django-autocomplete-light Documentation

Release 3.3.0

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Contents


pypi package
3.3.0rc6
build
failing

CHAPTER 1

Features

- Python 2.7, 3.4, Django 1.8+ support,
- Django (multiple) choice support,
- Django (multiple) model choice support,
- Django generic foreign key support (through django-querysetsequence),
- Django generic many to many relation support (through django-generic-m2m and django-gm2m)
- Multiple widget support: select2.js, easy to add more.
- Creating choices that don't exist in the autocomplete,
- Offering choices that depend on other fields in the form, in an elegant and innovant way,
- Dynamic widget creation (ie. inlines), supports YOUR custom scripts too,
- Provides a test API for your awesome autocompletes, to support YOUR custom use cases too,
- A documented, automatically tested example for each use case in test_project.

CHAPTER 2

Upgrading

See CHANGELOG..

For v2 users and experts, a blog post was published with plenty of details.

CHAPTER 3

Resources

- **Documentation** graciously hosted by RTFD
- Video demo graciously hosted by Youtube,
- Mailing list graciously hosted by Google
- For **Security** issues, please contact yourlabs-security@googlegroups.com
- Git graciously hosted by GitHub,
- Package graciously hosted by PyPi,
- Continuous integration graciously hosted by Travis-ci
- **Online paid support** provided via HackHands,

CHAPTER 4

Basics

4.1 Install django-autocomplete-light v3

4.1.1 Install in your project

Install version 3 with `pip install`:

```
pip install django-autocomplete-light
```

Or, install the dev version with git:

```
pip install -e git+https://github.com/yourlabs/django-autocomplete-light.git
↪#egg=django-autocomplete-light
```

Note: If you are trying to install from git, please make sure you are not using **zip/archive** url of the repo `django-autocomplete-light` since it will not contain required submodules automatically. Otherwise these submodules will then need to be updated separately using `git submodule update --init`.

4.1.2 Configuration

Then, to let Django find the static files we need by adding to `INSTALLED_APPS`, **before** `django.contrib.admin` and `grappelli` if present:

```
'dal',
'dal_select2',
# 'grappelli',
'django.contrib.admin',
```

This is to override the `jquery.init.js` script provided by the admin, which sets up jQuery with `noConflict`, making jQuery available in `django.jQuery` only and not `$`.

To enable more DAL functionalities we will have to add other DAL apps to `INSTALLED_APPS`, such as 'dal_queryset_sequence' ...

JQuery 3.x

JQuery 3.x comes with a "slim" version. This version is not compatible with DAL since the slim version does not contain Ajax functionality.

4.1.3 Install the demo project

Install the demo project in a temporary virtualenv for testing purpose:

```
cd /tmp
virtualenv -p python3 dal_env
source dal_env/bin/activate
pip install django
pip install -e git+https://github.com/yourlabs/django-autocomplete-light.git
↪#egg=django-autocomplete-light
cd dal_env/src/django-autocomplete-light/test_project/
pip install -r requirements.txt
./manage.py migrate
./manage.py createsuperuser
./manage.py runserver
# go to http://localhost:8000/admin/ and login
```

4.2 django-autocomplete-light tutorial

4.2.1 Overview

Autocompletes are based on 3 moving parts:

- widget compatible with the model field, does the initial rendering,
- javascript widget initialization code, to trigger the autocomplete,
- and a view used by the widget script to get results from.

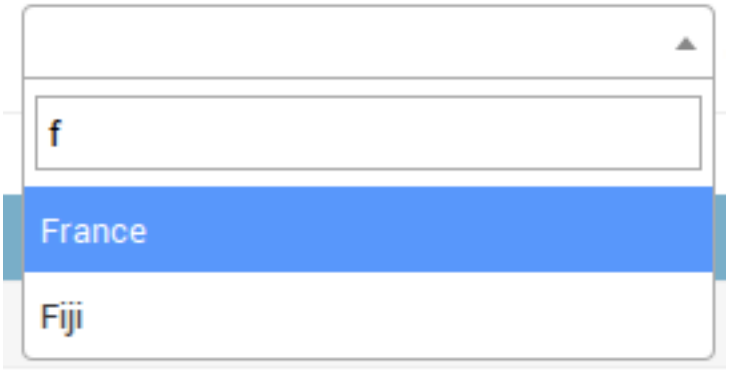
4.2.2 Create an autocomplete view

- Example source code: test_project/select2_foreign_key
- Live demo: /select2_foreign_key/test-autocomplete/?q=test

The only purpose of the autocomplete view is to serve relevant suggestions for the widget to propose to the user. DAL leverages Django's class based views and Mixins to for code reuse.

Note: Do **not** miss the Classy Class-Based Views website which helps a lot to work with class-based views in general.

In this tutorial, we'll first learn to make autocompletes backed by a QuerySet. Suppose we have a Country Model which we want to provide a Select2 autocomplete widget for in a form. If a users types an "f" it would propose "Fiji", "Finland" and "France", to authenticated users only:



The base view for this is *Select2QuerySetView*.

```
from dal import autocomplete

from your_countries_app.models import Country


class CountryAutocomplete(autocomplete.Select2QuerySetView):
    def get_queryset(self):
        # Don't forget to filter out results depending on the visitor !
        if not self.request.user.is_authenticated():
            return Country.objects.none()

        qs = Country.objects.all()

        if self.q:
            qs = qs.filter(name__istartswith=self.q)

        return qs
```

Note: For more complex filtering, refer to official documentation for the `QuerySet API`.

4.2.3 Register the autocomplete view

Create a `named url` for the view, ie:

```
from your_countries_app.views import CountryAutocomplete

urlpatterns = [
    url(
        r'^country-autocomplete/$',
        CountryAutocomplete.as_view(),
        name='country-autocomplete',
    ),
]
```

Ensure that the url can be reversed, ie:

```
./manage.py shell
In [1]: from django.urls import reverse
In [2]: #older django versions: from django.core.urlresolvers import reverse
```

```
In [3]: reverse('country-autocomplete')
Out[2]: u'/country-autocomplete/'
```

Danger: As you might have noticed, we have just exposed data through a public URL. Please don't forget to do proper permission checks in get_queryset.

4.2.4 Use the view in a Form widget

You should be able to open the view at this point:

"pagination": {"more": false}, "results": [{"text": "France", "id": 50}, {"text": "Fiji", "id": 51}]}

We can now use the autocomplete view our Person form, for its `birth_country` field that's a `ForeignKey`. So, we're going to override the default ModelForm fields, to use a widget to select a Model with Select2, in our case by passing the name of the url we have just registered to *ModelSelect2*.

