TextSmith

Release 0.0.1

Nov 02, 2020

Contents

A multi-user collaborative platform for creating and inhabiting text based literary worlds.

This is very much a work in progress.

CHAPTER 1

Developer Setup

This project uses Python 3.7+.

1. Ensure you have Redis installed.
2. Clone the repository.
3. Create and start a new virtual environment.
4. `pip install -r requirements.txt`
5. Type `make` to see a list of common developer related tasks. For instance, to run the full test suite and code checks type: `make check`.

The application expects certain configuration settings to be found in the environment. These are (with default settings within parenthesis):

- `TEXTSMITH_REDIS_HOST` (`"localhost"`) - the server running Redis.
- `TEXTSMITH_REDIS_PORT` (`6379`) - the port to use to connect to Redis.
- `TEXTSMITH_REDIS_PASSWORD` (`None`) - the password to use to connect to Redis.
- `TEXTSMITH_REDIS_POOLSIZE` (`10`) - the number of connections in the Redis connection pool.
- `TEXTSMITH_KEY` (`"CHANGEME"`) - the secret key used by the web application for cryptographic operations.
- `TEXTSMITH_DEBUG` (`False`) - the debug flag which results in detailed debug information from the web application. This flag is assumed to be `True` if any value is set in the environment variable.
- `RECAPTCHA_PUBLIC_KEY` (`"CHANGEME"`) - the public key for the reCaptcha v2 challenge in the signup form.
- `RECAPTCHA_PRIVATE_KEY` (`"CHANGEME"`) - the private key for the reCaptcha v2 challenge in the signup form.
- `TEXTSMITH_EMAIL_ADDRESS` (`"CHANGEME"`) - the email address of the account TextSmith uses to send emails to users.
- `TEXTSMITH_EMAIL_PASSWORD` (`"CHANGEME"`) - the password for the email account TextSmith uses to send emails to users.

- `TEXTSMITH_EMAIL_HOST` (`"CHANGEME"`) - the host for the email account TextSmith uses to send emails to users.
- `TEXTSMITH_EMAIL_PORT` (`"CHANGEME"`) - the port for the email account TextSmith uses to send emails to users.

To run TextSmith, `make run` and connect to the local server with your browser. If the `make` command doesn't work, try the following command from the shell: `hypercorn textsmith.app:app`.

JSON based structured logging is emitted to stdout. Each log entry is on a single line and contains a timestamp and details of the system upon which the application is running.

CHAPTER 2

Contents

2.1 Contributing

Hey! Many thanks for wanting to improve TextSmith.

Contributions are welcome without prejudice from *anyone* irrespective of who you are. If you're thinking, "but they don't mean me", *then we especially mean YOU*. Good quality code and constructive engagement with respect, humour and intelligence is what you should aim for.

- If you're from a background which isn't well-represented in most geeky groups, get involved - *we want to help you make a difference*.
- If you're from a background which *is* well-represented in most geeky groups, get involved - *we want your help making a difference*.
- If you're worried about not being technical enough, get involved - *your fresh perspective will be invaluable*.
- If you think you're an imposter, get involved.
- If your day job isn't code, get involved.
- This isn't a group of experts, just people. Get involved!
- We are interested in literature, technology, community and creativity. If you are too, get involved.
- This is a new community. *No-one knows what they are doing*, so, get involved.

We welcome contributors who show *a compassionate and tolerant spirit of being together*.

Feedback may be given for contributions and, where necessary, changes will be politely requested and discussed with the originating author. Respectful yet robust argument is most welcome.

Contributions are subject to the following caveats: the contribution was created by the contributor who, by submitting the contribution, is confirming that they have the authority to submit the contribution and place it under the license as defined in the LICENSE file found within this repository.

2.1.1 Checklist

- If your contribution includes non-obvious technical decision making please make sure you document this.
- Your code should be commented in *plain English* (British spelling).
- If your contribution is for a major block of work and you've not done so already, add yourself to the AUTHORS file following the convention found therein.
- We have 100% test coverage - include tests to maintain this!
- **Before submitting code ensure coding standards and test coverage by running**:

```
make check
```

- If in doubt, ask a question. The only stupid question is the one that's never asked.
- Most importantly, **be creative and have fun!** :-)

2.2 On Being Together

From here. Here's why.

