

# InteliWISE AVATAR



The Human Face of Artificial Intelligence on the Web

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**There is no doubt that the future Internet will be smarter, more sophisticated and more easy-to-use than ever, but at the same time the solutions will become far much complicated to create. InteliWISE AVATAR, designed as a Web 3.0 component, allows for interactive, natural language human-avatar communication on the Internet. As a hybrid of modern artificial intelligence approaches, it uses a large amount of multi-origin information to provide a compromise between response quality and processing speed to improve communication on the Internet.**

## Human Factor – Keeping Balance of Communication

As overall satisfaction of use seems to be the ultimate function of quality of Internet solutions, InteliWISE AVATAR uses natural language dialogue, supported by rich multi-channel user experience, as means of communication between human and machine on the Web.



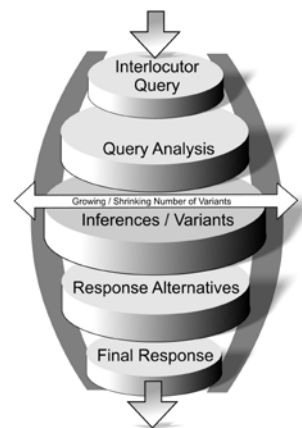
An InteliWISE AVATAR website conversational agent

Efficiency issues forced us to change the so called „extensive“ paradigm, characteristic to AIML approach, because of large rule sets and a large token tree to be built and to be scanned. That’s also why we didn’t choose to use neural networks: they are not so efficient for large data sets and their topology management and maintenance is not a polynomial problem.

For now, 98% of responses are produced in less than 0.5 s, with none above 4 s (single Intel Xeon 3.0 GHz). We must consider InteliWISE AVATAR is not a simple web search engine. It maintains not only semantic and lexical knowledge, but also clients’ knowledge bases, dictionary definitions, flexing dictionaries and at most it provides interlocations services, so we measure efficiency in the terms of the whole system but by single factor: time of responses to requests of the user.

## InteliWISE ENGINE – The Way of the Middle

Instead of trying to resolve already known problems from scratch, we started to analyze existing solutions and their best and worst cases. The paradigm of choosing the best pieces of solutions without gaining worse results and the accurately predicted boost of semantic nets’ popularity as well as their feedback to the structure of Internet, let us precisely identify the optimal paths of further research.



Now, we have been spending a lot of time on consequently joining chosen pieces into one hybrid system. Below we present the benefits gained from choosing the best parts of existing solutions. To state it clearly: our system is not build upon separate pieces of solutions – our system is a unique hybrid with characteristics similar to other known approaches.

## Quality vs. Efficiency – The Modern Approach

Keeping a compromise between quality and efficiency is a basic issue of all computer aided solutions. By carefully identifying the efficiency problems that can arise during system existence, we developed the mechanism of self-trimming of quality in the terms of processing times. As we all know, semantic nets have this not so pleasing characteristic of very fast growing number of possible interconnections between elements, so adding new semantic elements can fire actions of adding a few orders of magnitude for more interconnection elements. Typical user request needs millions of combinations to be checked before the final decision, so here is the point of invention to carefully identify parts of the request and nearby semantic elements to being a minimal set, but not changing the meaning of the request and spanning reasonably large set of variants that can be ranked in constant time. This characteristic of choosing best variants gives us the stability of process in the terms of response time and quality of responses.

**Semantic Net**

- + simple and flexible architecture, suitable for managing of large data sets
- badly adopts to partial information and misspelling

InteliWISE ENGINE: better adopts to partial information and misspelling, uses analogous structures for semantic information retrieval.

**Token Tree Search (AIML)**

- + simple formulation of rules
- needs huge amounts of rules to maintain language structures, leads to data redundancy

InteliWISE ENGINE: uses loose matching of rules, patterns and fragments of sentences to properly focus on searched data, is not order-sensitive, reuses the same information at various levels of processing (but in strictly different manner – differently connected).

**Expert System**

- + allows for fuzzy decision process
- needs large sets of rules, is sensitive to non-logical rules – leading to bad decisions, data supply process must be very carefully controlled

InteliWISE ENGINE: we do not use very strict decision rules, rather giving the system the opportunity to choose best ranked variants than building strict decision net, system uses multivariate decision schema.

**Neural Net**

- + is able to generalize information
- number of modes is finite and adding new modes in large nets forces the changes of net topology, which is not so simply applicable and takes a lot of time

InteliWISE ENGINE: we can store as many modes as we need without rebuilding the net topology; multilevel construction of our nets gives us opportunity to add new connections without changing the overall topology.