One way to do it is by overriding the form field, ie:

```
from dal import autocomplete

from django import forms


class PersonForm(forms.ModelForm):
    birth_country = forms.ModelChoiceField(
        queryset=Country.objects.all(),
        widget=autocomplete.ModelSelect2(url='country-autocomplete')
    )

    class Meta:
        model = Person
        fields = ('__all__')
```

Another way to do this is directly in the `Form.Meta.widgets` dict, if overriding the field is not needed:

```
from dal import autocomplete

from django import forms


class PersonForm(forms.ModelForm):
    class Meta:
        model = Person
        fields = ('__all__')
        widgets = {
            'birth_country': autocomplete.ModelSelect2(url='country-autocomplete')
        }
```

If we need the country autocomplete view for a widget used for a ManyToMany relation instead of a ForeignKey, with a model like that:

```
class Person(models.Model):
    visited_countries = models.ManyToManyField('your_countries_app.country')
```

Then we would use the *ModelSelect2Multiple* widget, ie.:

```
widgets = {
    'visited_countries': autocomplete.ModelSelect2Multiple(url='country-autocomplete')
}
```

4.2.5 Passing options to select2

Select2 supports a bunch of options. These options may be set in data-* attributes. For example:

```
# Instanciate a widget with a bunch of options for select2:
autocomplete.ModelSelect2(
    url='select2_fk',
    attrs={
        # Set some placeholder
        'data-placeholder': 'Autocomplete ...',
        # Only trigger autocompletion after 3 characters have been typed
        'data-minimum-input-length': 3,
    },
)
```

Note: Setting a placeholder will result in generation of an an empty `option` tag, which select2 requires.

4.2.6 Using autocompletes in the admin

We can make ModelAdmin to `use our form`, ie:

```
from django.contrib import admin

from your_person_app.models import Person
from your_person_app.forms import PersonForm


class PersonAdmin(admin.ModelAdmin):
    form = PersonForm
admin.site.register(Person, PersonAdmin)
```

Note that this also works with inlines, ie:

```
class PersonInline(admin.TabularInline):
    model = Person
    form = PersonForm
```

4.2.7 Using autocompletes outside the admin

- Example source code: test_project/select2_outside_admin,
- Live demo: /select2_outside_admin/.

Ensure that jquery is loaded before `{{ form.media }}`:

```
{% extends 'base.html' %}
{# Don't forget that one ! #}
{% load static %}

{% block content %}
<div>
    <form action="" method="post">
        {% csrf_token %}
        {{ form.as_p }}
        <input type="submit" />
    </form>
</div>
{% endblock %}

{% block footer %}
<script type="text/javascript" src="{% static 'admin/js/vendor/jquery/jquery.js' %}">
↪</script>

{{ form.media }}
{% endblock %}
```

4.2.8 Displaying results using custom HTML

You can display custom HTML code for results by setting the `data-html` attribute on your widget and overriding the view `get_result_label()` method to return HTML code.

```
from django.utils.html import format_html

class CountryAutocomplete(autocomplete.Select2QuerySetView):
    def get_result_label(self, item):
        return format_html('<img src="flags/{}.png"> {}', item.name, item.name)


class PersonForm(forms.ModelForm):
    class Meta:
        widgets = {
            'birth_country': autocomplete.ModelSelect2(
                url='country-autocomplete',
                attrs={'data-html': True}
            )
        }
```

Note: Take care to escape anything you put in HTML code to avoid XSS attacks when displaying data that may have been input by a user! *format_html* helps.

4.2.9 Displaying selected result differently than in list

You can display selected result in different way than results in list by overriding the view `get_selected_result_label()` method.

```
class CountryAutocomplete(autocomplete.Select2QuerySetView):
    def get_result_label(self, item):
        return item.full_name

    def get_selected_result_label(self, item):
        return item.short_name
```

Setting the `data-html` attribute affects both selected result and results in list. If you want to enable HTML separately set `data-selected-html` or `data-result-html` attribute respectively.

4.2.10 Overriding javascript code

We need javascript initialization for the widget both when:

- the page is loaded,
- a widget is dynamically added, ie. with formsets.

This is handled by `autocomplete.init.js`, which is going to trigger an event called `autocompleteLightInitialize` on any HTML element with attribute `data-autocomplete-light-function` both on page load and DOM node insertion. It also keeps track of initialized elements to prevent double-initialization.

Take `dal_select2` for example, it is initialized by `dal_select2/static/autocomplete_light/select2.js` as such:

```
$(document).on('autocompleteLightInitialize', '[data-autocomplete-light-
↪function=select2]', function() {
    // do select2 configuration on $(this)
})
```

This example defines a callback that does `// do select2 configuration on $(this)` when the `autocompleteLightInitialize` event is triggered on any element with an attribute `data-autocomplete-light-function` of value `select2`. Select2 Widgets have an `autocomplete_function` of value `select2`, and that's rendered as the value of the `data-autocomplete-light-function` attribute.

So, you can replace the default callback by doing two things:

- change the Widget's `autocomplete_function` attribute,
- add a callback for the `autocompleteLightInitialize` event for that function,

Example widget:

```
class YourWidget(ModelSelect2):
    autocomplete_function = 'your-autocomplete-function'
```

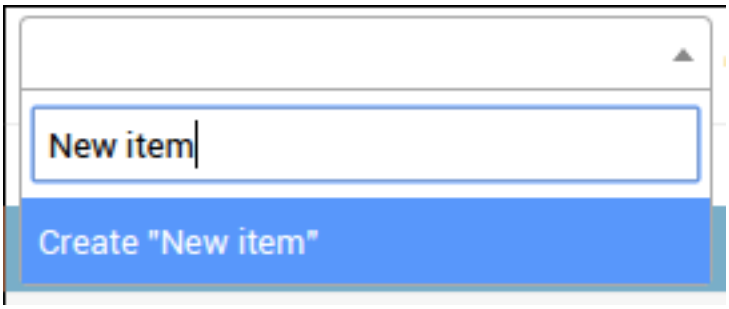
Example script:

```
$(document).on(
    'autocompleteLightInitialize',
    '[data-autocomplete-light-function=your-autocomplete-function]',
function() {
    // do your own script setup here
})
```

4.2.11 Creation of new choices in the autocomplete form

- Example source code: test_project/select2_one_to_one,
- Live demo: /admin/select2_one_to_one/testmodel/add/,

The view may provide an extra option when it can't find any result matching the user input. That option would have the label `Create "query"`, where `query` is the content of the input and corresponds to what the user typed in. As such:



This allows the user to create objects on the fly from within the AJAX widget. When the user selects that option, the autocomplete script will make a POST request to the view. It should create the object and return the pk, so the item will then be added just as if it already had a PK:

To enable this, first the view must know how to create an object given only `self.q`, which is the variable containing the user input in the view. Set the `create_field` view option to enable creation of new objects from within the autocomplete user interface, ie:

```
urlpatterns = [
    url(
        r'^country-autocomplete/$',
        CountryAutocomplete.as_view(create_field='name'),
        name='country-autocomplete',
    ),
]
```

This way, the option 'Create "Tibet"' will be available if a user inputs "Tibet" for example. When the user clicks it, it will make the post request to the view which will do `Country.objects.create(name='Tibet')`. It will be included in the server response so that the script can add it to the widget.

