Project Documentation

EXPENSIO

(Web project using Django & HTML/CSS)

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Project

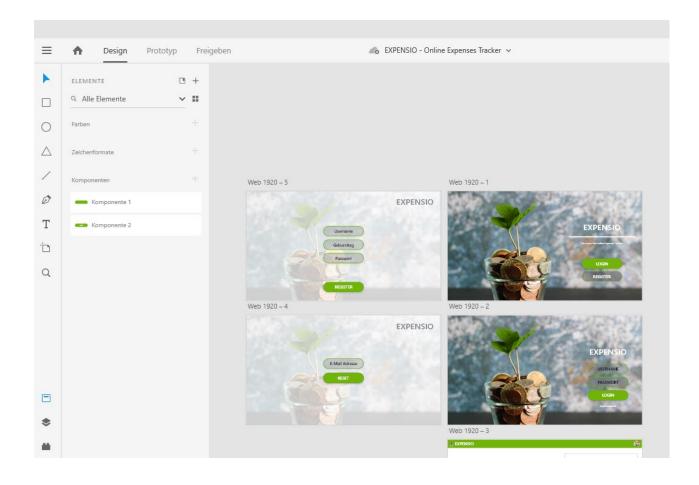
Ideas Description

The basic idea is to program a simple expense tracker using Django, with which you can record expenses, assign categories, create a budget for different expenses and a simple csv export and import function as well as overviews via charts. The App should be responsive and follow an intuitive usage concept.

- Tracking Expenses (CRUD)
- Import/Export Function
- Create Budget (CRUD)
- Tags or Categories (CRUD)
- User Management (Multiuser compatible)

Mockup / Paper Prototypes

We used AdobeXD and Paper Prototypes for our Mockups to design the basic functionalities.



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System Description

Used Technologies:

Programming Language	Python, HTML, JavaScript
Webframework	Django V. 3.0.6
Mockup Tool	AdobeXD
IDE / Editor	PyCharm / Emacs
Database	SQLite V. 3
OR-Mapper	Django-ORM
Version Control System	Github, Git Version 2.26.0
Documentation	Docstrings Sphinx's
Project Management	Github Kanban Board

External Packages/Libraries

django-crispy-forms V. 1.9.1: https://github.com/django-crispy-forms/django-crispy-forms

Bootstrap V. 4.4.1: https://getbootstrap.com/docs/4.4/getting-started/introduction/Chart.js V. 2.9.3: https://www.chartjs.org/docs/latest/getting-started/installation.html Font Awesome: https://fontawesome.com/

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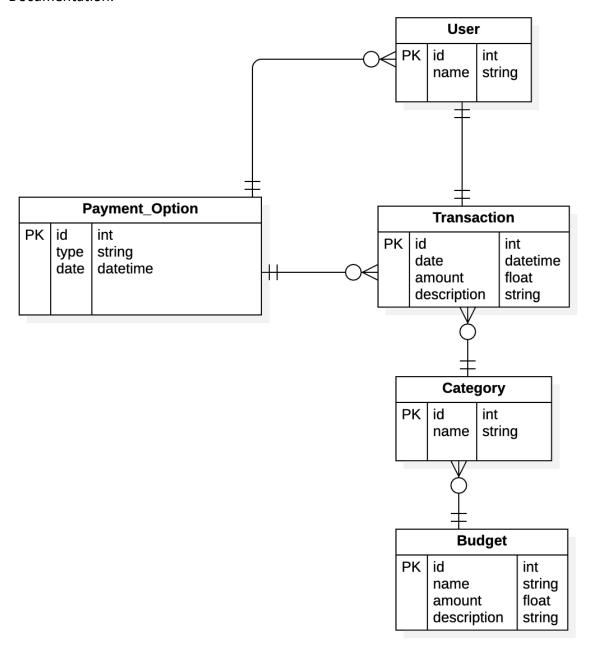
Design Decisions

- 1. Every user can only see his own data. That includes all budgets, transactions, and categories.
- 2. To see the functions, a user has to be logged in. If he wants to open a page with a required login status, the user is redirected to the login page.
- 3. For this project, the company data, contact person for data protection, imprint etc. are not mentioned.
- 4. The app uses only CHF as Currency.
- 5. CSV Upload is only possible in a predefined format. This format gets explained on the upload Page.
- 6. Payment types are given.
- 7.

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Database

ER Diagram – without Foreign Keys. FK are visible in the Data Model Section of this Documentation.



