

**POLITECNICO**  
MILANO 1863

# Coding Low-Code Dashboards

A practical **Streamlit** tutorial

Francesco Invernici, Andrea Colombo  
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**DATA**  
**SCIENCE GROUP**

DIPARTIMENTO DI ELETTRONICA  
INFORMAZIONE E BIOINGEGNERIA

# Outline

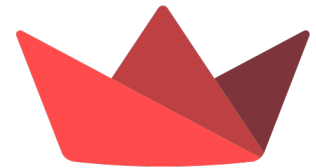
## What are we going to do?

### **PART I – The Basics**

- What is streamlit? Why?
- Architecture and principles
- Fundamental components
- *From a jupyter notebook to a st dashboard*
- Pack, deploy, and expose with Docker

### **PART II – Advanced Stuff**

- Advanced concepts
- *Walkthrough of a real app*
- Tips and tricks



streamlit.io

# The Basics

## What is streamlit? Why?

An open-source, low-code, pure-Python framework to make web app quickly.

### ...but why?

- Faster to build
- Easier to maintain
- You are not into front-ends
- Perfect for dashboard, small apps, and landing pages



## A faster way to build and share data apps

Streamlit turns data scripts into shareable web apps in minutes.  
All in pure Python. No front-end experience required.

[streamlit.io](https://streamlit.io)

# The Basics

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### rephrase

Generate professional sounding emails based on your direct comments - powered by Artificial Intelligence (OpenAI GPT-3) Implemented by [stefanrmmr](#) - view project source code on [GitHub](#)

What is your email all about?

SECTION - Email Input

Enter email contents down below! (currently 2x separate topics supported)

topic 1

topic 2 (optional)

Sender Name

[rephrase]

Recipient Name

[recipient]

Writing Style

formal

▼

Generate Email



## ay to build data apps

shareable web apps in minutes.  
-end experience required.

lit.io

# The Basics

## What is streamlit? Why?

### Configuration

Choose your preferred API:

echarts

Choose an example

Line: Stacked Line Chart

ECharts demos are extracted from <https://echarts.apache.org/examples/en/index.html>, by copying/formatting the 'option' json object into st\_echarts. Definitely check the echarts example page, convert the JSON specs to Python Dicts and you should get a nice viz.