Note that creating objects is allowed to logged-in users with `add` permission on the resource. If you want to grant `add` permission to a user, you have to explicitly set it with something like:

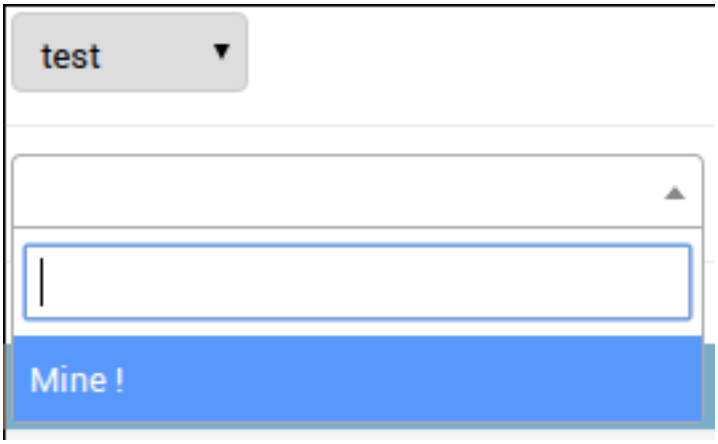
```
permission = Permission.objects.get(name='Can add your-model-name')
user.user_permissions.add(permission)
```

4.2.12 Filtering results based on the value of other fields in the form

- Example source code: test_project/linked_data.
- Live demo: Admin / Linked Data / Add.

In the live demo, create a TestModel with `owner=None`, and another with `owner=test` (test being the user you log in with). Then, in in a new form, you'll see both options if you leave the owner select empty:

But if you select `test` as an owner, and open the autocomplete again, you'll only see the option with `owner=test`:



Let's say we want to add a "Continent" choice field in the form, and filter the countries based on the value on this field. We then need the widget to pass the value of the continent field to the view when it fetches data. We can use the `forward` widget argument to do this:

```
class PersonForm(forms.ModelForm):
    continent = forms.ChoiceField(choices=CONTINENT_CHOICES)

    class Meta:
        model = Person
        fields = ('__all__')
        widgets = {
            'birth_country': autocomplete.ModelSelect2(url='country-autocomplete',
                                                       forward=['continent'])
        }
```

DAL's Select2 configuration script will get the value fo the form field named `'continent'` and add it to the autocomplete HTTP query. This will pass the value for the "continent" form field in the AJAX request, and we can then filter as such in the view:

```
class CountryAutocomplete(autocomplete.Select2QuerySetView):
    def get_queryset(self):
        if not self.request.user.is_authenticated():
            return Country.objects.none()
```

```
        qs = Country.objects.all()

        continent = self.forwarded.get('continent', None)

        if continent:
            qs = qs.filter(continent=continent)

        if self.q:
            qs = qs.filter(name__istartswith=self.q)

        return qs
```

4.3 Types of forwarded values

There are three possible types of value which you can get from `self.forwarded` field: boolean, string or list of strings. DAL forward JS applies the following rules when figuring out which type to use when you forward particular field:

- if there is only one field in the form or subform with given name

and this field is a checkbox without `value` HTML-attribute, then a boolean value indicating if this checkbox is checked is forwarded;

- if there is only one field in the form or subform with given name

and it has `multiple` HTML-attribute, then this field is forwarded as a list of strings, containing values from this field. - if there are one or more fields in the form with given name and all of them are checkboxes with HTML-attribute `value` set, then the list of strings containing checked checkboxes is forwarded. - Otherwise field value forwarded as a string.

- Example source code: test_project/rename_forward.
- Live demo: Admin / Rename Forward/ Add.

Let's assume that you have the following form using linked autocomplete fields:

```
class ShippingForm(forms.Form):
    src_continent = forms.ModelChoiceField(
        queryset=Continent.objects.all(),
        widget=autocomplete.ModelSelect2(url='continent-autocomplete'))
    src_country = forms.ModelChoiceField(
        queryset=Country.objects.all(),
        widget=autocomplete.ModelSelect2(
            url='country-autocomplete',
            forward=('src_continent',)))
```

And the following autocomplete view for country:

```
class CountryAutocomplete(autocomplete.Select2QuerySetView):
    def get_queryset(self):
        if not self.request.is_authenticated():
            return Country.objects.none()

        qs = Country.objects.all()

        continent = self.forwarded.get('continent', None)
```

```
        if continent:
            qs = qs.filter(continent=continent)

        if self.q:
            qs = qs.filter(name__istartswith=self.q)

        return qs
```

You cannot use this autocomplete view together with your form because the name forwarded from the form differs from the name that autocomplete view expects.

You can rename forwarded fields using class-based forward declaration to pass *src_continent* value as *continent*:

```
from dal import forward

class ShippingForm(forms.Form):
    src_continent = forms.ModelChoiceField(
        queryset=Continent.objects.all(),
        widget=autocomplete.ModelSelect2(url='continent-autocomplete'))
    src_country = forms.ModelChoiceField(
        queryset=Country.objects.all(),
        widget=autocomplete.ModelSelect2(
            url='country-autocomplete',
            forward=(forward.Field('src_continent', 'continent'),)))
```

Of course, you can mix up string-based and class-based forwarding declarations:

```
some_field = forms.ModelChoiceField(
        queryset=SomeModel.objects.all(),
        widget=autocomplete.ModelSelect2(
            url='some-autocomplete',
            forward=(
                'f1',  # String based declaration
                 forward.Field('f2'),  # Works the same way as above declaration
                 forward.Field('f3', 'field3'),  # With rename
                 forward.Const(42, 'f4')  # Constant forwarding (see below)
                 )
```

The other thing you can do with class-based forwarding declaration is to forward an arbitrary constant without adding extra hidden fields to your form.

```
from dal import forward

class EuropeanShippingForm(forms.Form):
    src_country = forms.ModelChoiceField(
        queryset=Country.objects.all(),
        widget=autocomplete.ModelSelect2(
            url='country-autocomplete',
            forward=(forward.Const('europe', 'continent'),)))
```

For *src_country* field "europe" will always be forwarded as *continent* value.

