

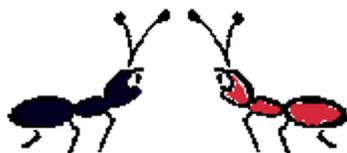
AntOptima

we speed up your business

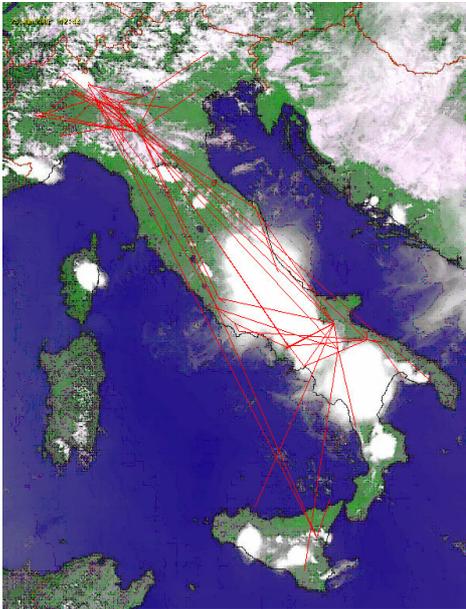
Imagine a network of research labs where groups of scientists develop state of the art algorithms in vehicle routing, scheduling, optimization and data mining. Think of hundred of academic benchmark problems improved by these algorithms. Read the major scientific journals publishing the results of these researches. Browse through a number of successful knowledge transfer projects involving industrial partners. Watch a team of experienced managers bringing this network to life.

This is AntOptima, a new company based in Lugano, which kicked off in 2001 to apply and to market new advanced technologies for optimization and management problems.

AntOptima provides solutions to complex industrial problems where a deep knowledge of both the problem to be solved and the optimization techniques are required. AntOptima identifies the right level of abstraction to model the problem and provides the best solution technology, seamlessly integrating new software and hardware within existing systems. Our solutions are efficient, flexible and adaptable to new situations. Our technologies are useful to create systems that are able to learn from experience and to continuously improve the quality of the generated solutions. AntOptima is able to perform because it relies on the contribution and the competence of different experts working together to a common aim: speed up your business.



AntRoute



From theory ...

Given a fleet of vehicles and a set of customers asking for pick-up and delivery operations the goal is to minimize a given cost function (time, distance, money).

...to practice

- Accessibility based on vehicle type
- Deliveries with multiple time windows
- Urgent on-line requests
- Stochastic travel time
- Multiple days planning
- Stochastic customer demand
- Unexpected events

From research ...

"Research in social insect behavior has provided computer scientists with powerful methods for designing distributed control and optimization algorithms. These techniques are being applied successfully to a variety of scientific and engineering problems. In addition to achieving good performance on a wide spectrum of static problems such techniques tend to exhibit a high degree of flexibility and robustness in a dynamic environment. Optimization algorithms inspired by models of co-operative food retrieval in ants have been unexpectedly successful and have become known in recent years as Ant Colony Optimization (ACO)", Nature, 6 July, 2000.

AntOptima is a spin-off company of the Swiss Research Institute IDSIA, Istituto Dalle Molle di Studi sull'Intelligenza Artificiale, which has recently proposed many ACO based algorithms to solve different types of combinatorial optimization like the sequential ordering problem [INFORMS Journal on Computing, vol.12(3), 2000] and the vehicle routing problem with time windows [New Ideas in Optimization. [McGraw-Hill, 1999]. The developed algorithms are among the best currently worldwide available and they have found new best-known solutions for many benchmark instances.

... to applications

- AntGDO: dynamic optimisation of vehicle routes for primary (large-scale) distribution.
- AntPOS: secondary distribution.
- DyvOil: heating oil distribution.
- OptiMilk: milk distribution.
- Logico: urban distribution.
- AntGuard: dynamic optimisation of guard visits.
- AntDoor: door-to-door distribution.
- Previs: forecasts the customers' consumption.
- SimTour: simulates the distribution process.
- TourOnline: dynamically plans tours in real-time.