2.3 Architecture

TBD

2.4 API

This API reference is automatically generated from the docstrings found within the source code. It's meant as an easy to use and easy to share window into the code base.

Take a look around! The code is simple and short.

2.4.1 `textsmith.constants`

Constant values for textual worlds. Mostly indicates default names for object attributes.

textsmith.constants.**ALIAS = '.alias'**
The attribute containing a list of the object's aliases.

textsmith.constants.**DESCRIPTION = 'description'**
The attribute giving the full description of an object.

textsmith.constants.**DESTINATION = 'destination'**
The attribute to indicate the destination of an exit.

textsmith.constants.**EMIT = 'emit'**
The attribute describing how an object emits output.

textsmith.constants.**EMOTE = 'emote'**
The attribute describing how an object emotes.

textsmith.constants.**ENTER_ROOM = 'enter_room'**
The attribute describing a user's entrance to a room.

textsmith.constants.**EXIT_ROOM = 'exit_room'**
The attribute describing a user's exit from a room.

textsmith.constants.**HUH = [l'Huh? That doesn't make sense to me.', l'I don't understand tha**
Default messages of last resort when the user's input cannot be parsed. Huh?

textsmith.constants.**IS_DELETED = '.deleted'**
The attribute flagging that an object is deleted.

textsmith.constants.**IS_EXIT = '.exit'**
The attribute to indicate if an object is an exit.

textsmith.constants.**IS_ROOM = '.room'**
The attribute to indicate the object is a room.

textsmith.constants.**IS_SCRIPT = '#!'**
Default indicator at the start of a string to indicate it is a script.

textsmith.constants.**IS_USER = '.user'**
The attribute to indicate an object is a user.

textsmith.constants.**MATCH_OBJECT_ID = re.compile('^#\\d+$')**
Regex for matching object ids. e.g. #1234.

textsmith.constants.**MOVABLE = 'movable'**
The attribute to flag if an object can be moved.

textsmith.constants.**NAME = 'name'**
The attribute containing the object's primary name.

textsmith.constants.**OWNER = '.owner'**
The attribute to indicate an object's owner.

textsmith.constants.**ROOM_ALIASES = [l'here', l'hither']**
Default aliases for the current location.

textsmith.constants.**SAYS = 'say'**
The attribute describing how an object says.

textsmith.constants.**SHOUTS = 'shout'**
The attribute describing how an object shouts.

textsmith.constants.**SUMMARY = 'summary'**
The attribute containing the summary (short) description of an object.

textsmith.constants.**SYSTEM_OUTPUT = '<pre><code>{}</code></pre>'**
The HTML fragment template for system or error messages for the user.

textsmith.constants.**TELL = 'tell'**
The attribute describing how an object tells.

textsmith.constants.**TRAVEL = 'travel'**
The attribute describing movement through an exit.

textsmith.constants.**USER_ALIASES = [l'me', l'myself']**
Default aliases for the current user.

2.4.2 textsmith.datastore

Functions that CRUD state stored in a Redis datastore. Data for objects is stored in Redis Hashes whose values are serialized as strings of JSON.

class textsmith.datastore.**DataStore**(*redis: asyncio_redis.pool.Pool*)
Gathers together methods to implement storage related operations via Redis.

add_object(***attributes*) → int
Create a new object. The new object's parent object is referenced by parent_id.

annotate_object(*object_id: int*, ***attributes*) → None
Annotate attributes to the object.

confirm_user(*confirmation_token: str*, *password: str*) → str
Given a confirmation token sets the referenced password against the email address related to the token. This is the final step in user confirmation.

create_user(*email: str*, *confirmation_token: str*) → int
Create metadata for the new user identified by the referenced email address and using the referenced password. Return the id of the object in the database associated with this user.

delete_attributes(*object_id: int, attributes: Sequence[str]*) → None
Given an object ID and list of attributes, delete them. Returns the number of attributes deleted.

delete_object(*object_id: int*) → None
Soft delete an object from the database. This involves setting the is_deleted flag and ensuring the object isn't contained within another object. The current time is set for the deleted flag.

