

Sathyabama University Information Kiosk

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ABSTRACT

In April 2014, Sathyabama University, Chennai, India will deploy its first public touchscreen information kiosk running on Windows 8, designed to provide on-demand access to useful and commonly viewed library information through an Interactive Kiosk. This article presents a description of the hardware and software development process, as well as the rationale behind a variety of design and implementation decisions.

Keywords: kiosk, Information, Touch-screen, Windows 8, Metro app

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I. INTRODUCTION

A common challenge in libraries is to present service information of immediate interest and need to users in an unmediated way. At Sathyabama, we have in the past attempted to fulfil this need through the use of notice boards and personal interaction. While this notice board initiative has been successful, a notable shortcoming is that users cannot view desired information on demand. Due course in April 2014, Sathyabama University will debut its first touchscreen information kiosk, in order to provide on-demand access to these commonly viewed notice boards. The kiosk is available during all hours of the day and remains powered on at all times and will be turned off for a period of 2 hours every night.

In this paper I talk about our process for designing and implementing this Windows 8 based touch interface used to drive this kiosk, and future advancements that will take place after its debut, and draw conclusions for future development of public touch-based interfaces. I identify the challenges we encountered during the development process and shortcomings in our implementation that we are currently experiencing during the course of development. I analysed various different kiosks set up in public by banks and other companies, in malls to understand what type of inputs people would prefer. I conclude with lessons being learned in the process of creating a public touch kiosk, including avenues for future upgrades.

II. MOTIVATIONS

The inspiration for development of a touchscreen kiosk in Sathyabama University resulted from the confluence of several ongoing endeavours at our college:

1. A need for information access at a seamless pace for users across the campus to ensure a well-connected and better informed crowd.
2. A desire to provide single touch access to a growing collection of new, updated information about the college and campus services.

As part of the above-mentioned initiative, The Computer Science and Engineering Department at Sathyabama University approved the idea for the use of an interactive kiosk in the college campus. The task of selecting content, hardware, and designing an interface, was up to me and my colleague Vimal Kumar Ojha under the guidance of Ms. Sarika, A primary goal for this project was to ensure a well-connected and tech-savvy campus — the project began in Late November 2013 with the goal of rolling out the final product early in April, next year. This goal drove many of the major implementation decisions:

1. In order to minimize delays due to hardware acquisition and configuration, we elected to use the Lenovo Ideapad Z400 Touch. Since, it had an ideal configuration of what was going to be used on the kiosk
2. To explore new technologies, to maximize opportunities and flexibility in design, we elected to develop the interface in Windows 8 Metro-Style using C# and XAML code.
3. To minimize costs, we chose to use common, freely available hardware present in our computer lab which was no longer being used, refurbish it and implement it suitable as a public kiosk.

III. CONTENT SELECTION

At the time of project inception, the college already had a well-established notice boards distributed throughout the campus. There was one next to the Controller of Examinations office, Director's office, Mess Hall, Department Entrances and Hostel Offices. These notice boards contained information on availability of services, advertisements for events, and staff contact information. The basic goal of this project was to identify the most *useful* information displayed on these boards and consolidate that information into the kiosk system so that users could view the information on-demand. A common pattern me and my colleague recognized that a new user would come and approach the notice board every 2 minutes. Sometimes there would be a crowd standing together and scanning for some information required by them.

It was also often noticed that the same user would come and view the board multiple times in a span of 15 minutes. Users exhibiting this behaviour were waiting for a particular piece of information to appear in the notice board. Although no statistics on these observations were maintained we selected the following services to include on the kiosk:

1. Mess Hall Menu
2. Director Availability Timings
3. College Updates
4. Department Information

In addition, we decided to try and develop navigation for new users to find their way across the campus without any problem.

IV. HARDWARE AND SOFTWARE CONFIGURATION

One of our goals was to build a touch interface that would be completely dedicated and independent. We wanted to minimize user awareness of operating system components, software and hardware infrastructure.

The touchscreen hardware, was yet to be provided by the Department of Computer Science and Engineering with the express purpose of creating an interactive kiosk. The display would behave as a normal large-format flat-panel display, with the addition of a touch-responsive The CPU that would handle the display would be a Core i7 2nd Generation processor and the GPU would be an Intel HD Graphics 3000 that supports the touchscreen's touch-sensitive overlay. Of the options available, we are going to implement the common touch features found in every windows 8 touch screen apparatus, which allows the user to perform an action by touching the screen. Some of the benefits of having a touch screen apparatus with windows 8 gestures are listed below:

1. Click events on interactive elements are interpreted more clearly and reliably by the applicationUsers are prevented from accidentally highlighting on-screen text.

