

Conversational Management in kama DEI

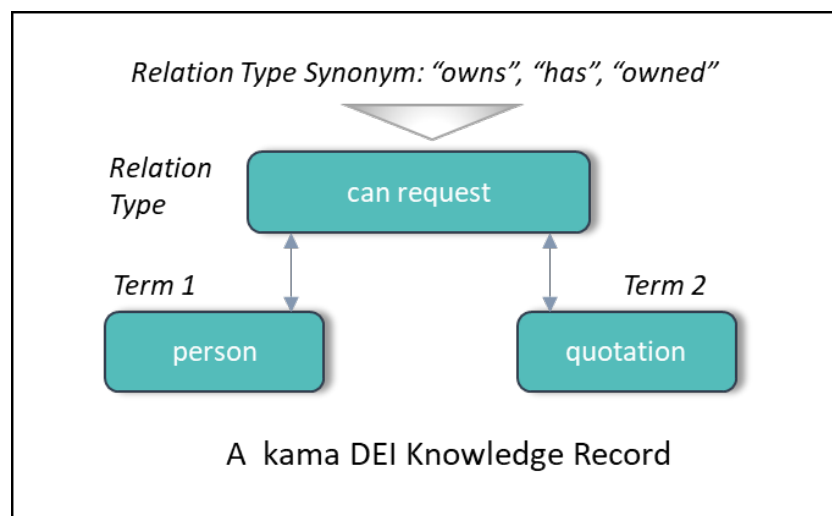
A Whitepaper on Knowledge and Conversational Management: Issue 1

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If you're reading this, you are likely already a user of the patented kama.ai Designed Emotional Intelligence platform®, kama DEI, or you, or your organization, are considering deploying it. This whitepaper series is intended to provide best-practices for designing informative and flexible customer use-cases to support the delivery of your organization's information through kama.ai's Designed Emotional Intelligence® platform.

Knowledge Records are the fundamental building blocks of the kama DEI approach. Knowledge Records allow us to build the general, or private organization, informational components that form both 'Problems' and 'Solutions' of kama DEI question and answer conversational use-cases. An example of a Knowledge Record (or KR for short) would be [person]+[can request]+[quotation].

In the technical area of knowledge management, or the '[Semantic Web](#)' initiative standardized by the World Wide Web Consortium, or W3C, this is called a 'triple' where two terms or concepts are joined by some logical relationship relating these terms.



In kama DEI terminology, we are creating a **Knowledge Record**, or **KR**, by joining two **Terms** with a logical **Relation Type**. In general, a Knowledge Record is typically constructed of a subject, a verb, and an object.

Relations Type Synonyms are another element within the kama DEI platform. These are part of our Natural Language Understanding (NLU) technique that allows kama DEI to recognise the many ways that people refer to a 'verb' like "can possess". Using **Relation Type Synonyms**, defined in kama DEI, we can associate the 'verbs' in a user's utterance (the user's input statement given to kama DEI) to specific Relation Types. Then, we are better able to resolve an utterance into one or more KR's for processing within kama DEI. For example, using Relation Type Synonyms, all of the following phrases can be resolved to the KR [person]+[can own]+[house]:

- He owns a house [present tense]
- She owned a house [past tense]
- They have a house [present tense]

As indicated, various tenses of a Relation Type Synonyms are implied in the utterance. These tenses are understood by kama DEI and considered as kama DEI recommends options or next steps in the conversation.

Knowledge Base Information stored in the 'potential' - kama DEI knowledge needs only to be stored in the potential form, usually stated as 'can be', 'can possess' or 'can be synonym to'. These singular forms of Relation Types allow for the possibility of past, present, or future representations. These different tenses of relationships are inferred through the Relation Type Synonyms like 'is' and 'was', and 'will be' as different tenses of 'can be' for example. This means that you, as a Knowledge Manager, only need to store one KR for your product or service references such as [person]+[can request]+[product X]]. kama DEI will understand and process all the forms of a particular situation or context regarding the product, service, or issue you want to handle with the user.