delete_user(*email: str*) → None
Soft delete the user whilst keeping all the objects owned by the user (who is identified by the referenced email address). This involves setting the user as inactive (so they can't log in) and ensuring they are not contained within another object.

email_to_object_id(*email: str*) → int
Return the id of the in game object representing the player identified by the referenced email address.

get_attribute(*object_id: int*, *attribute: str*) → Union[str, int, float, bool, Sequence[Union[str, int, float, bool]]]
Given an object ID and attribute, return the associated value or raise a KeyError to indicate the attribute doesn't exist on the object.

get_contents(*object_id: int*) → Dict[int, Dict[str, Union[str, int, float, bool, Sequence[Union[str, int, float, bool]]]]]
Return a dictionary containing all the objects contained within the referenced object.

get_last_seen(*user_id: int*) → Optional[datetime.datetime]
Returns a datetime object representing the moment at which the user, whose in-game object is referenced in the arguments, was last seen.

get_location(*object_id*) → Optional[int]
Given an object_id, return the id of the object that contains it. If the object is not contained within another object, return None.

get_objects(*ids: Sequence[int]*) → Dict[int, Dict[str, Union[str, int, float, bool, Sequence[Union[str, int, float, bool]]]]]
Given a list of object IDs, return a dictionary whose keys are object IDs and values are a dictionary of the related attributes of each object.

get_script_context(*user_id: int*) → Dict[KT, VT]
Returns a complete context in order that a script can be executed.

get_user_context(*user_id: int*) → Dict[str, Any]
Return the user object and a representation of the object containing the user. This is used to obtain the minimal context needed for social interactions (saying, emoting etc):

```
{
  "user": { .. object representing the user .. },
  "room": { .. object representing the room .. },
}
```

get_users_in_room(*object_id: int*) → Sequence[Dict[str, Union[str, int, float, bool, Sequence[Union[str, int, float, bool]]]]]
Return a list of object ids for users who are contained within the room identified by the object id passed into the method.

hash_password(*password: str*) → str
Hash a password for safe storage.

inventory_key(*object_id: int*) → str
Given an object id, return the key to use to record the objects contained within the referenced object. This is recording "what do I contain?"

last_seen_key(*user_id: int*) → str
Given a user id, return the key to use to set the timestamp at which the user was last seen on the server.

location_key(*object_id: int*) → str
Given an object id, return the key used to record the id of the object that contains the referenced object. This is recording "who contains me?"

set_container(*object_id: int*, *container_id: int*) → None
Ensure the referenced object is set to be contained by the object referenced as container_id. If the container_id < 0, then the referenced object_id is not contained anywhere.

set_last_seen(*email: str*) → None
Set the last_seen value for the user identified by the referenced object id.

set_user_active(*email: str*, *active_flag: bool = True*) → None
Set the "active" flag against the user identified via the email address to the value of "active_flag".

set_user_password(*email: str*, *password: str*) → bool
Given a user identified by the referenced email address, update their password to the one provided as an argument to this function.

Passwords cannot be set for non-existent users, nor inactive users.

token_key(*token: str*) → str
Given a token value, return the key to use to retrieve the associated user's details.

token_to_email(*confirmation_token: str*) → Optional[str]
Given a confirmation token, will return the related email address. If no email or token exists, returns None.

user_exists(*email: str*) → bool
Returns a boolean indication if a user linked to the referenced email address exists within the system.

user_key(*email: str*) → str
Given a user's unique email address, return the key to use to reference the user in the Redis database.

verify_password(*stored_password: str*, *provided_password: str*) → bool
Verify a stored password hash against a plaintext provided password.

verify_user(*email: str*, *password: str*) → bool
Given an email address and password, will check that the credentials are valid for signing into the system.