Made in  by @andfanilo

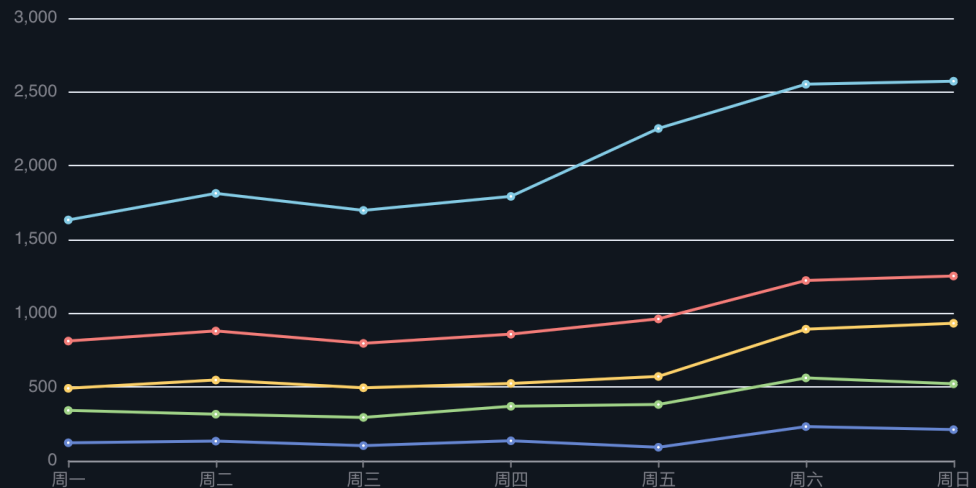


Buy me a coffee

## Streamlit ECharts Demo

折线图堆叠

邮件营销 联盟广告 视频广告 直接访问 搜索引擎

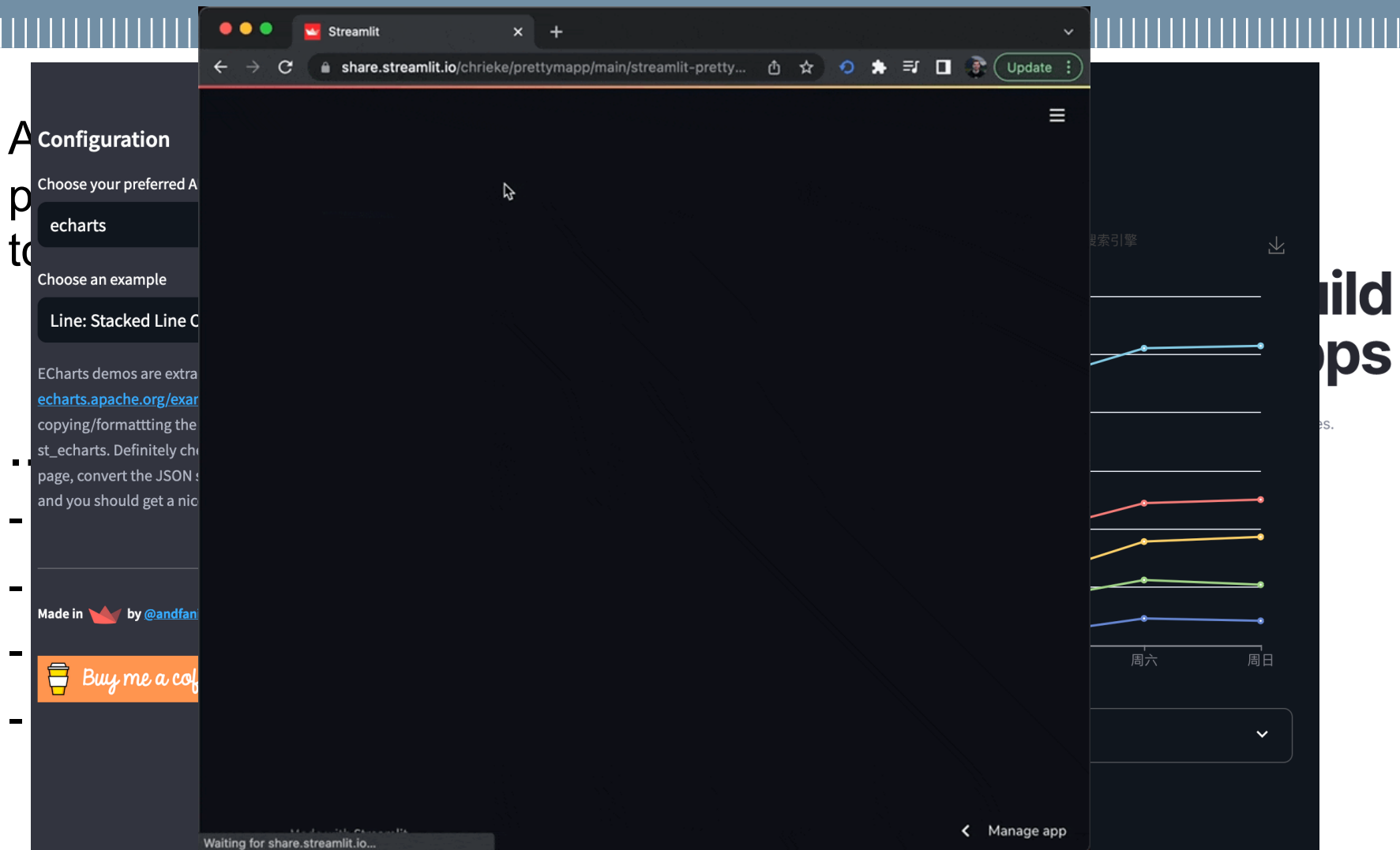


Source Code

Credit: <https://echarts.apache.org/examples/en/editor.html?c=line-stack>

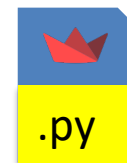
# The Basics

## What is streamlit? Why?





- ***A Streamlit app is self contained in one (or more) .py script***
- Fat server and thin client
  - ...but no hard separation!
  - **Both server and client are in the same script**
  - Everything in the .py script is executed on the server, just the I/O is rendered on the client (browser)
  - All requests are automatically managed via WebSocket



# The Basics

## Principles

Run with *streamlit run my\_app.py*

The *my\_app.py* script is read **top-down**

> The UI elements are placed following this order

### **Development Flow:**

change app.py script -> save it -> «changes detected!» -> rerun  
REPEAT

### **Data Flow:**

*«any time something must be updated on the screen, Streamlit reruns your entire Python script from top to bottom.»*



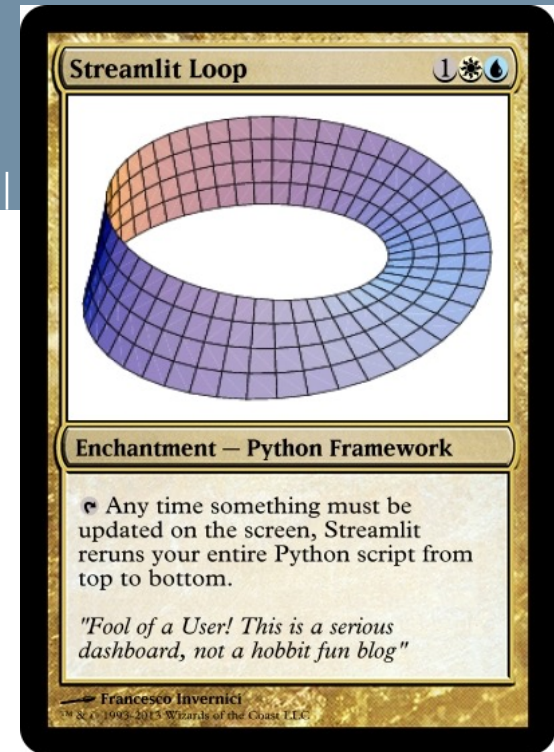
# The Basics Principles

*any time something must be updated  
on the screen...*

- you changed the script
- **the user touched something**

## ***Mitigations:***

- callbacks, *EG* `st.button( ..., on_change=my_method)`
- forms
- session state, *EG* `st.session_state['my_string'] = 'hello'`  
...time passes...  
`st.session_state.my_string >> still 'hello'`



# The Basics

## Fundamental components

Three main categories of widget:

- Display (output)
- Input
- Layout

**Browsing the docs is fundamental!**

<https://docs.streamlit.io/develop/api-reference/>

<https://docs.streamlit.io/develop/quick-reference/cheat-sheet>

# The Basics

## An Ordinary Dashboard

### Tutorial time!

We will make a dashboard from a simple jupyter notebook  
*basics/an\_ordinary\_analysis.ipynb*

[https://github.com/FrInve/polimi\\_streamlit\\_tutorial/](https://github.com/FrInve/polimi_streamlit_tutorial/)

