Computer Science and Engineering Department, University Of Nevada Reno

TouchBadge: An Internet Connected Lanyard for Conferences

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Project Summary

Conferences are a primary source of professional networking for many industries. Obtaining contact information from potential clients and fellow industry members is heavily tied into attendee badges. Existing attendee badge concepts rely on old technology (barcodes, magnetic strips) and are cumbersome to use in high traffic environments like convention floors. Working in development with sponsorship partner and hardware designer Breadware, TouchBadge seeks to eliminate these issues by creating a modern badge which utilizes Bluetooth and Near-Field Communications (NFC) to allow instant transfer of contacts while on the convention floor as well as a convenient interface for transferring those contacts into an existing Customer Relationship Management (CRM) solution.

Project Description

Main Goals

Existing conference attendee badges use old technology and are difficult to use in an actual convention environment. They typically utilize barcodes (or similar) or magnetic stripe, both of which require a separate reading device for interfacing. Additionally, collecting contact information can be slow for interpersonal contacts, but for presenters it requires full time staff just for this purpose. TouchBadge seeks to reduce this complexity and improve interactions through the use of a smart badge. The badge would allow attendees and presenters to touch badges momentarily to transfer contact information in both directions. A mobile application and web interfaces will allow attendees, presenters, and organizers to interface with the information on the badges and export acquired contacts to their Customer Relationship Management (CRM) software of their choice.

Main Functionality

Hardware

The hardware will be designed by Breadware in cooperation with Team 11 members to meet project needs. At three inches by five inches, The initial proposed design, as seen in Figure 1, is similar in size to existing convention badge implementations. The rear facing side of the badge contains the primary hardware including Bluetooth, NFC, and WiFi hardware. The front facing side of the badge contains a set of small multicolor LEDs as well as custom silkscreened logos for the given event.
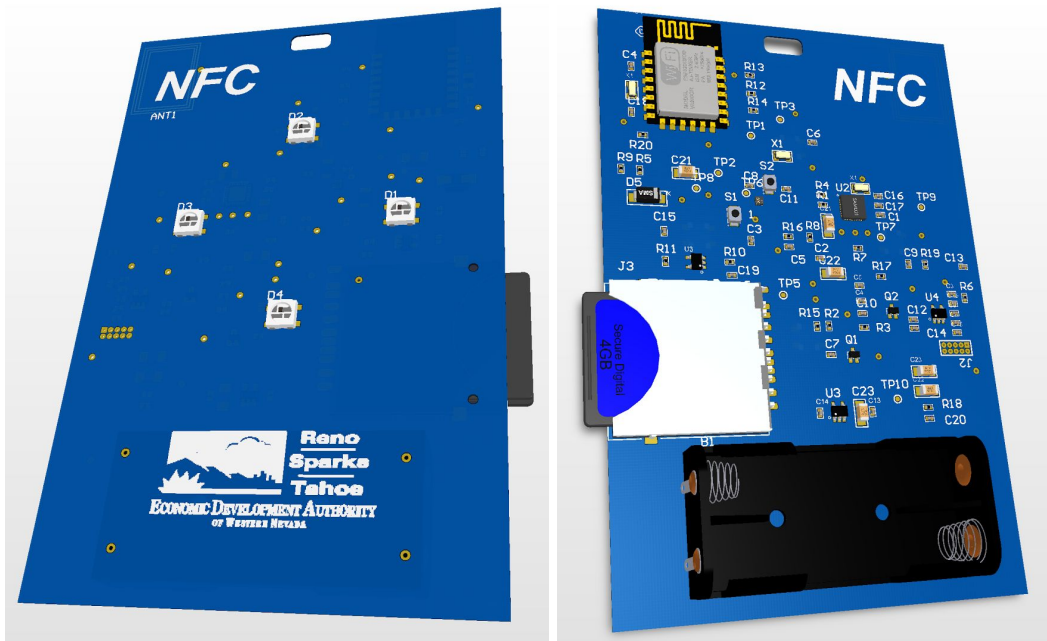
Figure 1: Preliminary mock-ups of badge hardware provided by sponsor. Product front (left) and rear (right) are shown.

Mobile Application

The mobile app will be the core interface for conference attendees while on the convention floor. Attendees will be able to update their contact information, view a list of fellow attendees and presenters that they've met, as well as view updates from convention organizers. In phase two of development, app would allow attendees to activate offers provided by conference organizers such as complimentary food/drinks that could be activated by touching their badge to a vendor terminal.

Figure 2: Mobile application Mock-up.