2.4.3 textsmith.logic

Functions that implement application logic.

class textsmith.logic.**Logic**(*datastore: textsmith.datastore.DataStore*, *email_host: str*, *email_port: int*, *email_from: str*, *email_password: str*)
Gathers together methods which implement application logic. Uses the dependency injection pattern.

check_email(*email: str*) → bool
Return a boolean indication if an email address is not already taken.

check_token(*confirmation_token: str*) → Optional[str]
Return the email address of the user associated with the token, or None if it doesn't exist.

clarify_object(*user_id: int, message: str, match: Sequence[Dict[KT, VT]]*) → None
A problem match (containing more than one object) needs to be handled by asking the user to clarify or re-state their term of reference to the desired object.

confirm_user(*confirmation_token: str*, *password: str*) → None
Given the user has followed the link containing the confirmation token and successfully set a valid password: update their record, activate them and send them a welcome email.

create_user(*email: str*) → None
Create a user with the referenced email. Email a confirmation link with instructions for setting up a password to the new user.

emit_to_room(*room_id: int, exclude: Sequence[int], message: str*) → None
Emit a message to all users not in the exclude list in the referenced room.

emit_to_user(*user_id: int*, *message: str*) → None
Emit a message to the referenced user. All messages are run through Markdown.

get_attribute_value(*obj: Dict[KT, VT], attribute: str*) → str
Return the value of the referenced object attribute. If the value is a string that starts with `constants.IS_SCRIPT` evaluate it and return the result. Otherwise, return a string representation of the value. If there is no such value, return an empty string.

get_script_context(*user_id: int*, *connection_id: str*, *message_id: str*) → Dict[KT, VT]
Return a dictionary representation of the room-wide context in which the user finds themselves:

```
{
    "user": { ... user's attributes ... },
    "room": { ... room's attributes ... },
    "exits": [{ ... exits from the room ... }, ],
    "users": [{ ... other users in the room ...}, ],
    "things": [{ ... other objects in the room ...}, ],
}
```

get_user_context(*user_id: int*, *connection_id: str*, *message_id: str*) → Dict[KT, VT]
Return a dictionary representation of the immediate context in which the user finds themselves:

```
{
    "user": { ... user's attributes ... },
    "room": { ... room's attributes ... },
}
```

match_object(*identifier: str, context: Dict[KT, VT]*) → Tuple[Sequence[Dict[KT, VT]], str]
Given a potentially ambiguous user entered identifier, try to find a matching object in the given context.

An object's name, object id or alias is assumed to begin the identifier string. The identifier string is always normalised: it is stripped of leading and trailing whitespace and matches are case insensitive.

An object id is an integer starting with "#". For example, #123.

A name or alias may be a multi-word reference to the object.

A match will be the shortest sequence of words that also match the id, name or aliases of those objects that are the current user, the current room, exits from the current room, other users within the current room and things found in the current room all in the current context.

The special aliases found in constants.USER_ALIASES always refer to the current user, and aliases found in constants.ROOM_ALIASES refer to the current room.

This method returns two values: a list of matching objects (or an empty list of no matches found), and a string representing the token that made the match (or an empty string if there were no matches).

For example, given the identifier: "#378 some more text", the return values will be a list containing a single dictionary representing the object with the id 378, and a string "#378" to indicate it was "#378" that caused the match.

matches_name(*name: str, obj: Dict[KT, VT]*) → bool
Returns a boolean indication if the referenced object matches the given name. This is case insensitive and checks the name and alias list for a name match.

no_matching_object(*user_id: int*, *message: str*) → None
There is a problem because the expected object match could not be found. Report this and ask the user to clarify or re-state their term of reference to the desired object.

send_email (*message: email.message.EmailMessage*) → None
Asynchronously log and send the referenced email.message.EmailMessage.

set_last_seen (*email: str*) → None
Set the last_seen timestamp to time.now() for the user with the referenced email address.

verify_credentials (*email: str*, *password: str*) → int
Given a user's email and password, return the user's in-game object id or else 0 to indicate verification failed.

2.4.4 textsmith.log

Configure structured logging.

textsmith.log.**host_info** (*logger*, *log_method*, *event_dict: dict*) → dict
Add useful information to each log entry about the system upon which the application is running.