The ER Diagramm.mdj File and a png of the ER Diagram are available on Github:

SS-20-Information-Systems-Development---Expense-Tracker/doc/**Diagrams**/

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Data Model in Django

Transaction Data Model:

```
class Transaction_Expense(models.Model):
    date = models.DateTimeField()
    amount = models.DecimalField(max_digits=19, decimal_places=2)
    description = models.CharField(max_length=200, default="")
    user = models.ForeignKey("auth.User", on_delete=models.CASCADE)
    category = models.ForeignKey(Category, on_delete=models.CASCADE, null=True)
    payment = models.ForeignKey(Payment, on_delete=models.CASCADE, null=True)
Payment_Option Data Model:
class Payment(models.Model):
    VISA = "VISA"
    MASTERCARD = "MASTERCARD"
    BANK = "BANK"
    CRYPTO = "CRYPTO"
    CASH = "CASH"
    PAYMENT_TYPE = [
        (CASH, "Cash"),
        (VISA, "Visa"),
        (MASTERCARD, "Mastercard"),
        (BANK, "Bank"),
        (CRYPTO, "Crypto"),
    type = models.CharField(max_length=50, choices=PAYMENT_TYPE, default=CASH, )
    date = models.DateTimeField()
    description = models.CharField(max_length=100, default="")
    user = models.ForeignKey("auth.User", on_delete=models.CASCADE)
    def __str__(self):
        return f"Type: {self.type}, Description: {self.description}"
User Data Model:
class UserProfileSettingConfig(models.Model):
    user = models.OneToOneField(User, on_delete=models.CASCADE)
    description = models.CharField(max_length=100, default='')
    city = models.CharField(max_length=200, default='')
    phone = models.IntegerField(default=0)
def create_user_profile(sender, instance, created, **kwargs):
    if created:
        UserProfileSettingConfig.objects.create(user=instance)
```

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post_save.connect(create_user_profile, sender=User)

Category Data Model:

```
class Category(models.Model):
    name = models.CharField(max_length=100)
    created_date = models.DateTimeField(auto_now_add=True)
    user = models.ForeignKey("auth.User", on_delete=models.CASCADE)

"""

Returns self.name instead of object.object
"""

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

def get_absolute_url(self):
    return reverse("category-detail", kwargs={"pk": self.pk})
```

Budget Data Model:

```
class Budget(models.Model):
    name = models.CharField(max_length=50)
    amount = models.FloatField(null=True)
    description = models.CharField(max_length=200)

    created_date = models.DateTimeField(auto_now_add=True)
    user = models.ForeignKey("auth.User", on_delete=models.CASCADE)
    category = models.ForeignKey(Category, on_delete=models.CASCADE, null=True)

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

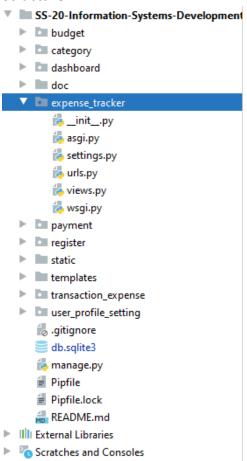
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Code

This project should be following the pep8 formatting standard, which should be carried out by the used editors PEP 8.

EXPENSIO uses several APP's to provide the different functionalities.

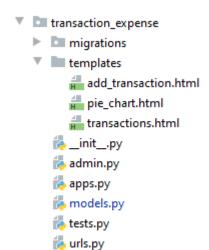
Structure



The folder expense_tracker holds the settings, urls and views python files.

EXPENSIO App's are:

- budget
- category
- dashboard
- payment
- register
- transaction_expense
- user profile setting



🐌 views.py

APP's Structure

Every APP uses their own templates folder to store all templates, has a urls.py file with all the connections between the views with templates and the URL path.

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URL's

In the main urls.py file in the folder expense_tracker is the include statement for the urls.py files in the different APP's.

Urls.py of expense_tracker

```
urlpatterns = [
    path("", views.welcome, name="welcome"),
    path("dashboard/", include("dashboard.urls")),
    path("category/", include("category.urls")),
    path("budget/", include("budget.urls")),
    path("admin/", admin.site.urls),
    path("register/", register_view.register, name="register"),
    path(
        "login/",
        auth_view.LoginView.as_view(template_name="register/login.html"),
        name="login",
    ),
    path(
        "logout/",
        auth_view.LogoutView.as_view(template_name="register/logout.html"),
        name="logout",
    ),
    path("", include("django.contrib.auth.urls")),
    path("transaction/", include("transaction_expense.urls")),
    path("payment/", include("payment.urls")),
    path("profile/", include("user_profile_setting.urls")),
    path("profile/", include("user_profile_setting.urls")),
1]
```

Example of urls.py file in an APP - expense_tracker