Personal Pronouns are Resolved - kama DEI also resolves personal pronouns contained in input statements such as "he", "she", "my" into 'person' so that we can limit the amount of general knowledge that needs to be stored in kama DEI, while maximizing the number of ways that things can be said, or referred to, in a user utterance. To be more specific, any pronoun can be resolved to 'person', which is often used as the left-hand Term in a KR such as [person]+[can request information on]+[Product X]].

Further, kama DEI will translate the Term 'Person', in a KR, to 'You' in the response passed to the user. An example would be, a KR [person]+[can consider]+[Product A]] found by kama DEI, will be converted to "You can consider {Product A}" as a selectable option [button] in the set of user options of the kama DEI response passed to the user.

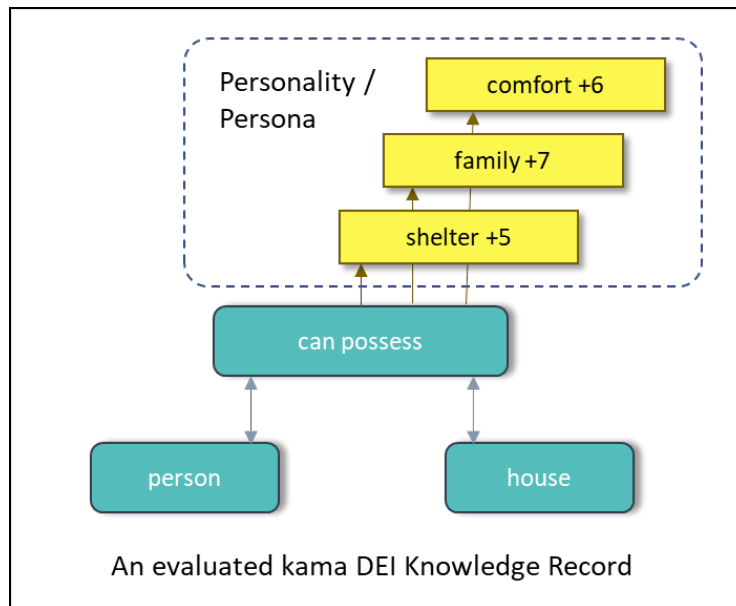
Values Make the Heart Grow Stronger – It is the rating of Knowledge (Records) with human values, combined with words and language rules, that powers kama DEI's emotional, contextual understanding, and its ability to respond with relevant, personalized, or prioritized information. This patented kama DEI capability uses numeric ratings on typical human values that all of us would

understand like ‘adventure’, ‘humor’, ‘shelter’, ‘compassion’, and about 145 or more others – but these are expandable customers using kama DEI without any programming.

By associating values with an Organization’s products and services, and developing an average consumer ‘Persona’ to attribute to new visitors to your organization, we can set up an environment where the contextual understanding of situations is enhanced AND information delivery regarding an Organization’s products and services, and the related product or service information, is personalized for each particular user accessing the system. This personalization technique allows organizations using kama DEI to build stronger engagements and connections with consumers and increase conversion from browsers to shoppers.

General Knowledge, Personas and Personalities – The knowledge in kama DEI exists outside of any particular value ratings. A real-world example of this is that there is a known fact that [hamburger]+[can reduce]+[hunger]. This we know to be true, so it belongs in the kama DEI Knowledge Base. However, to a vegetarian, this ‘fact’ is more or less meaningless, and it is therefore effectively non-information, and it should not be prioritized as an option to a person who is hungry, but who also has values and preferences that align with those of vegetarians.

For kama DEI to ‘understand’ what information is most relevant to a particular user, we rate information by way of personal Value Rating Pairs. Examples of these Value Rating Pairs for a Knowledge Record like [hamburger]+[can reduce]+[hunger] might be [comfort] -3, [health] -2 and [taste] -4. These Value Rating Pairs are first associated with a kama DEI **Persona**. When someone first ‘enters’ an organization through one of the supported kama DEI access clients, such as a chatbot, Facebook Messenger, Alexa or a connected mobile phone App, they gain a kama DEI Personality and inherit the Value Profile and all of the Knowledge Records with their associated Value Ratings defined in the Persona. Using this approach, every new user can gain a Value Profile and general appreciation for all the associated, value-rated information. However, their Personality can evolve over time to be a better and better reflection of their true personality as they interact with kama DEI.