Web Applications

The web portal is divided into two distinct functions, the Attendee Administration Portal (AAP) and the Conference Organizer Administration Portal (COAP)

The AAP will be the first interaction by the attendee with the system. It will be tied into the conference registration process, with the attendee creating their account during registration or logging in to an existing account if available (If they've already attended a previous conference using this technology). Once logged in, the attendee will be able to add or update contact information, associate relevant social media accounts such as their LinkedIn profile, and view acquired contacts and import them into their mobile device.

At the end of the day, or after the conference, the AAP will allow attendees to access acquired contacts, and allow them to export them to an existing contact management application (e.g. Outlook) or their CRM platform of choice (e.g Salesforce). The AAP is not intended to replace or replicate the Mobile app for attendees.

Event organizers will utilize the COAP to activate and troubleshoot convention badges. Organizers, and later on-site staff, will use the COAP to connect a badge to an individual attendee's AAP account. On-site staff will also be able to erase and reactive badges in the event

of product malfunction. Phase two of development would allow organizers to initiate offers, such as free food/drinks that will be passed down to the attendees mobile apps.
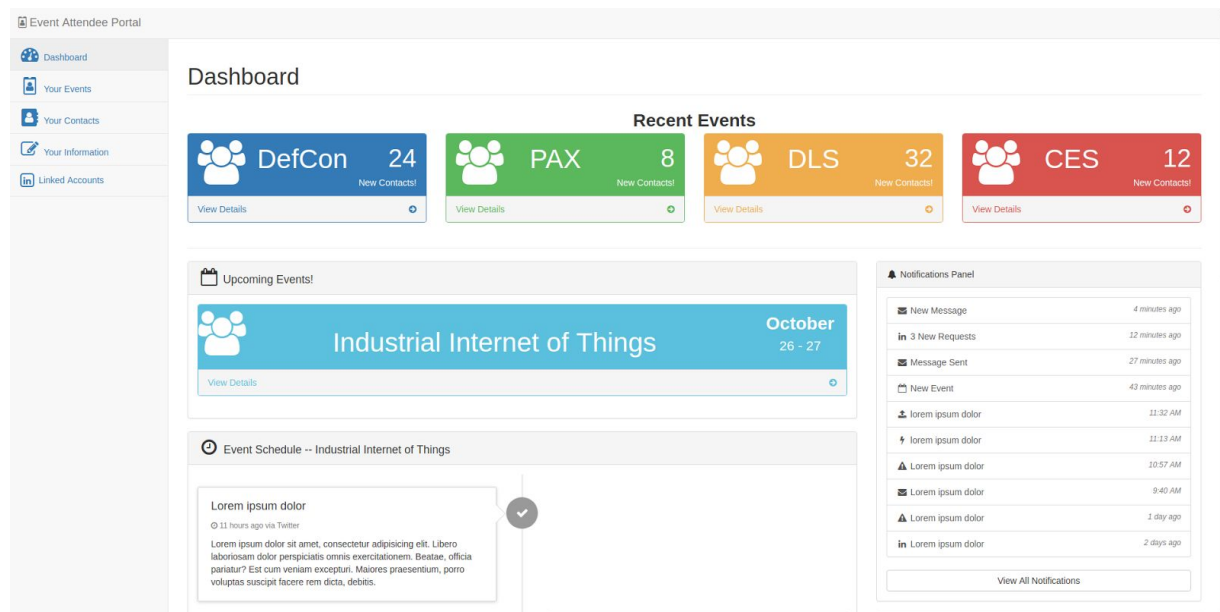

Figure 3: Design concept for web interface.

Intended Audience and Usability Goals

This project is designed for conference organizers and attendees. The software solutions are not likely to be valuable outside of this market. However, the hardware solution could be repurposed in the future for other applications that would require the set of connectivity provided.

Convention attendees at a convention implementing this project should enjoy a much more relaxed convention atmosphere without the inevitable bottlenecks caused by large scale badge scanning operations at large booths. Presenters should see reduced convention staffing requirements and greater ease in connecting their acquired contact information into their favorite CRM.

Potential Future Enhancements

As outlined in the Main Functionality section, phase two of development would be expanding the badges role for attendees. Future enhancements might include the ability for organizers to offer free or discounted food/drinks, transportation, or other perks provided vendors can interface with NFC.

Depending on the time available for completion, Team 11 has floated the idea that this project could be implemented as the official badge system for Innovation Day 2018. This kind of large presentation would be sure to wow attendees and potential investors.

Upon completion of the project, the sponsor has agreed to release all intellectual property to the team. This would allow the team to pursue growth of the product into the future.

Challenges

This project is not without challenges. The first challenge would be adoption. Conferences are big business and organizers are not eager to switch to small untested platforms. The goal for the team would be to meet with small conference organizers and convince them to give this project a trial run. Initial investments might be used to provide free implementation to early adopters of the project. Additionally, accessing the APIs for large Social Media and CRM solutions may not be easy. The team will likely need to leverage the sponsor's, and their own, industry connections to obtain access.