**InteliWISE AVATAR – A Web 3.0 Participant**

Designed as a Web 3.0 component, InteliWISE AVATAR is a multi-connected platform. There is no possibility of thinking about robust and fast growing solution without interconnectivity with external information. At early stages of development, we identified best data sources that make our solution a fast growing hybrid:

- Web 3.0 sources of semantic data provide us with possibility of adding new semantic rules
- dictionary sources let us extend our knowledge base of definitions (such as Wikipedia)
- news feeds (such as RSS, web feeds) give us the opportunity to stay up-to-date with dynamic events
- customized clients' CRM feeds are used to track changes of client data

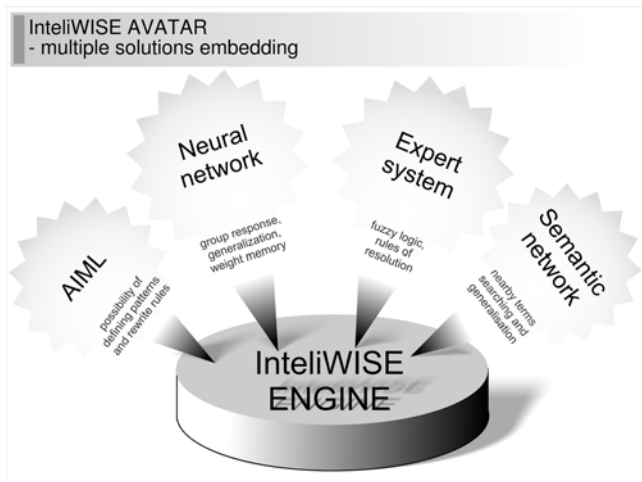
InteliWISE AVATAR is strongly supported by so called „wisdom of crowds“ and the collective intelligence of the Internet. Feedback of each conversation can be an added value for each participant of the system: interlocutor, client, knowledge base, information source – limited only by the business model.

Nowadays, it is evident that we cannot build large and growing solutions without help of other Web 3.0 providers. The main power of our solution is its large aspect and free access and integration of knowledge, and the core of the system is a unique way of integration of various information.

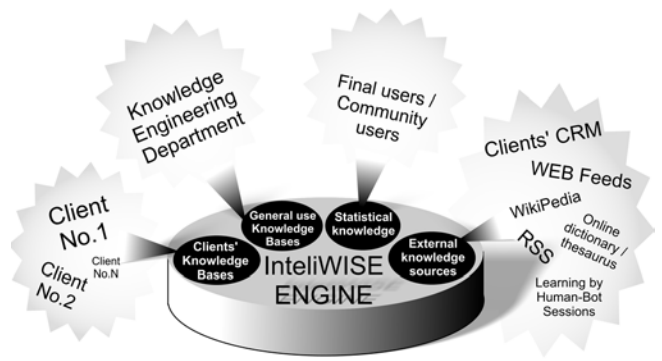
At InteliWISE, we clearly know that when you get something from the Web – you should put something back to boost other projects. We are planning to make some of our knowledge bases public to return some value that belongs to Internet and Web 3.0 community.

**Looking Forward – The Perspectives**

The most evident improvements are pointed toward users' trending and analysis. Basing on semantic data and statistical data, we will be able to make exact user profiles that will help us to find answers to such questions, as: „Is user satisfied with our solutions?“, „What kind of users mostly access our services: advanced users or beginners?“, „If we identify the user's knowledge level – what kind of response is best suited for this kind of user?“.



Multiple Solutions embedded into InteliWISE ENGINE



Knowledge Sources and Distribution

The ability to gain the trending information from loose interlocution is the best added value to our system. We can differentiate the response schemas basing on exact user profile and gain higher level of user's satisfaction.

We're also working on extending so called „inborn intelligence“ of our client-side conversational agents – to make them more autonomous, giving Internauts richer experience of communication. For now, we keep compromise between functionality and protection of our work in this case.

Because we have used voice synthesis from the beginning, second next straightforward extension of system is voice recognition. It will give us opportunity to connect our systems directly to online phone-lines and offline analysis systems.

And at the end we should point that we will be working on 3D interfaces extending our system connectivity – giving opportunity to communicate directly with voice and gestures. The main market target for this kind of solutions will be banking (interactive stands, home banking) and on-line shopping.

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