In the figure above, you can see how values of “family”, “shelter”, and “comfort” can be added to homeownership to make it more meaningful to kama DEI Consumer Users who engage digitally with an organization running kama DEI and are able to optimize consumer marketing interaction by way of language-based Emotion AI.

Creating KR ‘Problems’ and ‘Solutions’ – As described earlier, kama DEI uses Value Rating Pairs to extend the significance of KRs to make them ‘personal’ to Consumer Users of kama DEI. For example, owning a house may represent very different things to a married woman with 3 teenage children than it does to a single young adult. Personality Value Ratings allow us to quantify the emotional meaning of a KR to make it more appropriate (or less) to a particular user.

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Negatives and Positives Attract – kama DEI’s primary objective is to find one or more net-negative KRs in a user’s utterance. We call these net-negative KRs ‘Problems’, which is modeled after what we do as humans when speaking with a friend or family member. As concerned people, we listen to what a friend or family member is saying, and we look to identify issues in the statement; we must decide what the person wants to speak about and how we should respond.

Similarly, with kama DEI, we accept the input statement and detect net-negatively rated issues (KRs) and then kama DEI searches for Solution KRs (Solutions) that have offsetting values compared to the Problem KR. Note that the Problem and the Solution are NOT required to have exactly the same values or exactly the same opposite ratings; it just means that the values and ratings of each Solution will offset the values of the Problem sufficiently to be a net-positive measure. This also implies that kama DEI may find 2 or more Solutions, and not surprisingly, the highest net-rated Solution will be prioritized 1st in the response list to the user. The

prioritization of value-rated Solutions is a key patented function of kama DEI's emotional interaction with the user.

Catch me if you can – There is another key part to kama DEI's identification of a Solution to a Problem. This is an essential requirement in the understanding of how kama DEI operates. That is, to be identified as a Solution, kama DEI will locate KR's to solve identified (net-negatively rated) triples (possibly more than one) within a user's utterance based on the right-hand Term.

There are 4 ways that an issue, identified in the user's utterance, can be 'matched' first to a Problem KR in kama DEI and then to a number of possible Solution KR's; this matching occurs through the right-hand Term of the Problem and the Solution. The following information describes the 'match types' and provides examples of each with corresponding utterances, Problem and Solution KR's:

1. **Direct** - The right-hand Term of the Problem **directly matches** the right hand term of the Solution(s) (i.e. [person]+[can have]+[headache] and [ibuprofen]+[can reduce]+[headache])
2. **Noun Form** - The right-hand Term of the Solution is the '**noun form of**' the right-hand form of the Problem located in the utterance (i.e. [person]+[can be]+[hungry] and [hamburger]+[can reduce]+[hunger]) **Note:** There **MUST** be a complimentary KR [hunger]+[is the noun form of]+[hungry] stored in kama DEI for this to function.
3. **Type of** - The right-hand Term of the Solution is a '**type of**' the right-hand form of the Problem found in the utterance (i.e. [person]+[can request]+[automobile] and [I]+[have information on]+[Mustang]) **Note:** There **MUST** be a complimentary KR [Mustang]+[is a type of]+[automobile] for this to function.
4. **Synonym** – Synonym matching is applied at a different level than the Problem/Solution KR matching in types 1-3 above, and it is supportive of all the above match types. In the case of synonym matching, the 'synonym' exists **between** the issue 'term' found in the user utterance and the right-hand Term of the Problem KR. For example, the user utterance is "I am starving" and our kama DEI Problem is [person]+[can be]+[hungry] **Note:** There **MUST** be a complimentary KR [starving]+[can be synonym to]+[hungry] stored in kama DEI. It does not matter whether this synonym record is stored left to right or right to left. That is, the KR [hungry]+[can be synonym to]+[starving] would also satisfy this requirement. Once a sufficient number of synonyms have been entered in kama DEI to support a use-case, the Problem KR will be found, and the above match types will be supported for the use-case.

