TO PLAN OR NOT TO PLAN

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Making a decision that involves implementing several steps in succession is called planning. This distinguishes a plan from "just a decision" to take action following the situation. The "***behavioristic***" approach to building automatic devices, based on the use of ***action as a reaction*** to a situation, is obviously more straightforward than drawing up a multi-step plan; this circumstance is the basis of the widely held belief that "real" artificial intelligence should be based on a repeating sequence of "***make a plan - execute a plan - make the next plan - execute it***," and so on. However, such a scheme encounters significant problems when trying to implement it in practice.

A plan explicitly or implicitly involves planning actions based on some expected course of events, that is, on a ***forecast***. And forecasts, as you know, have the peculiarity that reality does not always correspond to them - both because of the ***unpredictability*** of the actions of other objects in the environment and the banal reason for the ***lack of the required information***.

And the broader the "***planning horizon***" - the number of steps of the plan and the time it takes to complete it - the more likely it is that the forecast will not come true at one of the stages.

What happens if, during the execution of the plan, the situation does not match the expectations used in the construction of the plan? Naturally, the decision on what to do is subject to revision. At the same time, the reason for revision is by no means always something that makes the implementation of the plan impossible! If you plan to visit two stores, and everything you need is in the first of them, it is natural to change the plan by canceling the visit to the second store. If the trip is planned with refueling at the route's final destination, it makes no sense to refuse to revise the plan if a gas station with a knowingly lower fuel price is encountered along the way.

Just as important, there are almost always ***several needs that require different sequences of actions to achieve*** - and it is often possible to come up with some kind of "composite" plan to satisfy both needs. But, the more complex the plan, the greater the chance that it cannot be carried out precisely as planned.

Finally, there is an aspect related to the ***time scale***. The sequence of coffee-making actions and the series of steps for acquiring a profession are examples of how different the time scales for plans can be.

In the end, the reality comes down to the fact that there is a ***set of many needs and intentions*** and a ***set of plans to satisfy them***. Plans ***coexist and are permanently adjusted*** following the changing situation. And a specific current action is selected based on the current ***priorities of the set of needs*** and ***what actions are possible*** at the moment.

The choice of the following action is based on ***how the decision affects each of the actual needs***. And the essence of the problem of choosing an effort is, accordingly, an ***optimization problem***. This has the consequence that planning becomes "***rolling***," suggesting correcting each of the existing plans at each step.

It is no less critical that the deliberate dependence of the plan's feasibility on external conditions makes detailed planning of multi-stage plans meaningless. The ***permanent component of achieving the need/intentions is the need/intention, not the plan*** to achieve it. Accordingly, when choosing a current action in the presence of many needs/intentions, it is an assessment of which goals will be more likely to be achieved after the action is completed and what results can become unachievable.

The way of planning and/or choosing the current action depends on prediction possibilities. In turn, the possibilities of forecasting significantly depend on the duration of the process of achieving the desired result. The possibilities of predicting the natural environment vary in a vast range. There is a ***static environment*** without active objects (night office cleaning) at one extreme. On the other, there are many ***dynamic objects***, which are constantly changing (driving a car, patrolling a crowded shopping center), up to situations where there are objects that ***actively prevent*** the achievement of desired (sports, military operations).

Practical analysis suggests that the most frequently requested in a natural environment is short-term activity planning, which uses predicting the actions of environmental objects based on their observation utilizing the technology described in AGI: CONTINUITY IMPLEMENTATION. In this case, the primary data source for choosing the following action is a ***description of the current situation*** and ***data on the course of events for a short time***. The dynamism of the environment requires quick decision-making; the impossibility of accurately predicting the activity of environmental objects requires regular revision of the plan and the low usefulness of plans longer than a few steps.

Meeting needs requiring ***continuous activity*** is based on long-term experience accumulated in ***Knowledge storage (*** see WHERE LEARNING AND REASONING ARE HIDDEN). The basis for choosing the current action is to eliminate unwanted events as much as possible and increase the chances of desirable events. At the same time, as in the case of the short-term planning process described above, building long detailed chains of actions does not make sense due to the low chances of their implementation. Thus "***strategic***" planning is reduced to a combination of a small number of ***structured steps***, and

the structured actions used are found to be ***patterns of remembered past experience***. This is offset by using structural action that ***encapsulates typical chains of simpler actions***.

In general, decision-making is based on the ***parallel use of both approaches*** - taking into account the fact that in stressful situations, when the short-term forecast indicates high chances of undesirable events and a decision needs to be made quickly, the assessment of the impact of decisions on strategic goals is omitted. On the contrary, more resources are used to form and correct long-term plans in a low-dynamic situation.

The "academic" approach to planning mentioned at the beginning of the chapter as a sequence of alternating stages of drawing up a plan and its implementation is not very suitable for management in natural conditions (one of the proofs is the results of the use of this approach by Marxists in economics).

SUMMATION

- *Multiple requirements are on hand at the same time, and numerous plans are running at the same time.*
- *The choice of the current action is combined with the evaluation and correction of plans.*
- *The choice of the current action compromises several current needs and corresponding plans.*
- *Multi-step plans have little chance of implementation while requiring many resources for analysis.*
- *Various sources of information are used to achieve short-term and long-term goals.*
- *The use of structural actions allows you to build complex plans, avoiding the construction of long sequences of actions.*
- *The balance between analyzing the short-term and long-term consequences of actions depends on the current situation.*