```
urlpatterns = [
    path("", login_required(TransactionExpenseListView.as_view()), name="transactions"),
    path(
        "add/",
        login_required(TransactionExpenseCreateView.as_view()),
        name="add_transaction",
    ),
    path(
        "<int:pk>/edit",
        login_required(TransactionExpenseEditView.as_view()),
        name="edit_transaction",
    ).
    path("<int:pk>/delete", login_required(TransactionExpenseDeleteView.as_view())),
        "pie_chart/",
        login_required(views.transaction_expense_pie_chart),
        name="pie-chart",
    ),
ı
```

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Views

The views.py file hold the Code for the view generation and Code to provide the functions for the view generation or provide the needed data in the return.

Example of a view Class generation

```
class UserProfileSettingConfigView(TemplateView):
    template_name = "user_profile_detail.html"

def form_valid(self, form):
    form_to_save = form.save(commit=False)
    form_to_save.user = self.request.user
    return super(UserProfileSettingConfigView, self).form_valid(form)
```

```
Example of csv import function
   # https://docs.djangoproject.com/en/3.0/topics/db/queries/#creating-objects
   # https://stackoverflow.com/questions/8636760/parsing-a-datetime-string-into-a-django-datetimefield
   # https://www.foxinfotech.in/2018/09/python-how-to-skip-first-line-in-csv.html
   def transaction_upload(request):
Ex
       template = "user_profile_detail.html"
       prompt = {"order": "Date, Amount, User, Payment, Description, Category"}
# <u>h</u>
       if request.method == "GET":
# h
           return render(request, template, prompt)
def
       csv_file = request.FILES["file"]
       data_set = csv_file.read().decode("UTF-8")
       user = request.user
       csv_data = csv.reader(data_set.split("\n"), delimiter=",", quotechar='"')
       next(csv_data)
       for column in csv_data:
           if len(column) is not 0:
               # print('column: ', column)
               csv_date = parse_datetime(column[0])
               csv_amount = column[1]
               csv_payment_data = column[3]
               csv_description = column[4]
               csv_category = column[5]
               user = User.objects.get(username=user)
               category = Category.objects.get(name=csv_category, user=user)
               csv_payment_type, csv_payment_description = get_payment(csv_payment_data)
               payment = Payment.objects.get(type=csv_payment_type, user=user)
               transaction = Transaction_Expense(
                   date=csv_date,
                   amount=csv_amount,
                   user=user,
                   category=category,
                   payment=payment,
                    description=csv_description,
               transaction.save()
       context = {}
       return render(request, template, context)
```

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Example of login function