The software was configured to disallow double-clicks. The primary advantage of disallowing double clicks is in a failure case: should the browser driving the kiosk display crash, or should the machine be forced to reboot, the computer's desktop would reboot into kiosk mode which would only allow the user to open the Information Kiosk Application. We are still trying to implement a stand-alone version of either here maps or Google maps in order to achieve successful navigation through the campus. In order to provide as interactive an experience as possible, we want to allow users to pan and zoom into the map application, which requires dragging to support panning and pinch-zoom.

In order to create a touch interface that feels dedicated and independent, we felt it was important not to display a cursor on the screen at any time. Since the screen would be in a location with easy staff monitoring and access, we felt the potential risks for damage to the kiosk in any way would be negligible. Although our design for the kiosk interface did not include links to external websites we would consider to introduce a link to google maps for better navigation and earlier deployment of the kiosk. Maps window would include a link to Google, which opens in a new browser tab. This presented two problems: first, this link provides access to web content outside the kiosk interface, an unacceptable condition. To prevent a user from accessing other web content we are trying to find other means of implementing the map as a stand-alone module in the application. Another approach would be to disable the access of any other URL's that the user might try to access via the administrator who handles the network connections throughout the campus. In this case all the proxy web servers will have to be disabled to prevent users from accessing other web content.

V. INTERFACE DESIGN

Our goal for an interface was to develop something simple and appealing to the eyes, with the minimum instructions necessary to guide the user. The rough outlines of the interface were a Grid template used to maintain certain options for selection and side finger swipes for main navigational controls. A layout that was preserved through production. The interface concept was to maintain a static set of controls to call the content on the touch of the corresponding button.

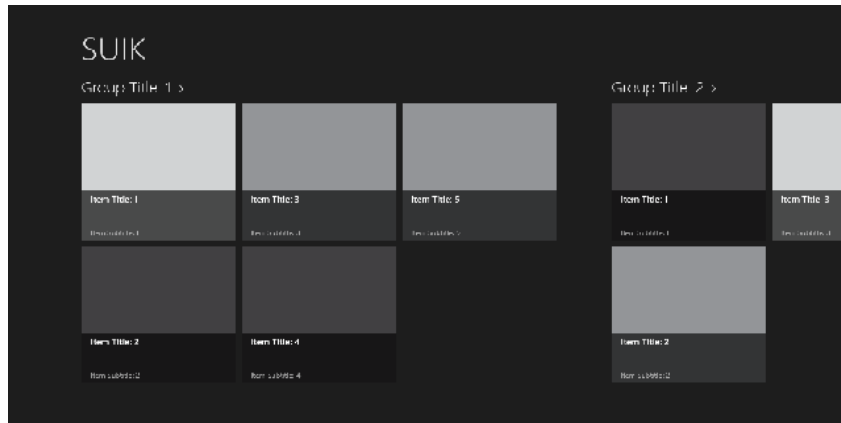


Fig.1 Basic kiosk layout and screen division

The SUIK(Sathyabama University Information Kiosk) will have a grid interface. As of now we have not yet decided the amount of grid icons to place as this will be updated in time with the deployment of the kiosk. There might be certain modification and additions that will be told to us by the director of the college according to his needs.