Quite often (especially in multiselect) you may want to exclude value which is already selected from autocomplete dropdown. Usually it can be done by forwarding a field by name.

```
from dal import forward
```

```
class SomeForm(forms.Form):
    countries = forms.ModelMultipleChoiceField(
        queryset=Country.objects.all(),
        widget=autocomplete.ModelSelect2Multiple(
            url='country-autocomplete',
            forward=("countries", )
```

For this special case DAL provides a shortcut named `Self()`.

```
from dal import forward

class SomeForm(forms.Form):
    countries = forms.ModelMultipleChoiceField(
        queryset=Country.objects.all(),
        widget=autocomplete.ModelSelect2Multiple(
            url='country-autocomplete',
            forward=(forward.Self())
```

In this case the value from `countries` will be available from autocomplete view as `self.forwarded['self']`. Of course, you can customize destination name by passing `dst` parameter to `Self` constructor.

DAL tries hard to reasonably forward any standard HTML form field. For some non-standard fields DAL logic could be not good enough. For these cases DAL provides a way to customize forwarding logic using JS callbacks. You can register JS forward handler on your page:

Then you should add forward declaration to your field as follows:

```
from dal import forward

class ShippingForm(forms.Form):
    country = forms.ModelChoiceField(
        queryset=Country.objects.all(),
        widget=autocomplete.ModelSelect2(
            url='country-autocomplete',
            forward=(forward.Javascript('my_awesome_handler', 'magic_number'),)))
```

In this case the value returned from your registered handler will be forwarded to autocomplete view as `magic_number`.

4.4 Building blocks for custom logic

Javascript logic for forwarding field values is a bit sophisticated. In order to forward field value DAL searches for the field considering form prefixes and then decides how to forward it to the server (should it be list, string or boolean value). When you implement your own logic for forwarding you may want to reuse this logic from DAL.

For this purpose DAL provides two JS functions:

- `getFieldRelativeTo(element, name)` - get field by `name` relative to this

autocomplete field just like DAL does when forwarding a field.

- `getValueFromField(field)` - get value to forward from `field` just like

DAL does when forwarding a field.

For the purpose of understanding the logic: you can implement forwarding of some standard field by yourself as follows (you probably should never write this code yourself):

You can use the `$.getFormPrefix()` jQuery plugin used by DAL to clear the `birth_country` autocomplete widget from the above example when the `continent` field changes with such a snippet:

```
$(document).ready(function() {
    // Bind on continent field change
    $(':input[name$=continent]').on('change', function() {
        // Get the field prefix, ie. if this comes from a formset form
        var prefix = $(this).getFormPrefix();

        // Clear the autocomplete with the same prefix
        $(':input[name=' + prefix + 'birth_country]').val(null).trigger('change');
    });
});
```

To autoload the script with the form, you can use Form.Media.

4.4.1 Autocompleting based on a List of Strings

Sometimes it is useful to specify autocomplete choices based on a list of strings rather than a QuerySet. This can be achieved with the *Select2ListView* class:

```
class CountryAutocompleteFromList(autocomplete.Select2ListView):
    def get_list(self):
        return ['France', 'Fiji', 'Finland', 'Switzerland']
```

This class can then be registered as in the previous example. Suppose we register it under URL 'country-list-autocomplete'. We can then a create a ListSelect2 widget with:

```
widget = autocomplete.ListSelect2(url='country-list-autocomplete')
```

With this in place, if a user types the letter `f` in the widget, choices 'France', 'Fiji', and 'Finland' would be offered. Like the Select2QuerySetView, the Select2ListView is case insensitive.

Two fields are provided, *Select2ListChoiceField*, *Select2ListCreateChoiceField* that can be used to make it easier to avoid problems when using Select2ListView. For example:

```
def get_choice_list():
    return ['France', 'Fiji', 'Finland', 'Switzerland']


class CountryForm(forms.ModelForm):
    country = autocomplete.Select2ListChoiceField(
        choice_list=get_choice_list,
        widget=autocomplete.ListSelect2(url='country-list-autocomplete')
    )
```

Since the selections in Select2ListView map directly to a list, there is no built-in support for choices in a ChoiceField that do not have the same value for every text. `Select2ListCreateChoiceField` allows you to provide custom text from a Select2List widget and should be used if you define `Select2ListViewAutocomplete.create`.

It is better to use the same source for `Select2ListViewAutocomplete.get_list` in your view and the `Select2ListChoiceField choice_list` kwarg to avoid unexpected behavior.

An opt-group version is available in a similar fashion by inheriting Select2GroupListView :

```
class CountryAutocompleteFromList(autocomplete.Select2GroupListView):
    def get_list(self):
```

```
        return [
            ("Country", ['France', 'Fiji', 'Finland', 'Switzerland'])
        ]
```

CHAPTER 5

External app support

5.1 Autocompletion for GenericForeignKey

5.1.1 Model example

Consider such a model:

```
from django.contrib.contenttypes.fields import GenericForeignKey
from django.db import models


class TestModel(models.Model):
    name = models.CharField(max_length=200)

    content_type = models.ForeignKey(
        'contenttypes.ContentType',
        null=True,
        blank=True,
        editable=False,
    )

    object_id = models.PositiveIntegerField(
        null=True,
        blank=True,
        editable=False,
    )

    location = GenericForeignKey('content_type', 'object_id')

    def __str__(self):
        return self.name
```

5.1.2 View example for QuerySetSequence and Select2

To enable the use for QuerySetSequence we need to add 'dal_queryset_sequence' to `INSTALLED_APPS`.

We'll need a view that will provide results for the select2 frontend, and that uses QuerySetSequence as the backend. Let's try *`Select2QuerySetSequenceView`* for this:

```
from dal_select2_queryset_sequence.views import Select2QuerySetSequenceView

from queryset_sequence import QuerySetSequence

from your_models import Country, City


class LocationAutocompleteView(Select2QuerySetSequenceView):
    def get_queryset(self):
        countries = Country.objects.all()
        cities = City.objects.all()

        if self.q:
            countries = countries.filter(continent__icontains=self.q)
            cities = cities.filter(country__name__icontains=self.q)

        # Aggregate querysets
        qs = QuerySetSequence(countries, cities)

        if self.q:
            # This would apply the filter on all the querysets
            qs = qs.filter(name__icontains=self.q)

        # This will limit each queryset so that they show an equal number
        # of results.
        qs = self.mixup_querysets(qs)

        return qs
```

Register the view in urlpatterns as usual, ie.:

```
from .views import LocationAutocompleteView

urlpatterns = [
    url(
        r'^location-autocomplete/$',
        LocationAutocompleteView.as_view(),
        name='location-autocomplete'
    ),
]
```

5.1.3 Form example

As usual, we need a backend-aware widget that will make only selected choices to render initially, to avoid butchering the database. As we're using a QuerySetSequence and Select2, we'll try *`QuerySetSequenceSelect2`* widget.