```
# https://www.youtube.com/watch?v=z4lfVsb_7MA - for creating the login
# https://www.youtube.com/watch?v=3aVqWaLjqS4
@login_required
def profile(request, *args, **kwargs):
    return render(request, "profile.html")
```

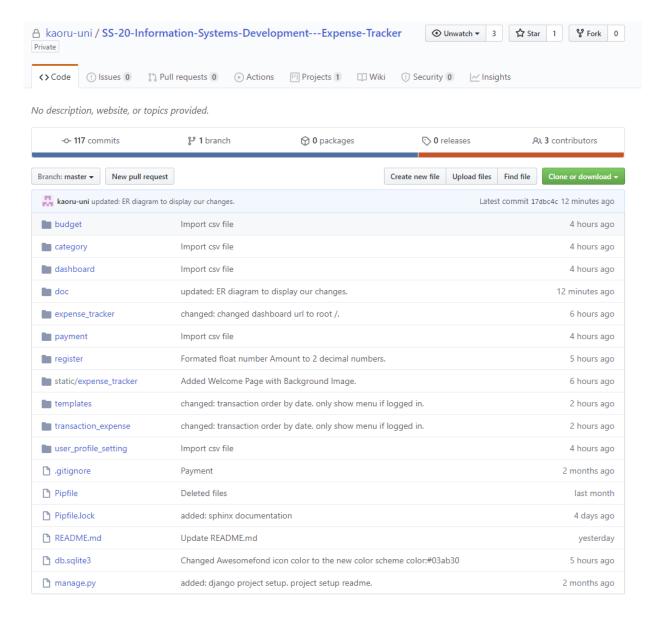
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Version Control System

The source code and version control was realized with Github.

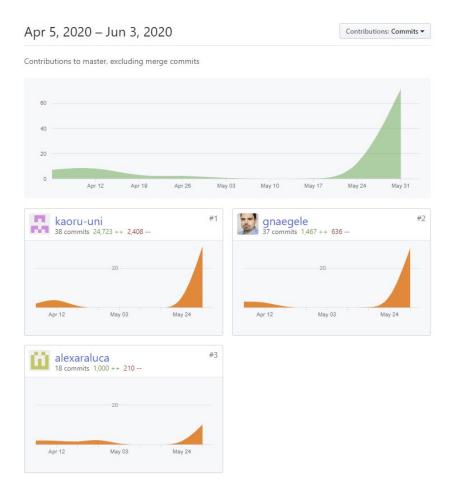
The repository was created by Kaoru Steinböck. Github was used by all team members to push their own code or get the work of others. Only the Master Branch was used.

https://github.com/kaoru-uni/SS-20-Information-Systems-Development---Expense-Tracker



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Contributions



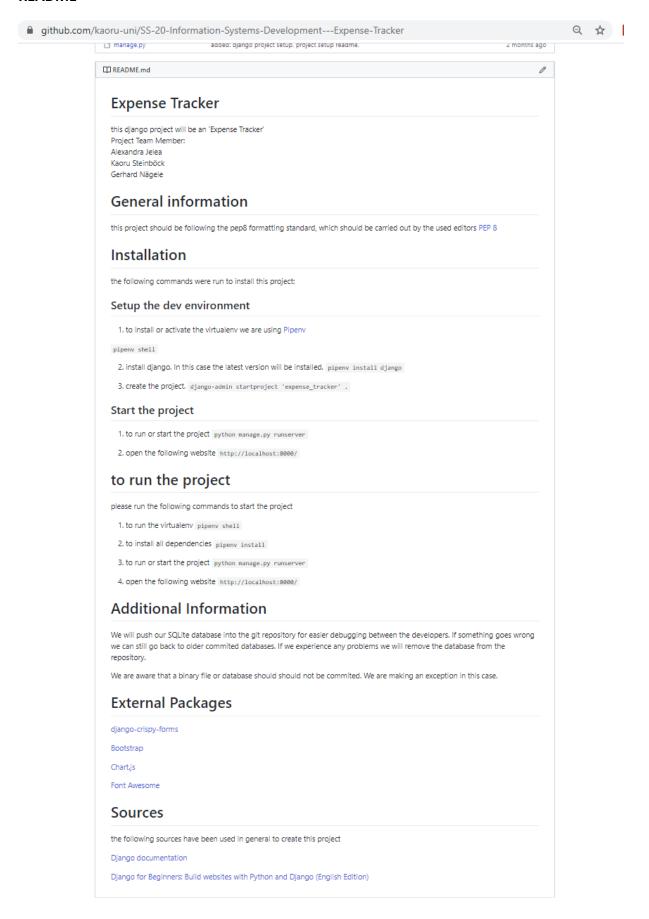
Additional Information

We will push our SQLite database into the git repository for easier debugging between the developers. If something goes wrong we can still go back to older committed databases. If we experience any problems we will remove the database from the repository.

We are aware that a binary file or database should not be committed. We are making an exception in this case.

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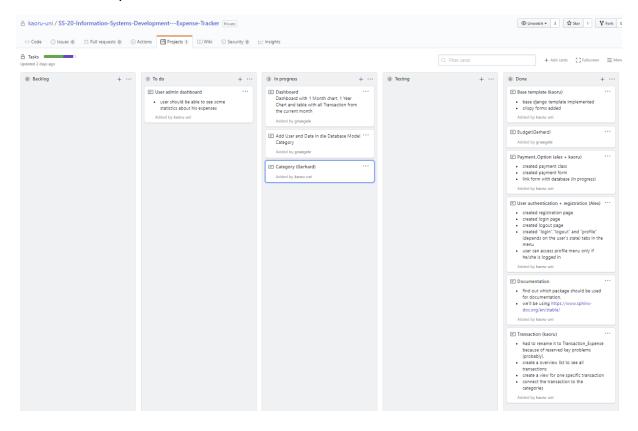
README



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Project-Management Function of Github

To coordinate the work between the Group members and keep the actual Project status available to all team members, we used the Github Function Project with a Kanban Board like functionality.



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Challenges and Findings

CHALLENGES:

- Python was a new language for some of us
- Understand the View Concept
- VCS we had some issues with merge conflicts. (These do not appear with git but with the PyCharm build in VCS Module)

FINDINGS:

- Django has a big Community. Solution for every problem we encounter.
- In Contrast to other Programming Languages Django Documentation is easier to read/understand.
- Even older Solutions from Stackoverflow worked
- Django does most of the Job (ORM, Return Values, Forms,..)

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Start/Run Project

Prerequisites

The computer must have Python version 3.8 and Pipenv installed.

Pipenv: https://pipenv.pypa.io/en/latest/

Python Version 3.8: https://www.python.org/downloads/

Tested Environments

Windows 10 Version 1903/1909 and macOS Catalina 10.15,

Setup the dev environment

- 1. to install or activate the virtualenv we are using Pipenv
- 2. type

cmd: pipenv shell

in command line (in the project directory)

3. install django. In this case the latest version will be installed.

cmd: pipenv install django

4. create the project.

cmd: django-admin startproject 'expense_tracker'

Start the project

1. To run or start the

cmd: project python manage.py runserver

2. Open the following website

Browser: http://localhost:8000/

Run the Project

Please run the following commands to start the project

1. to run the virtualenv

cmd: *pipenv shell*

2. to install all dependencies

cmd: *pipenv install*

3. To run or start the

cmd: project python manage.py runserver

4. Open the following website

Browser: http://localhost:8000/