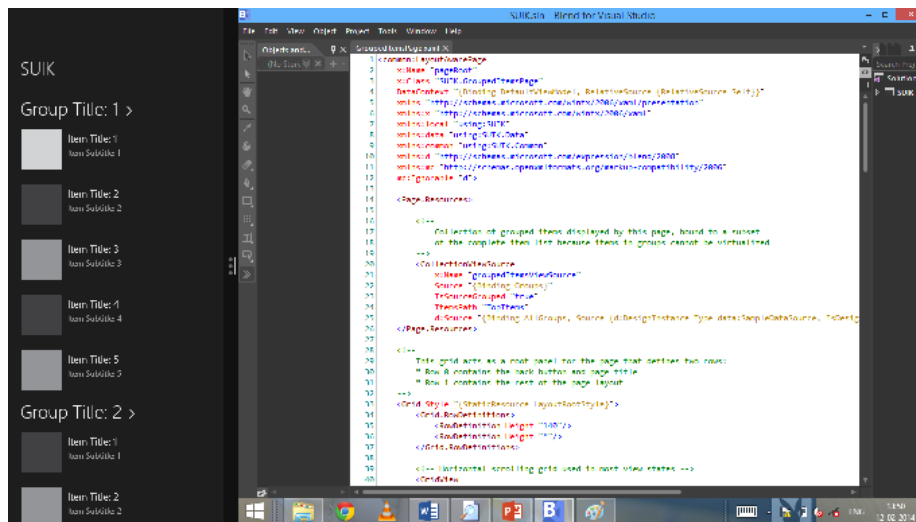


Fig.2 Vertical Split Screen in case of two applications being opened at the same time
Basic code being used for implementing this GRID interface that we are designing would be around the lines of:

```
<Application
x:Class="SUIK.App"
xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
xmlns:local="using:SUIK"
xmlns:localData="using:SUIK.Data">

<Application.Resources>
<ResourceDictionary>
<ResourceDictionary.MergedDictionaries>
```

```

<!--
    Styles that define common aspects of the platform look and feel
    Required by Visual Studio project and item templates
-->
<ResourceDictionary Source="Common/StandardStyles.xaml"/>
</ResourceDictionary.MergedDictionaries>

<!-- Application-specific resources -->

<x:String x:Key="AppName">SUIK</x:String>
</ResourceDictionary>
</Application.Resources>
</Application>

```

We designed the buttons carefully to make it as clear as possible that they were control elements. The lack of a cursor deprives the user of cursor-contextual affordances that indicate controls so we felt it was important to strengthen the visual appeal provided by them a button-like appearance.

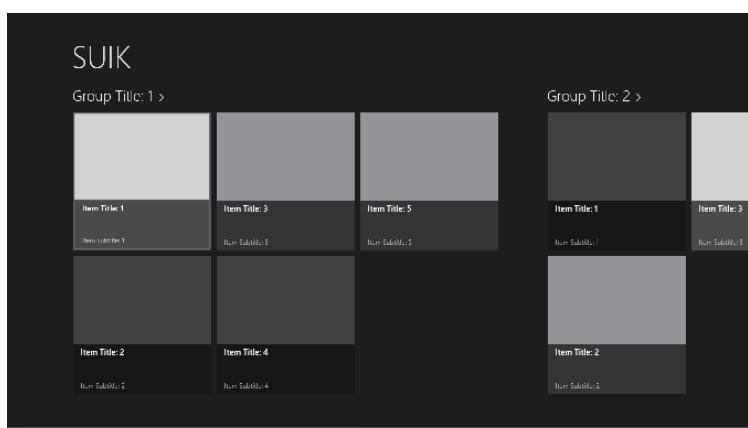


Fig 3. This depicts the button graphic. Tile 1 is clicked button state and tile 2 is normal state.

VI. INTEGRATING CONTENT INTO THE INTERFACE

For every content area except navigation, there was already content available, originally for the notice board or for the university website. For these contents that were already available to us. All we had to do was to integrate it with the application that we are about to create.

6.1 Mess Hall Menu

With a strength of about 10,000 students in the university. There will be the mess hall menu that will tell what is being served in the mess and at what time will there be lunch for each batch. In case a student is not able to make it for his own batch timing due to some work related issue. He can visit the kiosk, see when the next batch is going to be served and report accordingly. This menu will also tell the users what all is being provided in the mess hall according to what the user prefers. He/she will report to the mess hall.

This was achieved by contacting the Food Production department to get a detailed analysis of what would be served throughout the month. Every month according to the changes that are made in the menu. The information on the kiosk would be updated accordingly. The info would be given in a normal text- menu format that is common. It would just be typed into the text field and kept on display/