These are **key rules** that must be considered by you, as a kama DEI Knowledge Manager, when you construct the information to support your client conversation use-cases.

Key Principles of kama DEI Use-Case Design – While kama DEI is a zero-code solution to conversational, emotional intelligence, there are some principles that must be kept in mind while designing or optimizing your conversation use-cases. A use-case could be thought of here as one question and answer pair, but a use-case can also be one question or issue, like "I am looking for a good book", and a number of prioritized books for the user to consider.

Consideration for defining key Terms – One of the important initial considerations when setting up an FAQ or use-case design is what you will base the key Term around. This requires some consideration of the problem you are trying to solve for your clients or the frequently asked questions they ask your company. For example, if your business is home renovation contractor, one of your services may be repairing leaky basements.

While ‘leaky basement’ or ‘leaking basement’ is two words, these two words describe one issue or concept, much like ‘air conditioner’ or ‘home renovation’ for that matter. So, to build a use-case, you may want to design it around a key Term defined in kama DEI ‘leaky basement’. To do this, you would have to add a new Term to kama DEI if it is not already in the common kama DEI dictionary. **Note:** If the Term IS already in the kama DEI Term table, **you SHOULD NOT add another one** since **it will cause ambiguity** and your issue may not be detected or Solutions to a Problem may not be located.

Private, Protected and Public Ownership in kama DEI – There is a very important concept in kama DEI called data ‘ownership’. The owners of virtually all data can be either kama DEI, which means it is in the public dictionary for all Organizations, or it is owned by an Organization (or enterprise) that is using the kama DEI platform.

Private Ownership - Generally, information added by an Organization will be ‘Private’, which means that only your kama DEI conversations will access this information and operate (conduct conversations) on this data.

Protected Ownership – Organizations using kama DEI can choose to make information ‘Protected’, but this is a special use case where you want your organizations and some other organizations you are affiliated with to use this information and associated use cases. Examples of these affiliations could be dealers of yours that are also using the kama DEI solution.

Public Information – In kama DEI, **Terms are the ONLY data type can be made ‘Public’** by a kama DEI customer Organization. The default for adding Terms is ‘Private’, so it takes some effort to create a Term as Public, but it may be done in special cases. These cases generally exist around product names or trade names that you want to make available to other, not necessarily affiliated, Organizations running kama DEI. An example of this is if a car company launches a new model of vehicle called the “Panther”, while dealers may eventually sell the Panther, so too might used car dealers who aren’t necessarily affiliated with the manufacturer of the Panther. If the manufacturer and the used car dealer both added Panther, then finding the Panther in kama DEI could become ambiguous and that is why we allow for Public Terms to be added by Organizations in special cases.

Returning to the task above, and with the guidance on ownership, the home renovation company would want to make ‘leaky basement’ a key Term in kama DEI, with Private ownership, and use it to create a problem like [person]+[can request information on]+[leaky basement] as the Problem record and [I]+[have information on]+[leaky basement]. Following this, they would then need to add some ‘synonyms’ to make the language processing more robust, allowing many forms of user utterances regarding ‘leaky basements’, ‘leaking basements’, ‘leaking basement’ etc. to be captured by kama DEI and become associated to the Problem based on ‘leaky basement’.

Selection of key Term synonyms – We design kama DEI Problems and Solutions around principles of right-hand Term association as outlined in the 4 methods described below. When we design an end-user use-case, we begin by identifying a key Term to base the scenario around. The following table lists some examples that describe this approach. In these examples, we are comparing how a user input utterance will be resolved to a Problem KR.