Also, we need a field that's able to use a QuerySetSequence for choices to do validation on a single model choice, we'll use *`QuerySetSequenceModelField`*.

Finnaly, we can't use Django's ModelForm because it doesn't support non-editable fields, which GenericForeignKey is. Instead, we'll use *`FutureModelForm`*.

Result:

```
class TestForm(autocomplete.FutureModelForm):
    location = dal_queryset_sequence.fields.QuerySetSequenceModelField(
        queryset=autocomplete.QuerySetSequence(
            Country.objects.all(),
            City.objects.all(),
        ),
        required=False,
        widget=dal_select2_queryset_sequence.widgets.QuerySetSequenceSelect2(
↪'location-autocomplete'),
    )

    class Meta:
        model = TestModel
```

5.2 Autocompletion for django-gm2m's GM2MField

5.2.1 Model example

Consider such a model, using django-gm2m to handle generic many-to-many relations:

```
from django.db import models

from gm2m import GM2MField


class TestModel(models.Model):
    name = models.CharField(max_length=200)

    locations = GM2MField()

    def __str__(self):
        return self.name
```

5.2.2 View example

The *View example for QuerySetSequence and Select2* works here too: we're relying on Select2 and QuerySetSequence again.

5.2.3 Form example

As usual, we need a backend-aware widget that will make only selected choices to render initially, to avoid butchering the database. As we're using a QuerySetSequence and Select2, we'll try *QuerySetSequenceSelect2Multiple* widget.

Also, we need a field that's able to use a QuerySetSequence for choices to validate multiple models, and then update the GM2MField relations: *GM2MQuerySetSequenceField*.

Finnaly, we can't use Django's ModelForm because it doesn't support non-editable fields, which GM2MField is. Instead, we'll use *FutureModelForm*.

Example:

```
class TestForm(autocomplete.FutureModelForm):
    locations = autocomplete.GM2MQuerySetSequenceField(
        queryset=autocomplete.QuerySetSequence(
            Country.objects.all(),
            City.objects.all(),
        ),
        required=False,
        widget=autocomplete.QuerySetSequenceSelect2Multiple(
            'location-autocomplete'),
    )

    class Meta:
        model = TestModel
        fields = ('name',)
```

5.3 Autocompletion for django-generic-m2m's RelatedObjectsDescriptor

5.3.1 Model example

Consider such a model, using django-generic-m2m to handle generic many-to-many relations:

```
from django.db import models

from genericm2m.models import RelatedObjectsDescriptor


class TestModel(models.Model):
    name = models.CharField(max_length=200)

    locations = RelatedObjectsDescriptor()

    def __str__(self):
        return self.name
```

5.3.2 View example

The *View example for QuerySetSequence and Select2* works here too: we're relying on Select2 and QuerySetSequence again.

5.3.3 Form example

As usual, we need a backend-aware widget that will make only selected choices to render initially, to avoid butchering the database. As we're using a QuerySetSequence and Select2 for multiple selections, we'll try `QuerySetSequenceSelect2Multiple` widget.

Also, we need a field that's able to use a QuerySetSequence for choices to validate multiple models, and then update the RelatedObjectsDescriptor relations: `GenericM2MQuerySetSequenceField`.

Finnaly, we can't use Django's ModelForm because it doesn't support non-editable fields, which RelatedObjectsDescriptor is. Instead, we'll use `FutureModelForm`.

Example:

```
class TestForm(autocomplete.FutureModelForm):
    locations = autocomplete.GenericM2MQuerySetSequenceField(
        queryset=autocomplete.QuerySetSequence(
            Country.objects.all(),
            City.objects.all(),
        ),
        required=False,
        widget=autocomplete.QuerySetSequenceSelect2Multiple(
            'location-autocomplete'),
    )

    class Meta:
        model = TestModel
        fields = ('name',)
```

5.4 Autocompletion for django-tagging's TagField

5.4.1 Model example

Consider such a model, using `django-tagging` to handle tags for a model:

```
from django.db import models

from tagging.fields import TagField


class TestModel(models.Model):
    name = models.CharField(max_length=200)

    tags = TagField()

    def __str__(self):
        return self.name
```

5.4.2 View example

The *QuerySet view* works here too: we're relying on Select2 and a QuerySet of Tag objects:

```
from dal import autocomplete

from tagging.models import Tag


class TagAutocomplete(autocomplete.Select2QuerySetView):
    def get_queryset(self):
        # Don't forget to filter out results depending on the visitor !
        if not self.request.user.is_authenticated():
            return Tag.objects.none()

        qs = Tag.objects.all()

        if self.q:
```

```
            qs = qs.filter(name__istartswith=self.q)

        return qs
```

Note: Don't forget to *Register the autocomplete view*.

5.4.3 Form example

As usual, we need a backend-aware widget that will make only selected choices to render initially, to avoid butchering the database.

As we're using a QuerySet of Tag and Select2 in its "tag" appearance, we'll use `TaggitSelect2`. It is compatible with the default form field created by the model field: `TagField`.

Example:

```
class TestForm(autocomplete.FutureModelForm):
    class Meta:
        model = TestModel
        fields = ('name',)
        widgets = {
            'tags': autocomplete.TaggingSelect2(
                'your-taggit-autocomplete-url'
            )
        }
```

5.5 Autocompletion for django-taggit's TaggableManager

5.5.1 Model example

Consider such a model, using django-taggit to handle tags for a model:

```
from django.db import models

from taggit.managers import TaggableManager


class TestModel(models.Model):
    name = models.CharField(max_length=200)

    tags = TaggableManager()

    def __str__(self):
        return self.name
```

5.5.2 View example

The *QuerySet view* works here too: we're relying on Select2 and a QuerySet of Tag objects:

```
from dal import autocomplete

from taggit.models import Tag


class TagAutocomplete(autocomplete.Select2QuerySetView):
    def get_queryset(self):
        # Don't forget to filter out results depending on the visitor !
        if not self.request.user.is_authenticated():
            return Tag.objects.none()

        qs = Tag.objects.all()

        if self.q:
            qs = qs.filter(name__istartswith=self.q)

        return qs
```

Don't forget to *Register the autocomplete view*.

