SIIM 2017 Scientific Session
Posters & Demonstrations

Open-Source Radiology Dashboard Application Pediatric Chest Radiography Imaging Technique Variability in the Emergency Department

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Background

As a large radiology department in a teaching hospital, providing easy to understand information related to the operation of our radiology department is critical.

In this presentation we will describe a radiology department dashboard solution based on both open-source software as well as custom written applications, designed to display information in a visually pleasing and informative manner.

Evaluation

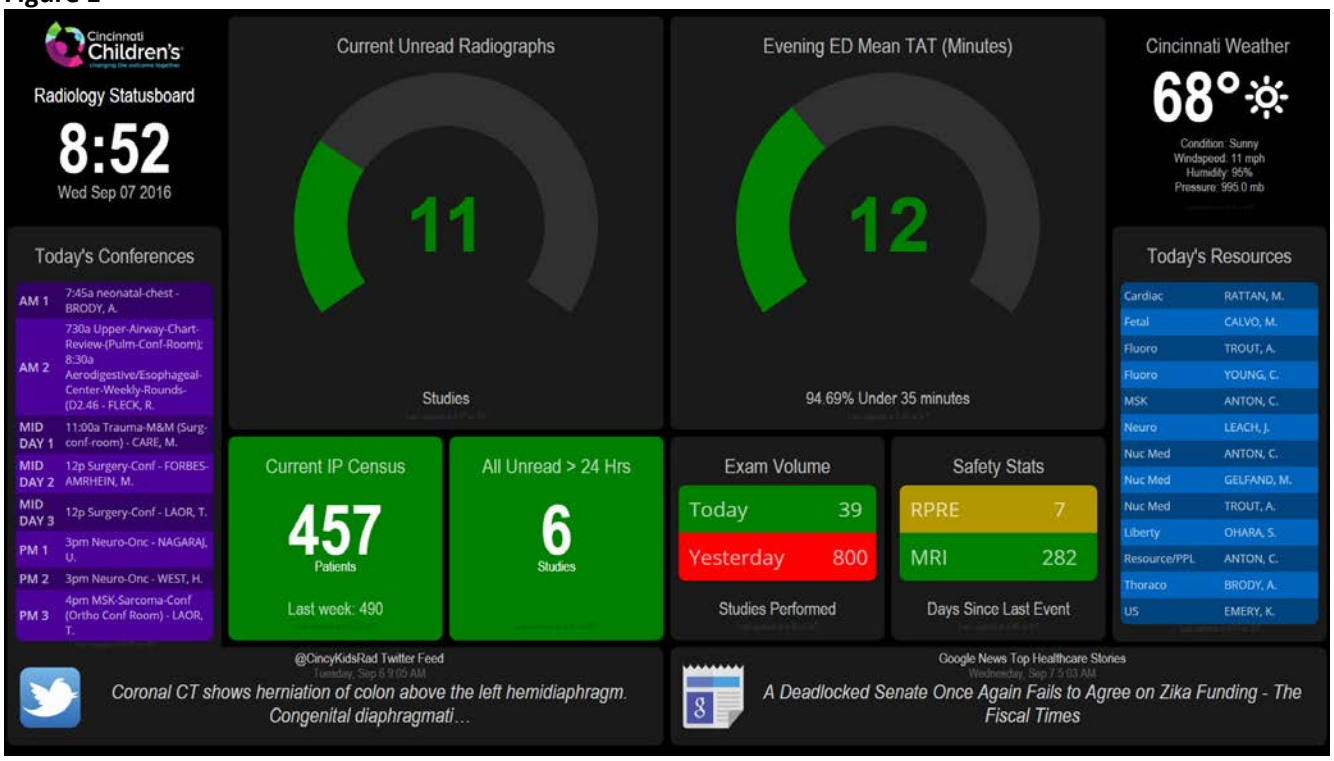
Several criteria were used when deciding to deploy the dashboard: 1) it should display critical departmental information in real-time; 2) it should display information in an easy to understand way; 3) it should be visually appealing, but not distracting; 4) it should be centrally located for easy access; 5) it should include a variety of information from the department, the hospital and other sources.

The underlying technology for our department dashboard solution is an open source application framework called Dashing (http://dashing.io). This framework is based on the Ruby programming language with an embedded Sinatra web server (http://www.sinatrab.com) that allows developers to quickly create web-applications with minimal effort. The Dashing framework makes use of "widgets" for displaying dashboard data, and provides both premade widgets as well as the ability to create custom widgets. These widgets (created in HTML, CSS, and compiled JavaScript) can be easily written to incorporate web-based design elements and the dynamic content displayed in each widget is updated using simple, independently addressable HTTP URL calls.

For our dashboard, custom widgets were created to display a variety of healthcare information including: radiology exam volume and hospital patient census data; unread study count; ED turnaround time data; department safety data; radiologist schedule; the daily conference schedule; recent department social media feed; recent healthcare news; the current local time and weather conditions. The different types of widgets we created also allow the data to be presented in visually appealing and informative ways including color thresholds and meter-style gauges.

In order to collect the data from a variety of existing data sources, custom programs were written in both Ruby and Visual Basic Script to gather information and execute the HTTP calls to the appropriate widgets. These programs make use of direct database calls, HTML scraping, and application program interfaces (API's) in a scheduled manner to allow updating the widgets at difference intervals. The current dashboard gathers data from the following sources: our voice dictation system database (PowerScribe 360, Nuance Communications, Burlington MA); an API to our radiologist scheduling system (QGenda, QGenda Inc., Atlanta GA); an API to our department Twitter feed (Twitter Inc., San Francisco, CA); an API to Google Healthcare News (Google Inc., Mountain View, CA) and API to weather information (Yahoo Inc., Sunnyvale, CA).

Figure 1



Discussion

The radiology dashboard application was deployed to a virtual server in the hospital datacenter which runs the Dashing dashboard generator, the integrated Dashing Sinatra web server, and the polling applications which collect and post the data. The dashboard itself is displayed on a 55 inch LED monitor at 1920x1080 pixel resolution in the central area of our main reading room pods using Google Chrome web browser which is automatically started in full screen mode. This location was chosen as it is a heavily trafficked area by radiologists, reading room assistants, and administrative staff. Additionally, department personnel can choose to access the dashboard on their own office computers if they wish.

Our reading room assistants monitor the status of certain widgets watching for critical issues based on color state changes. This is most often used to monitor the unread radiographic study backlog in order to bring on additional radiologists to read temporarily.

Conclusion

The development of an informative and easy to understand radiology department dashboard provides our staff with timely information to make decision throughout the day. We believe that displaying the information in a graphically pleasing, simple to understand way focuses the viewers' attention to the most important content.

Keywords

dashboard, statusboard, business intelligence, data, quality