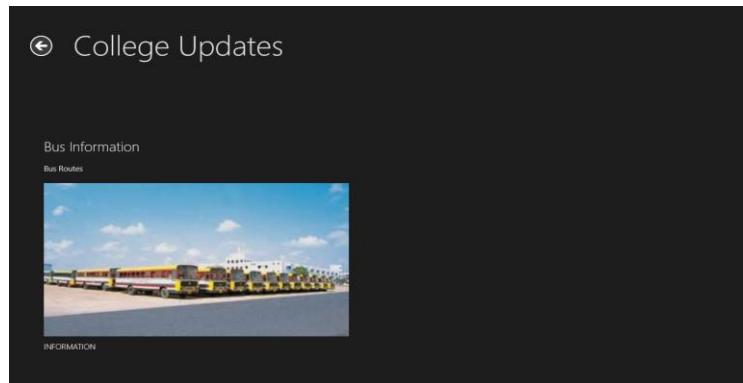
6.2 Director Availability Timings

Since the college is run by the director. Here majority of the decisions are to be taken by the director. Due, to the overload of work on the head of the director. We are introducing a tab where the users will know when the director will be available in his office to meet with him. Since, the director will also have time crunches in his busy schedule. The kiosk will be updated with him being available to meet the users at his preferred time. We are also trying to introduce a live feed which would tell the students when the director would be in his office. This real-time tag implementation is still unknown on the grounds of implementation. With further development into the project we will try and figure out a workaround to implement this live feed. .

College Updates

For the implementation of this we will require extensive knowledge on how to code a live news feed that will run in the background on the bottom of the screen. This module is still under developmental stages. Otherwise, till we come up with a way to implement a live tickr feed at the bottom of the screen. We will display this in the form of a scroll around page with information just manually entered into the kiosk at the time of development. This will also provide a link to the live update feed in the college website.

This will otherwise include information about the latest news and events that will take place in the college. It will also have information about college timings for first time users of this kiosk. It will provide bus route info. This will tell the user about which bus route will take them where.



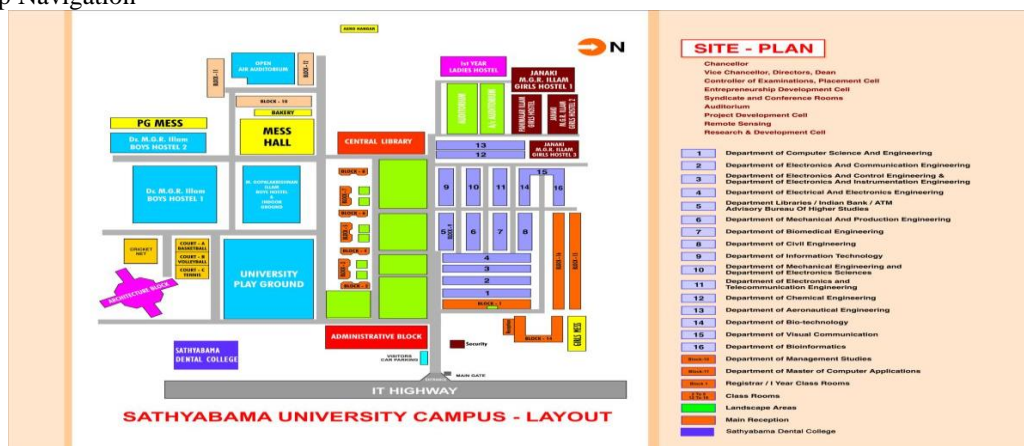
When the user will click on the tile that will specify what action is to performed. For example, One of the tiles will be called Bus Routes in the application. When the user will click on it. An Information page will come up will all the information. In the above given diagram the information will be displayed on the right about the bus routes. Due, to early stages of development this has not been shown. There are however constructor definition error despite giving the parameter value of the parent as infinity.

6.3 Department Information

This module will contain all the information of the Departments with their HOD names and the people under them according to importance. This will help the new user to understand who the HOD of the department is and meet with them in case of any problem or queries.

Getting hold of the information for each department is a hard task since they do not let out such information for some unknown reason. Every department in this institution is has its independent working clauses. The Interface for this page will be similar to the Bus information page and will consist of staff names and designations on the right side.

6.4 Map Navigation



The map graphic and path are implemented as separate PNG files of the same dimensions in pixels, positioned absolutely, with the path atop the map graphic. The background of the path image (i.e., all parts of the image that are not path) is transparent, allowing the map to show despite the fact that it is overlaid with another image. This arrangement allows us to keep the map images logically separate from the path images; thus, if the map must be updated or if a path is changed, only one file needs to be altered or replaced.

We want to allow users to pan and zoom the map to provide a maximally interactive experience and increase the utility of this feature. Since it would potentially be difficult or impossible for the user to return the map to its original view after extensive panning and zooming.