2.4.5 textsmith.parser

Functions for parsing the user input. Calls into the game logic layer to affect changes and read data from the datastore.

class textsmith.parser.**Parser** (*logic: textsmith.logic.Logic*)
Gathers together methods to parse user input. Uses the dependency injection pattern.

eval (*user_id: int*, *connection_id: str*, *message: str*) → None
Evaluate the user's input message. If there's an error, recover by sending the error message from the associated exception object.

handle_exception (*user_id: int*, *connection_id: str*, *message_id: str*, *message: str*, *exception: Exception*) → None
Given an exception raised in the logic or parsing layer of the game, extract the useful message which explains what the problem is, and turn it into a message back to the referenced user.

parse(*user_id: int*, *connection_id: str*, *message_id: str*, *message: str*) → None

Parse the incoming message from the referenced user.

There are four special characters which, if they start the message, act as shortcuts for common communication related activities:

- `"` - the user says whatever follows in the message.
- `!` - make it appear like the user is shouting the message.
- `:` - "emote" the message directly as "username " + message.
- `@` - the user is saying something directly to another @user.

Next the parser expects the first word of the message to be a verb. If this verb is one of several built-in commands, the remainder of the message is passed as a single string into the relevant function for that verb (as defined in the verbs module). These verbs are translated by Babel, so the equivalent verbs in the user's preferred locale (if supported by TextSmith) should work instead.

If the verb isn't built into the game engine, then the parser breaks the raw input apart into sections that follow the following patterns:

```
VERB
VERB DIRECT-OBJECT
VERB DIRECT-OBJECT PREPOSITION INDIRECT-OBJECT
```

Examples of these patterns are:

```
look
take sword
give big sword to andrew
say "Hello there" to nicholas
```

NOTE: English articles ("a", "the" etc) shouldn't be used in commands.

Verbs that start sentences are assumed to be single words. Direct objects and indirect objects may be identified via multiple words.

Anything enclosed in double-quotes (") is treated as a single entity if in the direct-object or indirect-object position. The parser will try to match objects against available aliases available in the current room's context. If there are no matches or multiple matches then the parser will retain the string representation of the direct-object or indirect-object.

The following lists of reserved words are synonyms:

- `constants.USER_ALIASES` - the user.
- `constants.ROOM_ALIASES` - the current location.

These reserved words are actually translated by Babel, so the equivalent terms in the user's preferred locale (if supported by TextSmith) should work instead.

At this point the parser has identified the verb string, and the direct and indirect objects. It looks for a matching verb on the four following objects (in order or precedence):

1. The user giving the command.
2. The room the user is in (including where the verb is an exit name).
3. The direct object (if an object in the database).
4. The indirect object (if an object in the database).

The game checks each object in turn and, if it finds an attribute that matches the verb it attempts to "execute" it.

Mostly, the attribute's value will be returned. However, if the attribute's value is a string and that string starts with the characters defined in constants.IS_SCRIPT, then it'll attempt to evaluate the rest of the string as a script (see the script module for more detail of how this works).

If such "executable" attributes are found then the associated code will be run with the following objects in scope:

- `user` - a reference to the user who issued the command.
- `room` - a reference to the room in which the user is situated.
- `exits` - objects that allow the user to move out of the current room.
- `users` - objects representing other users currently in the current room.
- `things` - all the other objects currently in the room.
- `this` - a reference to the object which matched the verb (the user, room or other object in scope).
- `direct_object` - either the matching object or raw string for the direct object. This could be `None`.
- `preposition` - a string containing the preposition. This could be `None`.
- `indirect_object` - either the matching object or raw string for the indirect object. This could be `None`.
- `raw_input` - the raw (html escaped) string from the user that caused the script to be run.

The user, room, direct_object and indirect_object objects can all be passed to a special "emit" function along with a message to display to that object (if the object is a user, it'll be sent just to them, if the object is a room, the message will be sent to all users in that room).

That's it!

