PROJECT PLAN

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Flexible Job Allocation Decision Support Framework for Small and Medium Size Service Personel Fleet Using Mobile Phone Terminals

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Fundamentals and goals

This project is an assignment in our Operation Research –course. Project Fundamental is make an general model to task allocation with a mobile. Mobile operated Decision making is especially useful for SME (small-medium enterprises), which have their labor in a field and doesn't have resources to call -center, repair services and cleaning companies for example. This kind of decision making is important to these firms because this type of enterprises need to use all working hours as efficiency as they can if they want to increase their productivity. Modern technology provides us to use PC servers to calculate necessary data, but the main challenge is what kind of data we can show in mobile phone screens (basic mobile color screen) and what data we need to make PC assisted decisions concerning task allocation. Nowadays algorithms for data treatment is quite well known (example for travelling salesman problem), so it's all about users interface to the data. We have to survey what data normal call –center based companies need for good decision making. We found out that there are many factors affecting to the decision-making Factors are also depending on which area of business the company is working in, but the most important and the most common factors are urgency, workers and jobs locations, workers know-how and tools and currently allocated tasks. Still we need to leave room for flexibility such as unexpected incidents and personal preferences. Our goal is to produce a good and easily human-approachable interface for mobile decisions making, in situations mentioned above. It is a challenge to find the optimum balance between computer and human decision-making. We try to find such balance comparing similar experiments, projects and articles. We try to make algorithms that accept this situation's uncertainty.

Approach

We have identified three separate problems to be solved: finding relevant metrics, choosing optimization and decision making algorithms, and presenting the data in the very restricted display of a mobile device. A preliminary approach is shown in Figure 1.

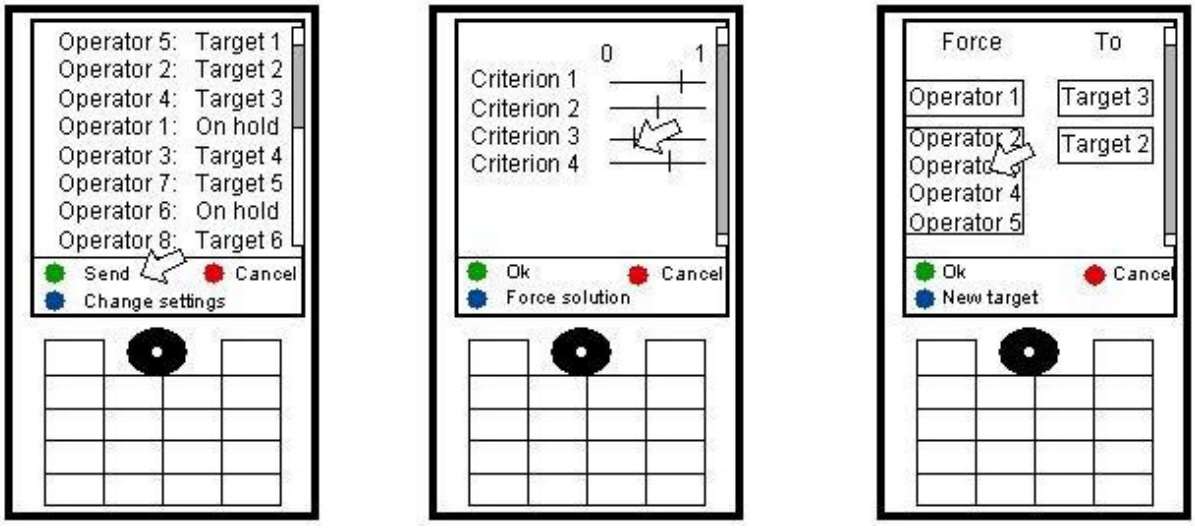

Figure 1: preliminary approach

In this approach the system receives information about new tasks with some information about their nature. This information and information about the operators is then used for presenting a suggested solution for the decision maker (DM). The DM can then accept the suggestion or change the criterion (metric) weights or even force some parts of the solution. Solving the problem may also require suggesting several successive steps for each operator.