```
Gerhard@DESKTOP-GD50IQ7 MINGW64 ~/PycharmProjects/SS-20-Information-Systems-Development---Expense-Tracker (master)
$ python manage.py runserver
Watching for file changes with StatReloader
[03/Jun/2020 20:16:24] "GET / HTTP/1.1" 200 4321
[03/Jun/2020 20:16:24] "GET / static/expense_tracker/logo_small.png HTTP/1.1" 304 0
[03/Jun/2020 20:16:24] "GET /static/expense_tracker/Background_Small.jpg HTTP/1.1" 304 0
```

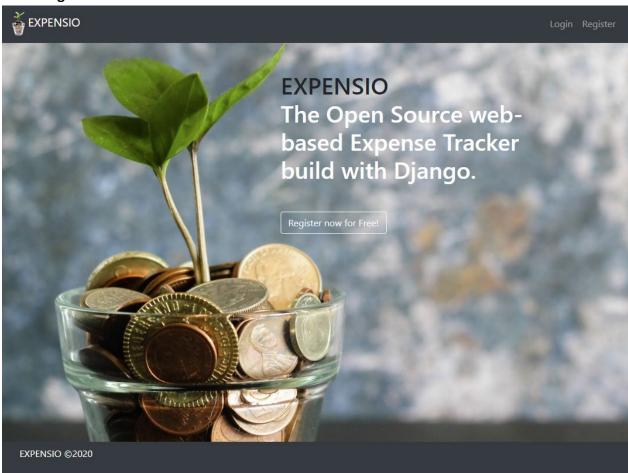
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User Manual

Welcome to EXPENSIO the open source expense tracker. To use EXPENSIO please create a user. This can be done under Register.

To use the functionality of EXPENSIO the user has to be logged in. All data entered by a user is only visible to the user.

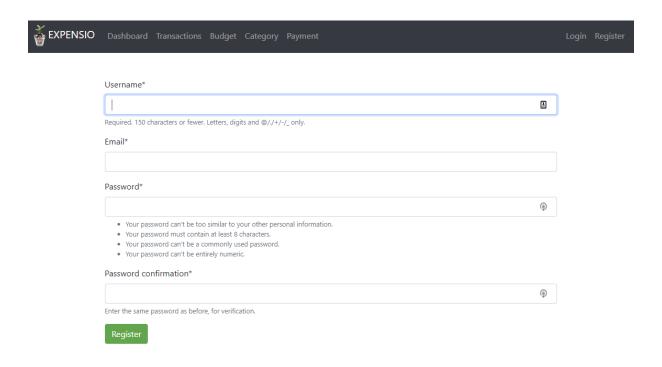
Main Page



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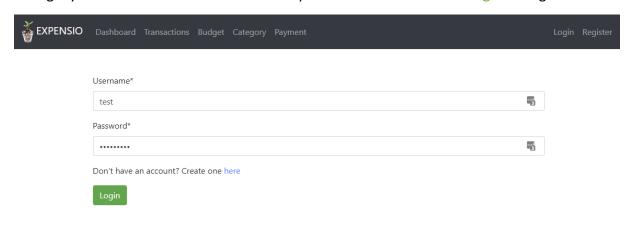
Register User

To register you have to enter a Username, E-Mail Address and password. Then click on the green register Button.



Login

To login you have to enter a Username and password. Then click on the green Login Button.



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Logout

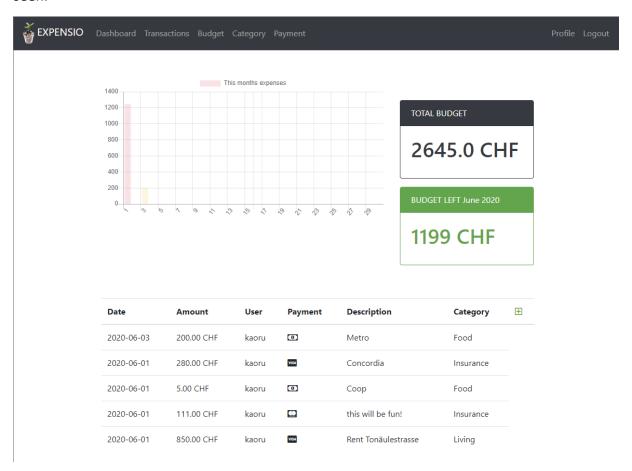
When you logout the only available actions are to Register or Login.



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Dashboard

The Dashboard is the main information page. Here all expenses of the current month can be seen.





On the right side is the total budget for this month visible and the budget which is left for this month. The green color signals the user, that there is still budget left for expenses.

Should the budget be exhausted, the color changes to red, this indicates that the expenditure should be limited.

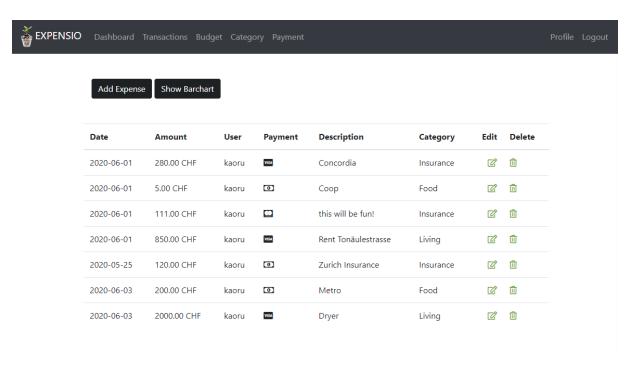
To **add a new Expense** over the plus function on the dashboard. Click on the green Plus on the right corner on the Dashboard Table.



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Transactions

On the main page of the transaction App all transactions are shown.



Edit transaction

