

# The Synergy: A Platform for Argumentation-Based Group Decision Making

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**Abstract.** “The Synergy” is an on-line collaborative argument-based decision making platform. Our goal is to create a system allowing for both user-driven (the users themselves can vote “for” and “against” any particular option) and machine-driven (the system can propose an order of options based on the arguments provided by users) decision making. For the second option, we implemented existing and newly developed decision-making criteria. The basic concepts of our system are an option, a goal and an argument. An argument links an option with a goal. It can be in favour of or against an option and it can be attached a probability measure, which we believe is necessary for representing numerous scenarios in decision making under uncertainty. Our long term goal is to have pre-made answers for some general decisions: like Wikipedia collects data, we will collect PROS and CONS of possible decisions.

**Keywords.** argumentation, decision making, software, applications, rating system

**The goals of the project.** The main goal of “The Synergy”<sup>3</sup> is to allow group decision making based on the construction and the evaluation of arguments. Furthermore, we want to combine classic decision making criteria and newly created criteria taking into account users’ feedback in form of likes / dislikes on certain arguments / options. Our long-term goal is to collect arguments in favour of and against particular decisions, and the data about their strength. Once some number of users have participated in a discussion about a decision (e.g. whether or not to continue using nuclear energy), that discussion becomes a reference for people who want to start studying that question. Just like *Wikipedia* is a good starting point for studying facts, our goal is to make “The Synergy” a good starting point for studying disputable questions. The name of the project suggests that the knowledge obtained by a group of people throughout a debate is more than just

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<sup>3</sup><http://thesynergy.org/>, (username = guest, password = guest)

a sum of the individual contributions, what is known as *collective intelligence* [1].

**Main concepts of the system.** “The Synergy” relies on three concepts: options, goals and arguments. *Options* represent possible alternatives. Every *goal* has its importance, which is a subject to debate. A central notion in our system is that of an *argument*. Every argument has four properties: first – an option it is linked to; second – whether it is in favour of or against that option; third – which goal the argument refers to; and finally the probability that if the given option is chosen, the goal will be satisfied.

**Decision making criteria.** We implemented existing decision criteria and developed new ones. Some of them are based on users’ votes in form of likes / dislikes of options or arguments, whereas others are based on decision criteria taking in account arguments’ strengths and goals’ importance. We also developed so-called *hybrid criteria* which combine those two approaches by taking into account both likes / dislikes and deeper analysis provided by more patient users (e.g. the strengths of arguments, importance of goals).

**Related work.** Existing software systems for argumentation-based discussion and decision making include: *Debatepedia*, *TruthMapping*, *DebateGraph*, *Cohere* and *LivingVote*. They provide basic discussion services, but *do not provide enough structure* for our needs. Namely, we want to allow two kinds of decision making: first – *users* can like / dislike / discuss options (i.e. decisions); second – the software itself can also calculate an order of the options based on users’ arguments. To allow the second option, we need the arguments, goals and options to be more structured / related to each other. Some existing systems that have more structure include IBIS [2] and its formal version ZENO [3]. Our approach shares some ideas with this well-established line of research; however, “The Synergy” has many original features, such as arguments’ probabilities. We need them to model decision under uncertainty. For example, when deciding whether to take an umbrella, we do *not* want to solve the issue “rain” first, and then think about whether to take an umbrella, since for example, in the case when one *knows that it will rain with probability of 40%*, then (s)he prefers to *take* his / her umbrella. An issue based system would first conclude that issue “rain” is OUT, and then decide not to take an umbrella.

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