Note: For more complex filtering, refer to official documentation for the `QuerySet API`.

5.5.3 Form example

As usual, we need a backend-aware widget that will make only selected choices to render initially, to avoid butchering the database.

As we're using a QuerySet of Tag and Select2 in its "tag" appearance, we'll use *`TaggitSelect2`*. It is compatible with the default form field created by the model field: TaggeableManager - which actually inherits `django.db.models.fields.Field` and `django.db.models.fields.related.RelatedField` and **not** from `django.db.models.Manager`.

Example:

```
class TestForm(autocomplete.FutureModelForm):
    class Meta:
        model = TestModel
        fields = ('name',)
        widgets = {
            'tags': autocomplete.TaggitSelect2(
                'your-taggit-autocomplete-url'
            )
        }
```

CHAPTER 6

API

6.1 dal: django-autocomplete-light3 API

6.1.1 Views

Base views for autocomplete widgets.

class dal.views.**BaseQuerySetView**(***kwargs*)
Base view to get results from a QuerySet.

create_field
Name of the field to use to create missing values. For example, if create_field='title', and the user types in "foo", then the autocomplete view will propose an option 'Create "foo"' if it can't find any value matching "foo". When the user does click 'Create "foo"', the autocomplete script should POST to this view to create the object and get back the newly created object id.

model_field_name
Name of the Model field to run filter against.

create_object(*text*)
Create an object given a text.

get_queryset()
Filter the queryset with GET['q'].

get_result_label(*result*)
Return the label of a result.

get_result_value(*result*)
Return the value of a result.

get_selected_result_label(*result*)
Return the label of a selected result.

has_add_permission(*request*)
Return True if the user has the permission to add a model.

has_more(*context*)
For widgets that have infinite-scroll feature.

post(*request*)
Create an object given a text after checking permissions.

class dal.views.**ViewMixin**
Common methods for autocomplete views.

It is assumed this view will be used in conjunction with a Django `View` based class that will that will implement OPTIONS.

forwarded
Dict of field values that were forwarded from the form, may be used to filter autocompletion results based on the form state. See `linked_data` example for reference.

q
Query string as typed by the user in the autocomplete field.

dispatch(*request*, **args*, ***kwargs*)
Set *`forwarded`* and *`q`*.

6.1.2 Widgets

Autocomplete widgets bases.

class dal.widgets.**QuerySetSelectMixin**(*url=None*, *forward=None*, **args*, ***kwargs*)
QuerySet support for choices.

filter_choices_to_render(*selected_choices*)
Filter out un-selected choices if choices is a QuerySet.

class dal.widgets.**Select**(*url=None*, *forward=None*, **args*, ***kwargs*)
Replacement for Django's Select to render only selected choices.

class dal.widgets.**SelectMultiple**(*url=None*, *forward=None*, **args*, ***kwargs*)
Replacement SelectMultiple to render only selected choices.

class dal.widgets.**WidgetMixin**(*url=None*, *forward=None*, **args*, ***kwargs*)
Base mixin for autocomplete widgets.

url
Absolute URL to the autocomplete view for the widget. It can be set to a a URL name, in which case it will be reversed when the attribute is accessed.

forward
List of field names to forward to the autocomplete view, useful to filter results using values of other fields in the form.

Items of the list must be one of the following:

- string (e. g. "some_field"): forward a value from the field with named "some_field";
- 'dal.forward.Field("some_field"): the same as above;
- 'dal.forward.Field("some_field", "dst_field"): forward a value from the field with named "some_field" as "dst_field";
- 'dal.forward.Const("some_value", "dst_field"): forward a constant value "some_value" as "dst_field".

autocomplete_function
Identifier of the javascript callback that should be executed when such a widget is loaded in the DOM, either on page load or dynamically.

build_attrs(**args*, ***kwargs*)
Build HTML attributes for the widget.

filter_choices_to_render(*selected_choices*)
Replace self.choices with selected_choices.

optgroups(*name*, *value*, *attrs=None*)
Exclude unselected self.choices before calling the parent method.

Used by Django>=1.10.

render(*name*, *value*, *attrs=None*, ***kwargs*)
Call Django render together with *render_forward_conf*.

render_forward_conf(*id*)
Render forward configuration for the field.

render_options(**args*)
Django-compatibility method for option rendering.

Should only render selected options, by setting self.choices before calling the parent method.

Remove this code when dropping support for Django<1.10.

6.1.3 Fields

6.2 FutureModelForm

tl;dr: See FutureModelForm's docstring.

Many apps provide new related managers to extend your django models with. For example, django-tagulous provides a TagField which abstracts an M2M relation with the Tag model, django-gm2m provides a GM2MField which abstracts an relation, django-taggit provides a TaggableManager which abstracts a relation too, django-generic-m2m provides RelatedObjectsDescriptor which abstracts a relation again.

While that works pretty well, it gets a bit complicated when it comes to encapsulating the business logic for saving such data in a form object. This is three-part problem:

- getting initial data,
- saving instance attributes,
- saving relations like reverse relations or many to many.

Django's ModelForm calls the model field's `value_from_object()` method to get the initial data. `FutureModelForm` tries the `value_from_object()` method from the form field instead, if defined. Unlike the model field, the form field doesn't know its name, so `FutureModelForm` passes it when calling the form field's `value_from_object()` method.

Django's ModelForm calls the form field's `save_form_data()` in two occasions:

- in `_post_clean()` for model fields in `Meta.fields`,
- in `_save_m2m()` for model fields in `Meta.virtual_fields` and `Meta.many_to_many`, which then operate on an instance which as a PK.

If we just added `save_form_data()` to form fields like for `value_from_object()` then it would be called twice, once in `_post_clean()` and once in `_save_m2m()`. Instead, `FutureModelForm` would call the following methods from the form field, if defined:

- `save_object_data()` in `_post_clean()`, to set object attributes for a given value,
- `save_relation_data()` in `_save_m2m()`, to save relations for a given value.

For example:

- a generic foreign key only sets instance attributes, its form field would do that in `save_object_data()`,
- a tag field saves relations, its form field would do that in `save_relation_data()`.

class dal.forms.**FutureModelForm**(**args*, ***kwargs*)
ModelForm which adds extra API to form fields.