To edit a transaction, click on the edit button on the right of the overview table. The edit Page opens up and all fields can be altered.

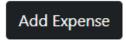


Delete transaction

To delete a transaction, click on the iii delete button on the right of the overview table.

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Add Expense



To add an expense click on the "Add Expense" button. A new site is shown with the input fields to add a new Expense. Fill in all data and click the green "Save Transaction" button.

Input Fields:

Date: Date when the Transaction happened. Can also be in the past or future.

Amount: How much the Transaction in Swiss Francs was.

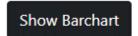
Description: Here is space to describe the transaction. E.g. Grocery Shopping Aldi

Category: Here you can select a category like e.g. Vacation, Shopping...

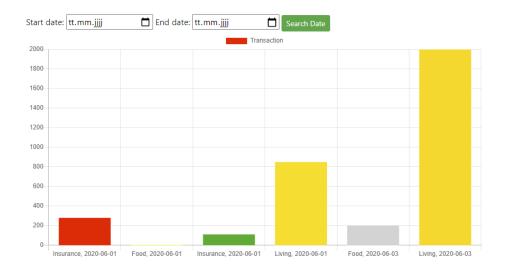
Payment: There are 5 payment types available - Visa, Mastercard, Bank, Cash, Crypto



Show Bar chart



The "Show Bar chart" function, opens a page with a diagram where you can select the Date Range and all Transactions in this time period are shown.

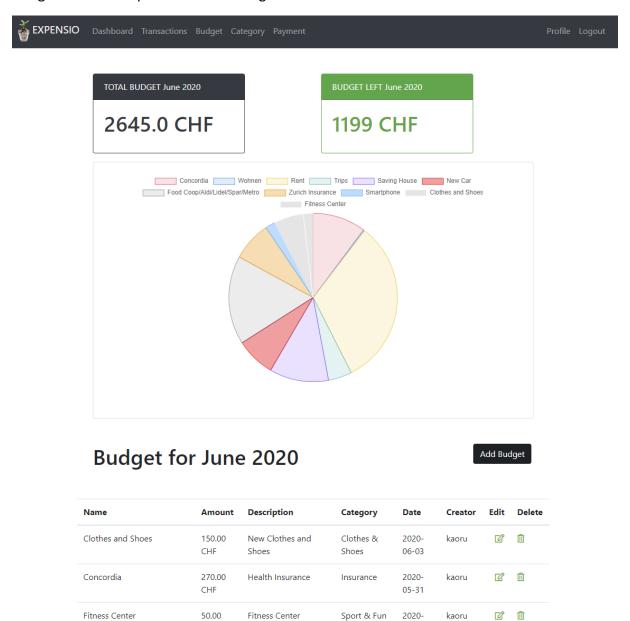


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Budget

The main page of the budget App shows all budget and an overview with charts and info cards of the current month.

Budgets show the different planed budgets which are available every month and all the budgets summed up are the total budget for the current month.





On top is the total budget for this month visible and the budget which is left for this month. The green color signals the user, that there is still budget left for expenses.

Should the budget be exhausted, the color changes to red, this indicates that the expenditure should be limited.

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Edit budget

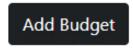
To edit a budget, click on the edit button on the right of the overview table. The edit Page opens up and all fields can be altered.



Delete budget

