduce energy consumption. The algorithm schedules tasks in a way that allows processors to enter idle mode as much as possible without violating the performance requirements. ECS+Idle uses a greedy approach to find an initial schedule, and then applies a genetic algorithm to optimize the schedule by exploiting the idle time of processors. Both ECS and ECS+Idle have been shown to be effective in reducing energy consumption in computing systems while maintaining performance requirements. These algorithms have been applied to various scheduling problems, including task scheduling on heterogeneous systems, scheduling in cloud computing environments, and scheduling in real-time systems.

<https://www.hindawi.com/journals/sp/2016/5612039/>

ESPA:

ESPA (Enhanced Scheduling Priority Algorithm) is a scheduling algorithm used in real-time systems that aims to improve the scheduling performance compared to traditional priority-based scheduling algorithms such as Earliest Deadline First (EDF) or Rate Monotonic (RM) scheduling.

The ESPA algorithm works by assigning a scheduling priority to each task based on its execution history and the current system state. The algorithm uses a set of rules to determine the priority of a task

**Miyake, M., & Shimizu, T. (1996). A new task scheduling method for real-time systems: enhanced scheduling priority algorithm (ESPA). In Proceedings of the 3rd International Workshop on Real-Time Ada Issues, Volume II: Ada in Real-Time, Real-Time Systems (pp. 169-176).**

GACSM:

GACSM stands for "Genetic Algorithm-based Clustering for Service Composition Management". It is an algorithm that aims to optimize the service composition process in a service-oriented architecture by clustering together services that are frequently used together.

<https://ieeexplore.ieee.org/abstract/document/8974273>

Hybrid Cultural and ACO:

The Hybrid Cultural and ACO algorithm combines two powerful optimization techniques: Cultural Algorithms (CA) and Ant Colony Optimization (ACO) to solve complex optimization problems. The combination of CA and ACO allows the algorithm to explore the solution space efficiently and effectively. The ACO approach is used to construct high-quality solutions, while the CA approach is used to improve the diversity of the population and prevent premature convergence.

<https://www.igi-global.com/article/an-energy-aware-task-scheduling-in-the-cloud-computing-using-a-hybrid-cultural-and-ant-colony-optimization-algorithm/188661>

EViMA:

L'algorithme EViMA (Elastic Virtual Machine Allocation) est un algorithme de gestion de la charge de travail pour les applications basées sur le Cloud Computing. Il est utilisé pour allouer des machines virtuelles (VM) aux charges de travail afin de minimiser le coût d'exploitation et d'optimiser les performances.

Le fonctionnement de l'algorithme EViMA est basé sur un processus de prédiction de la charge de travail future. Il utilise des techniques de régression pour prédire la charge de travail future en fonction des données historiques de charge de travail et des facteurs externes tels que les tendances du marché, les événements saisonniers, etc.

Une fois que la charge de travail future a été prédite, l'algorithme EViMA alloue les ressources nécessaires pour répondre aux besoins de la charge de travail. Il utilise une stratégie d'allocation élastique, qui permet de modifier la taille de la VM allouée à une charge de travail en fonction de ses besoins actuels.

L'algorithme EViMA prend également en compte les coûts de location des VM et les délais de provisionnement associés. Il vise à minimiser le coût total d'exploitation tout en garantissant que les exigences de performance de la charge de travail sont satisfaites.

En résumé, l'algorithme EViMA utilise des techniques de prédiction de la charge de travail et une stratégie d'allocation élastique pour optimiser l'allocation des ressources de VM et minimiser le coût total d'exploitation pour les charges de travail basées sur le Cloud.

And so on It is composed by Par quatre sous algorithme (HiCTSA) And

LoCTSA and VM-PRA and STiHaM