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CASE STUDY: DEVELOPING A CROSS-PLATFORM MEDICAL CALCULATOR FOR LUNG CANCER ASSESSMENT USING FYSION AND THE FYNE TOOLKIT

Overview

Lung cancer is one of the leading causes of cancer deaths globally, and early detection and precise monitoring are essential for improving patient outcomes. Accurate evaluation of lung nodules, which can potentially develop into malignant tumours, plays a crucial role in diagnosing and managing lung cancer. However, the tools available to radiologists often have limitations, such as restricted platforms, compatibility issues, or unreliable performance. To address these challenges, Dr. Michelle Williams, a radiologist and medical researcher, developed a specialised app called **Volume Doubling Time** using the **Fysion App Builder**. This case study details the journey of creating this time saving tool, its impact on clinical practice, and the potential it holds for broader adoption within the medical community.

Background and Problem

Dr. Williams frequently encounters lung nodules in her clinical practice and relies on a metric called **Volume Doubling Time (VDT)** to determine the growth rate of these nodules. The VDT helps differentiate between benign conditions and potential malignancies. Fast or slow growth rates usually indicate benign processes, while intermediate rates are more suspicious for cancer.

Unfortunately, the software available at her hospital was inconsistent in calculating VDTs, and the only reliable alternative—a mobile app developed by the British Thoracic Society—was limited to iOS and unable to calculate VDTs across the full range of clinical parameters. This forced Dr. Williams to rely on manual calculations or inefficient workarounds, which increased the risk of errors and wasted valuable time.

Objective

The primary goal of the project was to develop a user-friendly, cross-platform application that could calculate the VDT of lung nodules based on two sets of volume measurements and timestamps. The app needed to be versatile enough to run on any operating system and

provide accurate results in real-time, with a clean and intuitive interface for easy adoption by other clinicians.

Solution: Fysion – A Cross-Platform Medical Calculator App

To overcome these limitations, Dr. Williams turned to the **Fysion App Builder** from Fyne Labs, which is built on the **Fyne GUI toolkit**, an open-source library for building cross-platform applications using the Go programming language. Leveraging these capabilities, she created **Volume Doubling Time**, a lightweight and portable app that meets the needs of clinical professionals.

Development Approach:

1. **Framework Selection:**
   Fysion and **Fyne** were chosen for its robust cross-platform capabilities, allowing seamless deployment on Windows, macOS, and Linux. Its simplicity in creating intuitive user interfaces also made it ideal for rapid prototyping and development.

2. **Initial Template and Customisation:**
   Dr. Williams started with a pre-existing BMI calculator template in Fyne's app-building environment, Fysion. She adapted it to suit the unique requirements of calculating VDT, modifying the input fields, labels, and calculation functions.

3. **User Interface Design:**
   The app's layout includes input fields for two sets of volume and date measurements, a "Calculate" button, and an output area for displaying the VDT result. It also incorporates disclaimers to emphasise that the app is intended for use by trained professionals, and used at their own risk.

4. **Mathematical Integration:**
   The VDT calculation formula was coded into the app's backend, using the Go programming language's built-in mathematical functions. The app accurately processes user input and delivers real-time results.

5. **Deployment and Testing:**
   After local testing, the app was deployed using Fysion's build server, **Geoffrey**. The deployment feature enabled Dr. Williams to download and install the app on multiple platforms, ensuring compatibility and performance consistency.

Impact and Benefits:

1. **Enhanced Clinical Efficiency:**
   The Fysion app streamlined the process of creating an app to calculate VDT, reducing the need for manual input and the risk of errors. With this app, Dr. Williams can quickly obtain reliable VDT values, leading to faster decision-making and improved patient care.

2. **Cross-Platform Accessibility:**
   Unlike the previous iOS-only app, Volume Doubling Time, and other apps created with

Fysion, is available on any operating system. This flexibility allows clinicians to use the tool on their preferred devices, whether at the hospital, in a research setting, or during multidisciplinary team meetings.

3. **Broader Range of Measurements:**
Volume Doubling Time accommodates a wider range of nodule sizes and time intervals, making it applicable to more clinical scenarios. This ensures that the app remains useful across different stages of nodule monitoring and management.

4. **Ease of Deployment and Updates:**
Fysion's seamless deployment through the Geoffrey build server simplifies distribution and updates. As new features are developed, users can easily access the latest version without complicated installation procedures.

Future Directions and Broader Adoption

Dr. Williams envisions Volume Doubling Time, and other apps created with Fysion, being adopted by radiologists, pulmonologists, and oncologists in various clinical settings. This app can serve as a template for other medical calculators, such as those for kidney cysts or liver lesions, by adapting the same Fyne-based framework. Its open-source nature also allows for community contributions and custom modifications.

Getting Access to Fysion

Clinicians and researchers interested in using Fysion or exploring its development process can access the app through the current testing programme. Fyne Labs provides comprehensive documentation for building similar applications, making it a valuable resource for developers looking to create medical or scientific tools.

Conclusion

The simplicity of creating Volume Doubling Time is a testament to the potential of the Fysion app builder and modern development frameworks like Fyne to address niche clinical needs. By providing a reliable, cross-platform solution for calculating Volume Doubling Time, it has not only improved Dr. Williams's clinical practice but also set a precedent for creating accessible, high-impact tools that can be widely adopted across healthcare settings.

For more information on Fysion and to explore how it can benefit your practice, visit Fyne Labs for access details and support.