To delete a budget, click on the 🗓 delete button on the right of the overview table.

Add Budget



To add a budget click on the "Add Expense" button. A new site is shown with the input fields to add a new Expense. Fill in all data and click the green "Save Budget" button.

Input Fields:

Name: Name of the budget

Amount: How much the budget is in Swiss Francs.

Description: Here is space to describe the budget. E.g. Rent

Category: Here you can select a category like e.g. Vacation, Shopping...



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Pie Chart

The Pie Chart shows all budgets for the current month. With a click on the names of a budget, the clicked budget is no longer shown in the chart. Like that it is possible to get a better overview over expenses it you can deselect big expenses like rent.

ALL EXPENSES

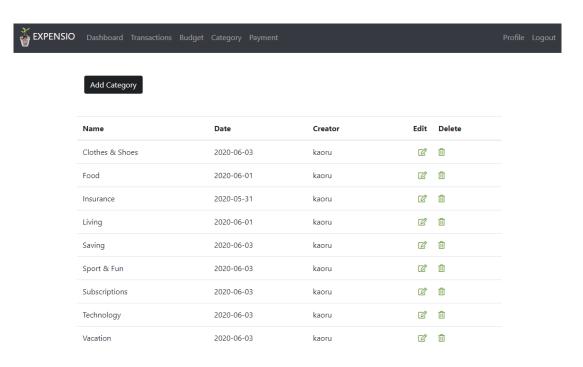
EXLUDED BIG EXPENSES



Category

The main site shows all available categories.

Categories are used to group transactions together. Each transaction has a category. Possible categories are: Food, Clothes/Shoes, Housing, Vacations, Insurance. Categories have a creation date and a creator. You can edit or delete them with the two familiar icons on the right side.



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Edit category

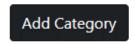
To edit a category, click on the dit button on the right of the overview table. The edit Page opens up and all fields can be altered.



Delete transaction

To delete a category, click on the iii delete button on the right of the overview table.

Add Category



To add a category click on the "Add Category" button. A new site is shown with the input fields to add a new Category. Fill in all data and click the green "Save Category" button.

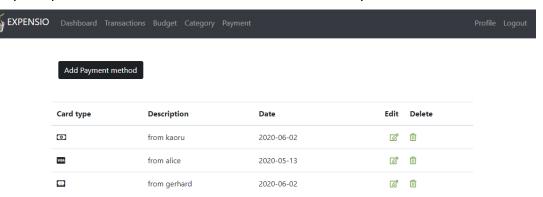
Input Fields:

Name: Name of the Category like - Food, Clothes/Shoes, Housing, Vacations, Insurance



Payment

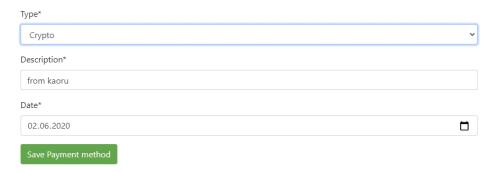
There are 5 basic types of payments to choose from: Visa, Bank, Mastercard, Crypto and Cash. It is possible to create more than one payment option like several Visa cards e.g. company and private card or a child bank account and a family bank account.