AntPlan

What?

A suitable description of the subject of scheduling is that it is a field of study concerned with the optimal allocation or assignment of resources, over time, to a set of tasks or activities. In the so-called "real world", these resources (money, labor, machines, etc.) are generally restricted or scarce so this allocation inevitably gives rise to competition among tasks that are vying for their use. Scheduling problems exist everywhere. Even a conservative reading of the description above leaves room enough to include important problems in the obvious settings of manufacturing, transportation, and logistics as well as ones not so evident in fields such as communications, media management, and sports. Effective scheduling solutions can produce substantial economic dividends.

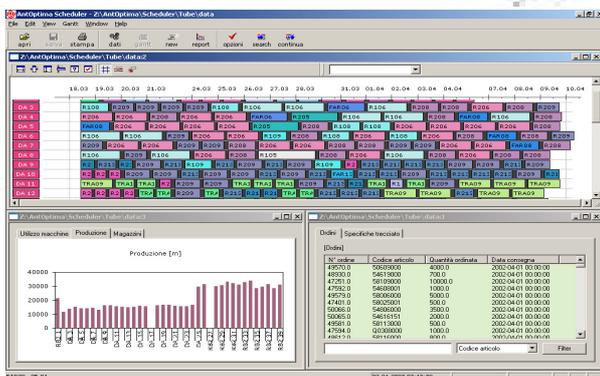


Situation

Many scheduling problems are exceptionally difficult to solve. During the last thirty to forty years, there has been an enormous growth of results in this field. The current situation is that there are a wide variety of effective techniques that can be applied to a broad class of scheduling problems. However, in the real world many of these results are neglected with considerable loss of money: in many cases crucial scheduling problems are hand-solved by rule of thumb, a practice that yields to unsatisfactory solutions.

We offer

During several years of theoretical and applied research we have matured the **knowledge** to create, design and develop cutting edge algorithms to cope with realistic and difficult scheduling problems. By combining advanced scheduling algorithms and heuristics, AntOptima Scheduler provides an efficient, reliable way to compute solutions that satisfy your most complex finite-capacity scheduling problems. Our algorithms work faster and more efficiently than other known algorithms (*Journal of Scheduling, January 2000*).



The AntOptima Scheduler is comprised of a heuristic combination of the following algorithms: Ant Colony Optimization, Tabu Search, Constraint Propagation, Linear Programming and other proprietary algorithms. Our scientific competence is at your service to put this knowledge in practice and solve your scheduling problems.

Data Mining



From data to knowledge

The importance of collecting data that reflect your business or scientific activities to achieve competitive advantage is widely recognized. The way for turning these data into your success lies in the capability of extracting knowledge about the system you study from the collected data. **Discovering valuable patterns in data is the goal of data mining.**

Tasks solved by data mining

Data mining answers questions as the following.

- What goods should be promoted to this customer?
- What is the probability that a certain patient suffers a given disease?
- How should a medical image be interpreted?
- Will this customer default on a loan?
- What should the medical diagnosis be for this patient?
- What is the good that a certain customer is likely to buy given that he bought another?
- How large the peak loads of an energy network are to be expected?
- Why the facility starts to produce defective goods?
- What is the avalanche risk in a certain area?

It does so by the techniques of classification, clustering, detection of relations, market basket analysis, prediction and many others.

We offer

Several years of internationally recognized scientific experience in theoretical and applied problems led us to develop advanced skills in the creation and use of state-of-the-art data mining methods. We have developed new techniques, called credal classifiers, that can provide you with trustworthy predictions even when only scarce or incomplete databases are available a commonplace of real applications. This exceptional reliability under hard conditions is an unmatched feature of our algorithms. We offer you off-the-shelf scientific competence, concrete experience and leading technologies to address and solve your data mining problems successfully.