2.4.6 `textsmith.pubsub`

The pub/sub message passing methods and handlers needed for TextSmith.

class `textsmith.pubsub.`**PubSub**(*subscriber: asyncio_redis.protocol.Subscription*)

Contains methods needed to manage listening for messages broadcast on the pub/sub layer of the game.

get_message(*user_id: int*) → str

Return the next message in the message queue for the referenced user. Otherwise, return an empty string (indicating no messages).

listen() → None
Listen to the messages on subscribed channels. Each channel represents an object ID. If the object ID is a user connected to this application, then it's put into the message queue for that user, to be sent via the websocket connection.

stop() → None
Cleanly stop listening to the Redis PubSub.

subscribe(*user_id: int*, *connection_id: str*) → None
Ensure there's an entry for the referenced user's message queue. Add the user ID to the list of channels this instance subscribes to via Redis. Log this event.

unsubscribe(*user_id: int*, *connection_id: str*) → None
Remove the user ID from the list of channels to which this instance subscribes via Redis. Delete the message queue for the referenced user. Log this event. If there are undelivered messages, log these.

2.4.7 textsmith.verbs

Contains definitions of verbs built into the system that encompass the core behaviours possible within the system.

exception textsmith.verbs.**UnknownVerb**
An exception that indicates the passed in verb was not found.

class textsmith.verbs.**Verbs**(*logic: textsmith.logic.Logic*)
Contains definitions of built-in verbs. These express the core fundamental capabilities of the world. Everything else is expressed in the scripting language.

The methods for verbs should NOT be called directly. Rather just call the Verb object with the verb written as appropriately for the user's locale and the translation to the actual method to use will happen automatically.

_emote(*user_id: int*, *connection_id: str*, *message_id: str*, *message: str*) → None
Emote the message to everyone in the current location.

_say(*user_id: int*, *connection_id: str*, *message_id: str*, *message: str*) → None
Say the message to everyone in the current location.

_shout(*user_id: int*, *connection_id: str*, *message_id: str*, *message: str*) → None
Shout () the message to everyone in the current location.

_tell(*user_id: int*, *connection_id: str*, *message_id: str*, *message: str*) → None
Say the message to a specific person whilst being overheard by everyone else in the current location.

2.5 License

TextSmith's code is licensed with the Gnu Affero GPL. Please contact the maintainer, Nicholas H.Tollervey (ntoll@ntoll.org) should you require more information.

2.5.1 GNU AFFERO GENERAL PUBLIC LICENSE

Version 3, 19 November 2007

Preamble

The GNU Affero General Public License is a free, copyleft license for software and other kinds of works, specifically designed to ensure cooperation with the community in the case of network server software.

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Developers that use our General Public Licenses protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License which gives you legal permission to copy, distribute and/or modify the software.

A secondary benefit of defending all users' freedom is that improvements made in alternate versions of the program, if they receive widespread use, become available for other developers to incorporate. Many developers of free software are heartened and encouraged by the resulting cooperation. However, in the case of software used on network servers, this result may fail to come about. The GNU General Public License permits making a modified version and letting the public access it on a server without ever releasing its source code to the public.

The GNU Affero General Public License is designed specifically to ensure that, in such cases, the modified source code becomes available to the community. It requires the operator of a network server to provide the source code of the modified version running there to the users of that server. Therefore, public use of a modified version, on a publicly accessible server, gives the public access to the source code of the modified version.

An older license, called the Affero General Public License and published by Affero, was designed to accomplish similar goals. This is a different license, not a version of the Affero GPL, but Affero has released a new version of the Affero GPL which permits relicensing under this license.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS

0. Definitions.

"This License" refers to version 3 of the GNU Affero General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as "you". "Licensees" and "recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based on the Program.

To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

1. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

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2.6 Authors

The following folks have made significant contributions to TextSmith's development:

Nicholas H.Tollervey - creator and maintainer.

2.7 Acknowledgements

TextSmith wouldn't be possible without the work of many others who have made their code freely available for all to use. In no particular order I'd like to recognise the contributions of:

- Cole Maclean for aiosmtplib.
- Jonathan Slenders for asyncio-redis.
- Hsiaoming Yang for flask-wtf.
- Phil Jones for quart.
- David Beazley for sly.

- Hynek Schlawack for structlog.
- The PyTest project for pytest.
- The Python Babel developers for flask-babel.
- The Pallets project for jinja.
- The Sphinx team for Sphinx.
- The folks at Read the Docs for making it so easy for documentation like this to be hosted online.
- Innumerable Python developers for many contributions to such a flourishing ecosystem.
- The folks behind Redis.

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