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Edit payment option

To edit a payment option, click on the dit button on the right of the overview table. The edit Page opens up and all fields can be altered.



Delete payment option

To delete a payment option, click on the find delete button on the right of the overview table.

Add payment option

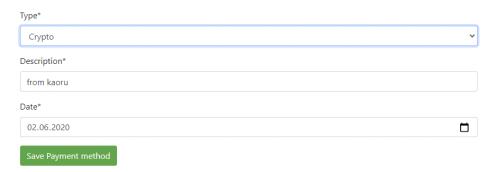
Add Payment method

To add a payment option click on the "Add Payment" button. A new site is shown with the input fields. Fill in all data and click the green "Save Payment" button.

Input Fields:

Type: Visa, Bank, Mastercard, Crypto and Cash

Description: Name of the Category like - Food, Clothes/Shoes, Housing, Vacations, Insurance Date: date of first usage.

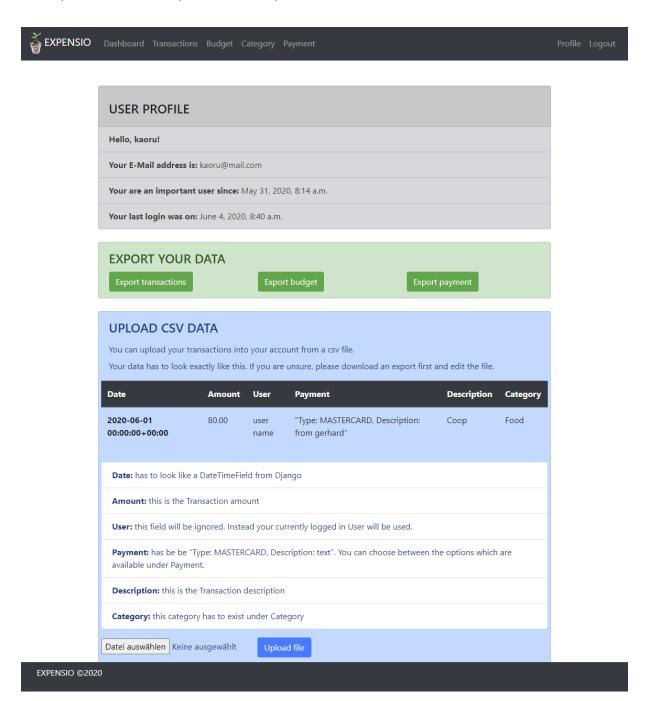


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User Profile

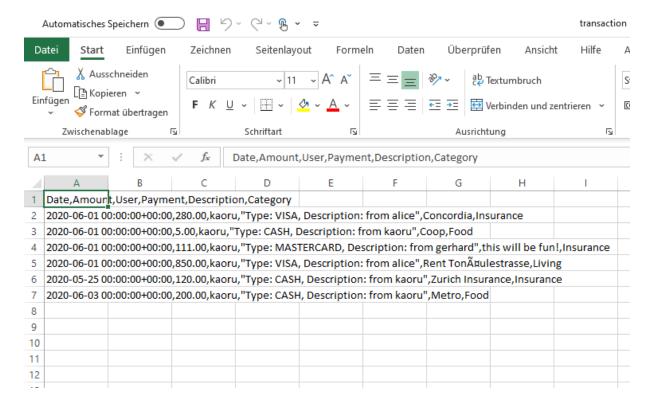
In User Profiles the user has access to the export and import function in addition to the user specifications.

Here it is possible to export all transactions, budgets, payments, or categories to a CSV file. The Upload button also provides an import function.



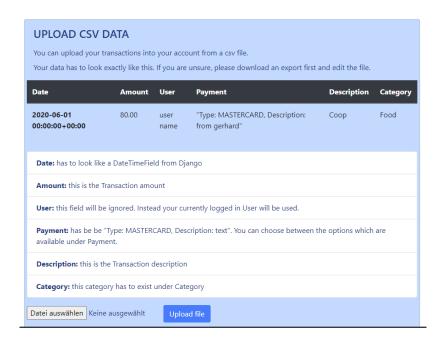
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Example of a csv export of all transactions:



Upload CSV file into EXPENSIO

EXPENSIO provides the functionality to upload a csv file to import transactions. A import file has to be a csv file and meet some requirements.



Requirements:

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- Date: must look like a DateTimeField from Django
- Amount: this is the Transaction amount
- User: this field will be ignored. Instead your currently logged in User will be used.
- Payment: has be of "Type: MASTERCARD, Description: text". You can choose between the options which are available under Payment.
- Description: this is the Transaction description
- Category: this category must exist under Category

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