Intelligent Kiosk System with Emergency Response for Smart Cities

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1- Introduction

Digital Content Kiosks have already been used in practice to **disseminate information** to the population of a City. Such kiosks are **advantageous for tourism *and* business**, but have the potential to further benefit citizens by assisting in **emergency response systems.**

Objectives:

- Provide interactive & reactive content to users.
- Allow citizens to establish emergency video calls.
- Implement a system capable of kiosk management and notification dispatching.
- Design a robust system architecture that is scalable to act as an aggregation point for IoT devices.

2- System Architecture

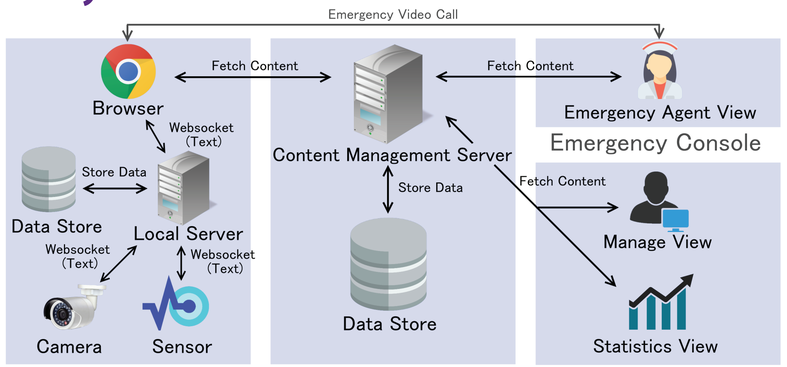

Figure 1: A block diagram of our System Architecture.

Intelligent Kiosk - Displays Responsive GUI & Local Notications triggered by websocket signals from IoT devices.

Content Management - Serves content, manages deployed Remote Notifications.

Emergency Console - Response Agents may force an emergency video call with an Intelligent Kiosk.

Admin Console - Admins may manage kiosks, deploy remote notifications and review Kiosk usage statistics.

3- User Interactions

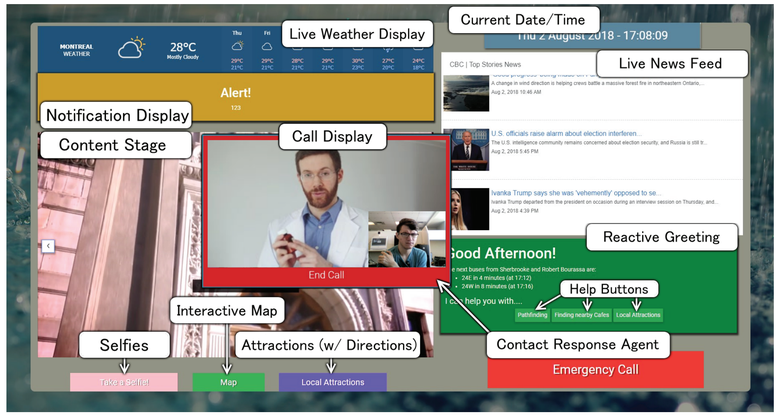

Figure 2: Our Kiosk Content Page, labelled with user features.

- **Basic Information:** Slideshow, Date/Time, Live Weather & News.
- **Local Notification:** Use Local Processing / Devices to trigger important local events *(greetings, dangerous sensor readings etc.)*.
- **Pathfinding:** Direct users to requested location *(Google Maps API)*.
- **Emergency Response:** Video call with response agent *(WebRTC)*.
- **Remote Notification:** Notification alerts deployed via management console *(Websocket Messaging)*.

4- Kiosk Management

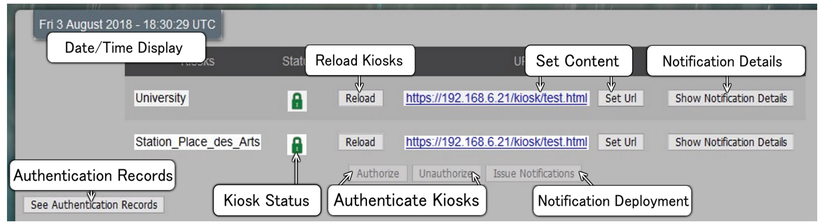

Figure 3: Our Management Console, labelled with admin features.

- **Kiosk Authentication:** Mark a Kiosk as trusted for content display.
- **Kiosk Status:** View the operational status of a Kiosk.
- **Remote Notifications:** Deploy or schedule notifications for display on Kiosks.
- **Content Management:** Set content for display on Kiosks.
- **Kiosk Reload:** Refresh content displayed on Kiosks.

5- Kiosk Usage Statistics

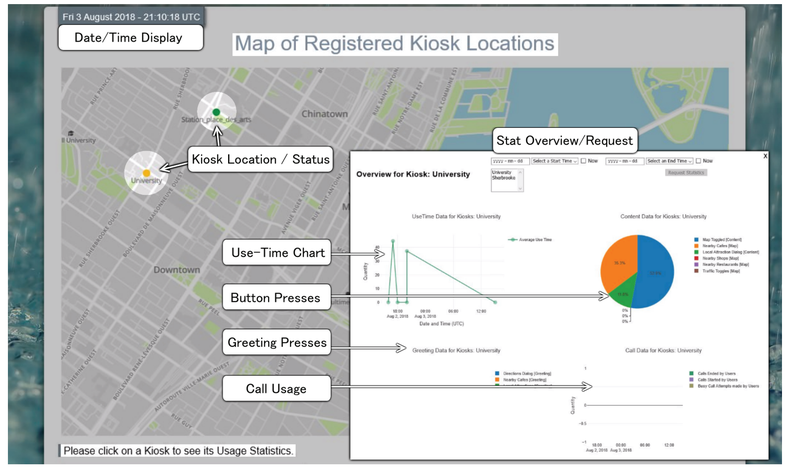

Figure 4: Our Statistics Console, labelled with admin features.

- **Operations:** Overview of Kiosk Status on Map.
- **In depth Statistics:** Detailed usage statistics for selected Kiosk.
- **Comparisions:** Compare statistics for different Kiosks.

6- Conclusions

- Designed and Implemented a Robust and Secure Architecture for an Intelligent Kiosk System in a Smart City.
- Designed Proof of Concept System capable of reactive and interactive content display on Kiosks.
- Demonstrated the feasability of establishing emergency video calls on the Kiosk with current technology.

Future Work:

- Integrate Kiosk within Real IoT Infrastructure.
- Expand Kiosk Usage Statistics Collection.
- Extend local processing functions.

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