User Utterance Example	Problem KR	Solution KR	Match type
I would like a <u>quotation</u>	[person]+[can request]+[<u>quotation</u>]	[I]+[have information on]+[<u>quotation</u>]	direct match
I am <u>hungry</u>	[person]+[can be]+[<u>hungry</u>]	[chicken wings]+[can reduce]+[<u>hunger</u>]	‘the noun form of’ (requires record [hunger]+[is the noun form of]+[hungry])
I am looking for a <u>guitar</u>	[person]+[can request]+[<u>guitar</u>]	[I]+[have information on]+[<u>Gibson 339</u>]	‘is a type of’ (requires record [Gibson 339]+[is a type of]+[guitar])
I want to know about <u>your services</u>	[person]+[can request information on]+[<u>service offering</u>]	[I]+[have information on]+[<u>service offering</u>]	‘can be synonym to’ (requires record [services]+[can be synonym to]+[service offering])

Note in our examples that **‘prepositions’** (like ‘for’ and ‘about’) and **‘articles’** (like ‘a’ and ‘an’) from the User utterance are handled by kama DEI’s Natural Language Understanding (NLU) layer. They **DO NOT** need to be accounted for in your Knowledge Record creation.

A Question of Synonym Strategy – Perhaps one of the most strategic approaches that can be taken, in kama DEI conversational planning, is the selection of the synonyms for the key Terms that assist in the association of the input utterance, to the Problem(s) identified by kama DEI. That is, the well-planned use of synonym KRs to ‘trap’ problem utterances is part of the art, and the science, of kama DEI.

Fortunately, there are definitive platform capabilities for sorting out this issue. We have already discussed that one of kama DEI’s key capabilities is locating multiple Solutions for a single Problem. However, identifying multiple Problems and their related Solutions is also an important feature that assists in providing users with the information they may be looking for, even though they may not have asked the question in the best way.

There is a special situation that occurs when kama DEI encounters multiple Problems and/or Solutions based on key Terms that have a common synonym; let’s consider the following:

- A Knowledge Manager wishes to identify and provide information for several types of sleep issues;
- One sleep Problem, and associated Solution set, deals with **‘sleep hygiene’** and getting improved rest through various practices around healthy sleep and relaxation techniques;
- In a second Problem, and its associated Solutions, the Knowledge Manager wishes to discuss the sleep disorder **‘sleep apnea’**.

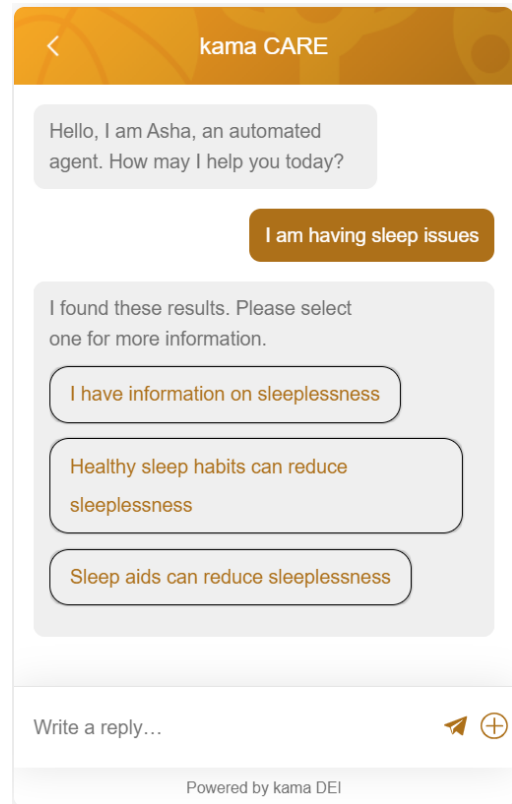
The issue is that there will be at least 1,000 different ways that a visiting client could ask about each sleep issue. Fortunately, kama DEI's NLU component can, and will, do a favorable job in resolving many of these. However, to increase the performance, it is helpful to use a number of synonyms to relate inquiries like 'I'm having sleeping problems' or 'Lately, I have had problems sleeping'.