Form fields may define new methods for FutureModelForm:

- `FormField.value_from_object(instance, name)` should return the initial value to use in the form, overrides `ModelField.value_from_object()` which is what ModelForm uses by default,
- `FormField.save_object_data(instance, name, value)` should set instance attributes. Called by `save()` **before** writting the database, when `instance.pk` may not be set, it overrides `ModelField.save_form_data()` which is normally used in this occasion for non-m2m and non-virtual model fields.
- `FormField.save_relation_data(instance, name, value)` should save relations required for value on the instance. Called by `save()` **after** writting the database, when `instance.pk` is necessarely set, it overrides `ModelField.save_form_data()` which is normally used in this occasion for m2m and virtual model fields.

For complete rationale, see this module's docstring.

save(*commit=True*)
Backport from Django 1.9+ for 1.8.

6.3 dal_select2: Select2 support for DAL

This is a front-end module: it provides views and widgets.

6.3.1 Views

Select2 view implementation.

class dal_select2.views.**Select2GroupListView**(***kwargs*)
View mixin for grouped options.

get(*request*, **args*, ***kwargs*)
Return option list with children(s) json response.

get_item_as_group(*entry*)
Return the item with its group.

class dal_select2.views.**Select2ListView**(***kwargs*)
Autocomplete from a list of items rather than a QuerySet.

autocomplete_results(*results*)
Return list of strings that match the autocomplete query.

get(*request*, **args*, ***kwargs*)
Return option list json response.

get_list()
Return the list strings from which to autocomplete.

post(*request*)
Add an option to the autocomplete list.

If 'text' is not defined in POST or self.create(text) fails, raises bad request. Raises ImproperlyConfigured if self.create if not defined.

results(*results*)
Return the result dictionary.

class dal_select2.views.**Select2QuerySetView**(***kwargs*)
List options for a Select2 widget.

class dal_select2.views.**Select2ViewMixin**
View mixin to render a JSON response for Select2.

get_create_option(*context*, *q*)
Form the correct create_option to append to results.

get_results(*context*)
Return data for the 'results' key of the response.

render_to_response(*context*)
Return a JSON response in Select2 format.

6.3.2 Widgets

Select2 widget implementation module.

class dal_select2.widgets.**ListSelect2**(*url=None*, *forward=None*, **args*, ***kwargs*)
Select widget for regular choices and Select2.

class dal_select2.widgets.**ModelSelect2**(*url=None*, *forward=None*, **args*, ***kwargs*)
Select widget for QuerySet choices and Select2.

class dal_select2.widgets.**ModelSelect2Multiple**(*url=None*, *forward=None*, **args*, ***kwargs*)
SelectMultiple widget for QuerySet choices and Select2.

class dal_select2.widgets.**Select2**(*url=None*, *forward=None*, **args*, ***kwargs*)
Select2 widget for regular choices.

class dal_select2.widgets.**Select2Multiple**(*url=None*, *forward=None*, **args*, ***kwargs*)
Select2Multiple widget for regular choices.

class dal_select2.widgets.**Select2WidgetMixin**
Mixin for Select2 widgets.

build_attrs(**args*, ***kwargs*)
Set data-autocomplete-light-language.

media
Automatically include static files for the admin.

class dal_select2.widgets.**TagSelect2**(*url=None*, *forward=None*, **args*, ***kwargs*)
Select2 in tag mode.

build_attrs(**args*, ***kwargs*)
Automatically set data-tags=1.

format_value(*value*)
Return the list of HTML option values for a form field value.

optgroups(*name*, *value*, *attrs=None*)
Return a list of one optgroup and selected values.

option_value(*value*)
Return the HTML option value attribute for a value.

options(*name*, *value*, *attrs=None*)
Return only select options.

value_from_datadict(*data*, *files*, *name*)
Return a comma-separated list of options.

This is needed because Select2 uses a multiple select even in tag mode, and the model field expects a comma-separated list of tags.

6.3.3 Fields

Select2 field implementation module.

class dal_select2.fields.**Select2ListChoiceField**(*choice_list=None*, *required=True*, *widget=None*, *label=None*, *initial=None*, *help_text=''*, **args*, ***kwargs*)
Allows a list of values to be used with a ChoiceField.

Avoids unusual things that can happen if Select2ListView is used for a form where the text and value for choices are not the same.

class dal_select2.fields.**Select2ListCreateChoiceField**(*choice_list=None*, *required=True*, *widget=None*, *label=None*, *initial=None*, *help_text=''*, **args*, ***kwargs*)
Skips validation of choices so any value can be used.

validate(*value*)
Do not validate choices but check for empty.

6.3.4 Test tools

Helpers for DAL user story based tests.

class dal_select2.test.**Select2Story**
Define Select2 CSS selectors.

clean_label(*label*)
Remove the "remove" character used in select2.

wait_script()
Wait for scripts to be loaded and ready to work.

6.4 dal_contenttypes: GenericForeignKey support

6.4.1 Fields

Model choice fields that take a ContentType too: for generic relations.

class dal_contenttypes.fields.**ContentTypeModelFieldMixin**
Common methods for form fields for GenericForeignKey.

ModelChoiceFieldMixin expects options to look like:

```
<option value="4">Model #4</option>
```

With a ContentType of id 3 for that model, it becomes:

```
<option value="3-4">Model #4</option>
```

prepare_value(*value*)
Return a ctypeid-objpk string for value.

class dal_contenttypes.fields.**ContentTypeModelMultipleFieldMixin**
Same as ContentTypeModelFieldMixin, but supports value list.

prepare_value(*value*)
Run the parent's method for each value.

class dal_contenttypes.fields.**GenericModelMixin**
GenericForeignKey support for form fields, with FutureModelForm.

GenericForeignKey enforce editable=false, this class implements save_object_data() and value_from_object() to allow FutureModelForm to compensate.

save_object_data(*instance*, *name*, *value*)
Set the attribute, for FutureModelForm.

value_from_object(*instance*, *name*)
Get the attribute, for FutureModelForm.

6.5 dal_select2_queryset_sequence: Select2 for QuerySetSequence choices

6.5.1 Views

View for a Select2 widget and QuerySetSequence-based business logic.

class dal_select2_queryset_sequence.views.**Select2QuerySetSequenceView**(***kwargs*)
Combines support QuerySetSequence and Select2 in a single view.

Example usage:

```
url(
    '^your-generic-autocomplete/$',
    autocomplete.Select2QuerySetSequenceView.as_view(
        queryset=autocomplete.QuerySetSequence(
            Group.objects.all(),
            TestModel.objects.all(),
        )
```

```
    ),
    name='your-generic-autocomplete',
)
```

It is compatible with the *widgets* and the fields of `dal_contenttypes`, suits generic relation autocompletes.

get_results(*context*)
Return a list of results usable by Select2.