The team was initially worried that the hardware design might be too difficult, but the sponsor has agreed to develop the hardware in-house and allow the team to focus on the software implementation. Additionally, this type of hardware has been used in other industries and needs minimal adjustment for this application.

Technology Description

As this project scope is rather large, it will encompass many different technologies and frameworks for each different section of the project. The badge itself will use Bluetooth and Near-Field communication (NFC) to interact with other Smart Badges nearby. The firmware for the badge will be written in C but is at the discretion of Breadware while the hardware itself is still being developed. The website portion of the project shall be implemented using ASP.NET in conjunction with the Bootstrap framework to create a responsive web design that will easily be accessible on mobile platforms. For the mobile application, Xamarin will be used to utilize both iPhone and Android devices.

Team Overview

Evan Grill is a Computer Science senior at the University of Nevada, Reno. He is the husband of a wonderful middle school mathematics teacher and companion to the most lovable pug in the world. His hobbies include watching films, video games, and electronic design and modification, especially in the field of analog video.

Jon Weatherspoon is a Computer Science and Engineering major and the University of Nevada, Reno, mostly interested in automation, firmware development, web development, and cybersecurity. When not programming or researching, he enjoys photography and modifying cars. His enjoyment of firmware development and web design will ensure he is a fantastic addition to team 11.

Cody Worsnop is a senior in Computer Science and Engineering at the University of Nevada, Reno. His hobbies include outdoor activities such as hiking and dirt biking and spending time with his family. His professional focuses include windows application work, UI programming, and cybersecurity. His past experience includes working as a web developer for the startup company Dringo as well as two internships at General Electric. Cody is excited for the opportunity to work with embedded controllers and gain more experience in the hardware world.

The sponsor company, Breadware, was launched by engineers, designers, and managers frustrated by the costs, time-frames, and roadblocks of developing IoT hardware. The Breadware team leveraged their technical expertise to create a modernized, friendly, and user-facing platform resting on an underlying algorithmic infrastructure that provides unparalleled quality and speed at unprecedented prices.

Advisory Overview
Daniel deLaveaga is currently the COO and co-founder of Breadware. He is a past lecturer at the University of California, Santa Barbara. Daniel's involvement with the project is out of professional engagement as well as personal interest.

Professional Growth

Team 11 expects professional growth as they work together with an industry partner to complete the project. The ability to not only utilize professional practices but to also leverage industry knowledge is exciting to the team. Breadware has stated they are willing to hire members of the team upon completion of the project determinant upon performance of each member.

Market Potential

Conventions are a primary source of professional networking in many fields. Existing badge solutions are not ideal and cause traffic bottlenecks and frustrations for attendees, presenters, and organizers. As such, this market is ready for a product that reduces the workload for all parties and provides an easy way to connect acquired contacts with CRM platforms.

In the team's research, they came across the "Parallax Hackable Badge", an existing open-source smart badge concept. The sponsor has provided us with one of the Parallax badges to act as a prototype for the project until such time that the final hardware design can be implemented. Unfortunately the Parallax lacks the functionality to be adopted by any large scale conventions. In practice the Parallax badge is a hobby project rather than a fully implemented conference solution.

Additional projects in this field include SmartTrac (http://www.hubvents.com/device/), eventBit (http://eventbit.experient-inc.com/), and Loopd (http://loopd.com/), all of which provide a similar end-to-end solution. However, all three emphasize user tracking and large scale data collection. Additionally, because users don't have to have physical interaction to exchange data, the potential for unwanted contact sharing is high.

The Smart Badge uses NFC technology bundled with Bluetooth to provide a greater ease-of-use when compared to existing products. The user is given the ability to simply "bump" with another badge to share contact information. This concept has already been given interest by the event management branch of Veeam, an enterprise data backup and storage company.

Time Worked on Project Concept

Evan Grill

Evan worked approximately 9 hours on this part of the project. The hours spent break down as follows:

- 1 hour meeting with Breadware discussing the project.
- 3 hours meeting with fellow team members.
- 3 hours working on initial and final drafts of this document.
- 2 hours of research about similar products and services.

Jon Weatherspoon

Jon spent approximately 11 hours on this part of the project. Breakdown of the work is as follows:

- 2 hours meeting with Breadware discussing product details.
- 3 hours meeting with fellow team members.
- 4 hours working on initial design mock-ups.
- 2 hours individual work on the project.

Cody Worsnop

Cody worked approximately 9 hours on this part of the project. There hours were incurred from the following activities:

- 2 hours meeting with Breadware discussing the project, implementation details, etc.
- 3 hours meeting with fellow team members.
- 2 hours working on various documentation.
- 2 hours individual work on the project.