The concept of the **Lowest Common Denominator** can be quite helpful here. In mathematics, we would look at two or more numbers and consider which smaller number can be a common divisor to the numbers we are interested in. Setting common synonyms can also be helpful here, like the common denominator.

One might think that this is NOT ideal; that kama DEI will confuse the two and not know which issue to address. While that is somewhat true, it is not a user experience concern; it is a benefit. In the case of overlapping synonyms leading to multiple Problems, kama DEI will present the user with the number of Problems that it detects within the user's utterance first before exploring the relevant Solutions. Then, once the user selects the Problem they wish to investigate, kama DEI will proceed with Solution processing and delivery of the list of personalized, prioritized Solutions.

That is, in the case above, where we choose to make 'sleep' a synonym for both 'sleep apnea' and 'sleep hygiene', and the user enters "I'm having sleep issues", kama DEI will respond with a number of Solution categories, in this case, that can address sleep issues. In the same manner, we could also make synonyms for 'restless' and 'sleeping' for "I am having trouble sleeping" or "I'm often restless at night".

An example of this is shown on the right.



Notes on setting Synonyms:

The above scenario identifies a flexible and effective strategy for 2 or more Problem FAQs involving the same word.

In cases where a Term, or its synonym found in the utterance, matches the right-hand Term of only one Problem KR, then kama DEI process only that one Problem through the synonym approach, regardless of how many synonym KRs point to this key Term.

With only one Problem located, kama DEI will go directly to conveying the Solution(s) associated with the key Term that the synonym was pointing to.

Further, if there is only one Solution with Extended Data linked to it, kama DEI will NOT display the Solution record [button], which, in the case of a single Solution, is only that delivery mechanism for the 'payload' Extended Data record(s) that contain the useful information whether text, links or both.

Having stated this, kama DEI has many more configurable options than to just deliver a single Solution with Extended Data Links. All of the following options can be configured in kama DEI:

1. Multiple Problems are identified in the user utterance and the Problems are initially displayed in value-based priority order for selection by the user.
2. One Problem is identified in the user utterance and a list of prioritized value-based priority order is displayed for selection by the user.
3. One Problem is identified in the user utterance and the Solution has an (optional) introductory Extended Data Link description followed by a set of Linking KR records for selection by the user.
4. The Problem has a Value Rating question that asks the user to rate several Values prior to displaying a prioritized set of value-based prioritized Solutions for selection by the user.

These various conversation information flows indicate the flexibility of configuring kama DEI to structure user inquiry and information delivery options.

These, and more advanced methods of structuring information for inquiries and delivering the associated user information, will be covered in a subsequent kama DEI best practice guides.

Coming up in the next Issue:

- Logical Linked Solution Sets
- Prioritizing Solutions with Value Ratings
- Inserting a Value Rating Question
- Building a “chat skills” FAQ helper for your Chat Bot

For more information on the use of kama DEI, drop by our YouTube channel which can be accessed [here](#) or from the icon at the bottom of our website and check out our training video collection.

About kama.ai and the kama DEI Solution:

kama.ai is the creator of the Designed Emotional Intelligence® platform, kama DEI, that allows curated information to be rated and distributed through a conversational agent based on personality value profiles. This allows a level of personalization between the consumer, and an enterprise’s product and service information that has not been achieved previously. The result is an automated consumer engagement service that works around the clock to address consumer inquiries with the right information for the right reasons for each customer.

kama DEI has an underlying knowledge base that unifies common information and an Enterprise Portal that allows non-technical users to curate and rate product and service information in simple natural language methods. The platform also allows for the setup of various target market demographic profiles (kama DEI ‘Persona’s’) to form the basis for various consumer/customer personality types.

kama.ai also offers a rapid launch front-end chatbot that can be configured and integrated within hours to your enterprise’s web and mobile web pages. As an alternative, the kama DEI Chatbot API allows integration to a current chat facility that you may already be using for live chat and it can also power other channels such as Messenger, SMS text or WhatsApp.

For more information on kama DEI, please chat with “Kady” on our website at kama.ai or fill out an inquiry form on our site.