It will render as a list of one <optgroup> per different content type containing a list of one <option> per model.

6.5.2 Wigets

Widgets for Select2 and QuerySetSequence.

They combine *Select2WidgetMixin* and `QuerySetSequenceSelectMixin` with Django's Select and SelectMultiple widgets, and are meant to be used with generic model form fields such as those in `dal_contenttypes`.

class dal_select2_queryset_sequence.widgets.**QuerySetSequenceSelect2**(*url=None*, *forward=None*, **args*, ***kwargs*)
Single model select for a generic select2 autocomplete.

class dal_select2_queryset_sequence.widgets.**QuerySetSequenceSelect2Multiple**(*url=None*, *forward=None*, **args*, ***kwargs*)
Multiple model select for a generic select2 autocomplete.

6.6 dal_queryset_sequence: QuerySetSequence choices

6.6.1 Views

View that supports QuerySetSequence.

class dal_queryset_sequence.views.**BaseQuerySetSequenceView**(***kwargs*)
Base view that uses a QuerySetSequence.

Compatible with form fields which use a ContentType id as well as a model pk to identify a value.

get_model_name(*model*)
Return the name of the model, fetch parent if model is a proxy.

get_paginate_by(*queryset*)
Don't paginate if `mixup`.

get_queryset()
Mix results from all querysets in QuerySetSequence if self.mixup.

get_result_value(*result*)
Return ctypeid-objectid for result.

has_more(*context*)
Return False if `mixup`.

mixup_querysets(*qs*)
Return a queryset with different model types.

6.6.2 Fields

Autocomplete fields for QuerySetSequence choices.

class dal_queryset_sequence.fields.**QuerySetSequenceFieldMixin**
Base methods for QuerySetSequence fields.

get_content_type_id_object_id(*value*)
Return a tuple of ctype id, object id for value.

get_queryset_for_content_type(*content_type_id*)
Return the QuerySet from the QuerySetSequence for a ctype.

raise_invalid_choice(*params=None*)
Raise a ValidationError for invalid_choice.

The validation error left unprecise about the exact error for security reasons, to prevent an attacker doing information gathering to reverse valid content type and object ids.

class dal_queryset_sequence.fields.**QuerySetSequenceModelField**(*queryset*, *empty_label=u'———'*, *required=True*, *widget=None*, *label=None*, *initial=None*, *help_text=u''*, *to_field_name=None*, *limit_choices_to=None*, **args*, ***kwargs*)
Replacement for ModelChoiceField supporting QuerySetSequence choices.

to_python(*value*)
Given a string like '3-5', return the model of ctype #3 and pk 5.

Note that in the case of ModelChoiceField, to_python is also in charge of security, it's important to get the results from self.queryset.

class dal_queryset_sequence.fields.**QuerySetSequenceModelMultipleField**(*queryset*, *required=True*, *widget=None*, *label=None*, *initial=None*, *help_text=u''*, **args*, ***kwargs*)
ModelMultipleChoiceField with support for QuerySetSequence choices.

6.6.3 Widgets

Widget mixin that only renders selected options with QuerySetSequence.

For details about why this is required, see *dal.widgets*.

class dal_queryset_sequence.widgets.**QuerySetSequenceSelect**(*url=None*, *forward=None*, **args*, ***kwargs*)

Select widget for QuerySetSequence choices.

class dal_queryset_sequence.widgets.**QuerySetSequenceSelectMixin**(*url=None*, *forward=None*, **args*, ***kwargs*)

Support QuerySetSequence in WidgetMixin.

filter_choices_to_render(*selected_choices*)

Overwrite self.choices to exclude unselected values.

class dal_queryset_sequence.widgets.**QuerySetSequenceSelectMultiple**(*url=None*, *forward=None*, **args*, ***kwargs*)

SelectMultiple widget for QuerySetSequence choices.

6.7 dal_gm2m_queryset_sequence

6.7.1 Fields

Form fields for using django-gm2m with QuerySetSequence.

class dal_gm2m_queryset_sequence.fields.**GM2MQuerySetSequenceField**(*queryset*, *required=True*, *widget=None*, *label=None*, *initial=None*, *help_text=u''*, **args*, ***kwargs*)

Form field for QuerySetSequence to django-generic-m2m relation.

6.8 dal_genericm2m_queryset_sequence

6.8.1 Fields

Autocomplete fields for django-queryset-sequence and django-generic-m2m.

class dal_genericm2m_queryset_sequence.fields.**GenericM2MQuerySetSequenceField**(*queryset*, *required=True*, *widget=None*, *label=None*, *initial=None*, *help_text=u''*, **args*, ***kwargs*)

Autocomplete field for GM2MField() for QuerySetSequence choices.

6.9 dal_gm2m: django-gm2m support

6.9.1 Fields

GM2MField support for autocomplete fields.

class dal_gm2m.fields.**GM2MFieldMixin**

GM2MField ror FutureModelForm.

save_relation_data(*instance*, *name*, *value*)

Save the relation into the GM2MField.

value_from_object(*instance*, *name*)

Return the list of objects in the GM2MField relation.

6.10 dal_genericm2m: django-genericm2m support

6.10.1 Fields

django-generic-m2m field mixin for FutureModelForm.

class dal_genericm2m.fields.**GenericM2MFieldMixin**

Form field mixin able to get / set instance generic-m2m relations.

save_relation_data(*instance*, *name*, *value*)

Update the relation to be `value`.

value_from_object(*instance*, *name*)

Return the list of related objects.

6.11 dal_select2_taggit: django-taggit support

6.11.1 Fields

Widgets for Select2 and django-taggit.

class dal_select2_taggit.widgets.**TaggitSelect2**(*url=None*, *forward=None*, **args*, ***kwargs*)

Select2 tag widget for taggit's TagField.

build_attrs(**args*, ***kwargs*)
Add data-tags="","

option_value(*value*)
Return tag.name attribute of value.

render_options(**args*)
Render only selected tags.

Remove when Django < 1.10 support is dropped.

value_from_datadict(*data*, *files*, *name*)
Handle multi-word tag.

Insure there's a comma when there's only a single multi-word tag, or tag "Multi word" would end up as "Multi" and "word".

6.12 dal_select2_tagging: django-tagging support

6.12.1 Fields

Widgets for Select2 and django-taggit.

class dal_select2_tagging.widgets.**TaggingSelect2**(*url=None*, *forward=None*, **args*, ***kwargs*)

Select2 tag widget for tagging's TagField.

render_options(**args*)
Render only selected tags.

CHAPTER 7

Indices and tables

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