Technology Review

BTS Flight Forecast
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Background & Use Case

BTS Flight Forecast is a tool to predict Flight delays.

Our goal is to utilize historical flight delay data along with past weather information to generate accurate predictions. By analysing existing datasets and integrating with weather forecast APIs, this tool assesses the likelihood of delays for a specified airport code, date, and time.

Use case: View Flight Delay Prediction

Objective: Validating user inputs and viewing the flight delay prediction.

Need: We need a graphical user interface for users to enter details like airport name, date and time for which they wish to see the prediction. Once they click submit, response from our core prediction logic needs to be displayed on the UI.

Python Package 1: PyQt5

PytQt5 is a library for creating GUI applications. It provides bindings for the Qt tool kit, which allows creation of cross-platform applications with rich graphical interfaces.

Some features include pre-built widgets allowing creation of various GUI elements (buttons, labels,etc), handling of user interaction.

Author: Riverbank Computing

Python Package 2: Tkinter

Tkinter is a Python binding to the Tk GUI toolkit, and is included with standard Linux, Microsoft Windows and macOS installs of Python.

It provides a set of built-in GUI components/widgets (such as buttons, labels, text boxes, etc.) that you can use to create desktop applications with graphical interfaces.

Tkinter is a free software released under python licence

Python Package 3: Shiny

Shiny is an open-source web application framework for R and, with recent developments, for Python. It enables data professionals to turn their analyses into interactive web applications.

Shiny for python is especially designed to make developing web applications accessible to anyone with Python coding knowledge. Under the hood, it stands on a foundation of HTML, CSS, and JavaScript.

Author: Posit PBC

Package Comparison

PyQt5

Pros
- Applications can run on various operating systems.
- Includes classes and modules for creating windows, dialogs, buttons, and other elements along with handling user interactions.
- Extensive documentation.

Cons
- Can be complex for beginners.

Tkinter

Pros
- Preinstalled with every python installation
- Cross-platform compatibility
- Simple and effective in creating basic GUIs

Cons
- Outdated look and feel
- Standard documentation is weak

Shiny

Pros
- Relatively easy development of webapps
- Best suited for Data Science visualisations
- Easily handles model outputs

Cons
- Security issues
- Focus on hosted application development
- Unconventional syntax

Choice - PyQt5

- Compared to tkinter:
  - Has better documentation
  - Has readily available tutorials for first-time users
  - Design templates exist for easy UI refinement
- Compared to Shiny:
  - Has a less complex implementation
  - Does not require the creation of a hosted app
    - Reduces chance of scope creep
  - More flexible and less dashboard-oriented

Drawbacks/ Remaining Concerns

- Back-end code for PyQT is unintuitive to beginners
  - May require practice to use
- Signal and slot design can be time-consuming
- Extremely obtuse when the designer is not used

- Otherwise a good fit for our work!