6.5 Idle Behaviour

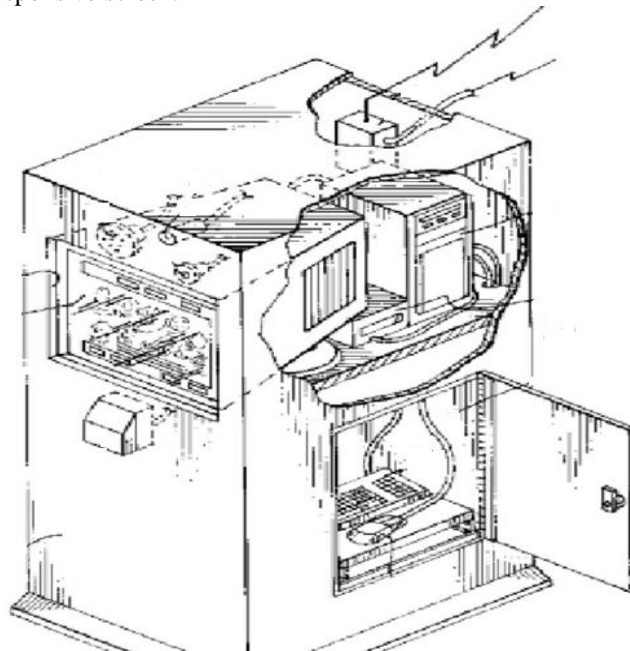
In addition to selecting content for the kiosk and developing an interaction model for that content, we determined that when the kiosk is idle it would not currently be in use. Our first idea was to display a rotation of slides. We have decided to keep the kiosk screen running despite its idle behaviour or at the max give it a standby blank screen which will be active upon touch response. periods, showing the same content that users would see if they manually selected a content area.

VII. DESIGN, DEVELOPMENT AND DEPLOYMENT CHALLENGES

In the time since this project was started, there have been many problems and challenges that have been revealed, primarily starting from the short development timeline for the project and the ad hoc implementation.

7.1 Design and Deployment

The design is a simple design that will be a computer placed in a compartment with enough space for ventilation and a touch responsive screen.



The figure given above will be the basic layout of the kiosk all over the college campus. There will be spaces provided for ventilation and power connection for the kiosk to run. This casing will also ensure security of the hardware and prevent it from being stolen. The only drawback we might face is that in case of a weather change the kiosk might get damaged. The location still has to be decided as to whether it would safe to keep outdoors or indoors.

7.2 Development

The ad hoc approach to content selection led to difficult coding instances. Existing scripts from other projects in other locations on the server were modified and used to code the application software. Because these projects were created by other individuals, we were not familiar with the architectures used, and the limited timeline did not afford developing a deep understanding of the external projects' architecture. Thus our adaptations consisted largely of duplicating and modifying existing scripts. Since, this project integrates components from so many other library projects and extensively reuses code from other files that are maintained separately. Our own code is has to be updated frequently to ensure maintenance.

Because this is our first attempt to implement a touch-based interface and first attempt to code XAML and C# to build a Windows 8 Metro app and because our understanding of interface requirements the interactive experiences will only grow as we go deeper into the project.

behaviour, but would not have prevented the exposed desktop. It is possible that some of the issues resulting from browser instability and/or system crashes could be mitigated by scheduled system reboots along with a boot script that automatically launches Firefox, but we have yet to explore this solution.

VIII. ANALYSIS

After April 2014, once the implementation is done of the system. We shall observe and see the amount of interactions received by the machine in total and test the flaws and the errors and rectify them. Since, this project was started with a short given timespan the difficulties yet to be encountered are unknown.

IX. CONCLUSIONS

A well interconnected college in a Globalized world. This is a step to technologically advance the mediums of information exchange among the entire Sathyabama community. A step closer to a technology. This ensures the sure cost effective way to create a kiosk and implement it across a wide area.

X. ACKNOWLEDGEMENTS

My thanks go to colleagues and project collaborators Vimal Kumar Ojha and Ms.Sarika without whom this project would not have been possible. Vimal Kumar Ojha is responsible for adapting most of the previously existing data from various sources for use in the kiosk interface. The three of us were equal partners in determining the concept, direction, and design of the kiosk, and without Vimal and Ms.Sarika's extensive contributions and many hours of collaboration, this project would not have been a success.

I would also like to thank our class counsellor, Mr.KamaleshMurari for helping us out at the times we needed him. And, a hearty thanks to all the staff of our department who helped implementing this project.

XI. ABOUT THE AUTHOR

Nipun Narayanan is a student currently studying his Bachelors in Computer Science and Engineering from Sathyabama University in Chennai, India. He is in his 4th year currently and is creating a kiosk as his final year project for the college. Future plans hold further studies in the same field in hardware architecture discipline.

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