Finding relevant metrics

This partial problem concerns finding metrics that are important for finding the best solution for each situation and that can readily be measured and analyzed. These metrics may be generic or dependent of the case or industry at hand. They

may also be of different formats - continuous, discrete, numeric, non-numeric, binary etc. Typical metrics could be distance to customer, know-how in the specified problem, or cost of delivery. We will try to find the metrics from existing academic and business literature or, if this proves difficult, from interviews or by defining them ourselves. The essential part of this task is to find metrics of different character so that the limits of the optimization and decision methods can be found.

Choosing decision support and optimization methods

As the information can vary depending on what kind of metrics are used, we have to find suitable optimization methods for solving the problem. The methods have to be able to process various formats of information. It is likely that we will solve integer problems such as the traveling salesman problem.

Project milestones

The project is divided into four phases: Concept Phase, Research Phase, Analysis Phase, and Reporting Phase.

In the Concept Phase the objective is to define the scope of the study and the relevant methods for the Research Phase. However, this is done at quite generic level in comparison to commercializing some specific product because the issue at hand is to find out framework that can be applied in various business cases. Thus, substantial attention is forced to define the scope of the study.

In the Research Phase the objective is generate solution concepts in a form of decision-making models. These are based on the results found in the preliminary study. Relevant results are elaborated to meet problem definition needs.

In the Analysis Phase the objective is to evaluate solutions and compare them with each other using sound metrics. Since the ultimate goal is to deliver useful case study for the customer, commercial point of view is taken into account.

The Report Phase delivers the final report containing problem description, solution methods with elaboration, and final results focusing especially in decision making point of view.

Phase 1: Concept →	**Phase 2: Research →**	**Phase 3: Analysis →**	**Phase 4: Reporting**
• Kick off meeting with NRC • Preliminary study • Problem definition • Scope definition • Project plan	• DM-models • Simulations • Some data with example case	• Comparison of solutions • Solution analysis • Commercial analysis	• Final report

Organization

Because there are just a few tangible objects to deliver, and they are in digital form, group work is done utilizing email, web, and phone communication. Documents are available on the projects's website. However, when deciding what to do next, who does what, customer meetings, presentation rehearsals are situations to meet vis a vis, in order to minimize communication lag, or just because of commons sense says so.

Project time line

The project at hand is a typical consultant case, thus time line is more important than classical resource allocation. There are two different sources for dead lines i.e. the customer, and the System Analysis Laboratory (SAL). The customer has signaled that SAL time line is satisfactory, though finishing early is considered as a good option. It might be compelling to adapt PERT-method or alike, but, considering the project group dynamics, PERT would not serve its purpose. Project members, customer contact included, have highly changing time tables, thus meeting scheduling must be done dynamically.

Relevant dead lines are (with common sense modifications):

There has already been preliminary study using scientific publication databases in order to lay sound foundation for abovementioned Concept Phase.

- February 22.-24., 2006: Project Plan delivery to opponents, generating Project Plan presentation material, and giving live presentation. In relation to project group opponents feed back is given and taken.
- March 31., 2006: Intermediate project report deadline, live presentation material deadline, and the actual live presentation.
- April 21, 2006: Final report delivery.

Additionally there is seminar April 28., 2006, which might include live presentation of this project.

Project risks and contingency plan

All risks involving the project are categorized to three (3) different classes according to their magnitude:

1. Small
2. Moderate
3. Substantial.

Identifying possible risks is an ongoing process involving every person on the project team. Risks are valued in every project meeting and new ones are identified according to the situation. Every risk is entrusted to a single member of the project team, whose responsibility is to minimize the affect of that risk. This is done by following and analyzing the significance of that risk to every move on the project and keeping the team informed so that the risk is kept in mind when doing decisions.

The following risks are so far identified with their category and distributed to the team members:

1. Team work, team members' participation to the project [3] (Janne)
2. Communications inside the team and to the client [2] (Janne)
3. Wrong approach to the problem at hand [3] (Mark)
4. Problem is too widely defined [2] (Mauno)
5. Project schedule [3] (Topi)
6. Achieving tangible results [2] (Antti).

Direct solutions for these risks are so far defined the following:

1. Regular meetings to which every team member are given home work.
2. Communication between the team is to be regular (email) and to the client by the project manager.
3. Every team meeting the approach is critisized and valued.
4. Keeping it simple!
5. The schedule is estimated in every meeting.
6. Communication to the client and to the professor when approach has been generated.

This Project Plan is delivered to the following parties for review:

- Opponent group
- SAL course assistant
- Customer.

Project Manager
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