John Hasey, Chris Motia, Tyler Mayer, and Zane Meiss

April 21st, 2019

INFO-I101

Logan Paul

Project Research

In an article that was found on the ACM Portal, an academic journal published by Amina Cherif and others discusses the protocol necessary to collect and safely secure data that is obtained by Radio Frequency Identification, or RFID technologies. RFID nodes are embedded computing devices, equipped with sensors using wireless technologies to communicate. Wristbands used at music festivals incorporate this RFID technology, allowing clients to access the concerts, make cashless payments, and use social media integration all via a single wristband. With all this confidential data stored in one accessory, the privacy and security protecting this information is of utmost importance.

In order to maintain secure data, information must be collected, stored, processed, and then transmitted to a third-party user, which in our scenario is the music festival attendee. This academic journal stresses that data must be protected from the moment the wristband is scanned all the way through its delivery to ensure the data does not fall into the wrong hands. To do this, a lightweight protocol using Mobile Data Collectors should be implemented to allow the data to be collected and transmitted to the desired third-party user. By using this method, data can be protected throughout all of its phases and allow for the users information to remain confidential.

Using this lightweight protocol can be applied effectively to the idea of using wristbands for a large-scale music festival, as various information can all be registered on a users wristband

and be protected for them to use. Some of this information involves sensitive data such as payment methods and tickets, and with advanced security systems the use of RFID technology can be a safer and reliable practice.

In another article written on Amplify.com, author Dave Brooks discusses how the music festival Governors Ball will have the most advanced radio-frequency identification, or RFID system seen to date. This new system offers things that no other RFID wristband has been able to do. This system allows for cashless payments, rapid onsite fulfillment and offline operations with multiple layers of redundancies to continue to power an event if the network goes down. This technology was originally created for long multi-day festivals. They created it in order to avoid extremely long lines, collect data, and avoid people from buying counterfeit tickets. These wrist bands are built with multiple levels just in case the system for checking people in were to go down for any reason. Since these tickets were so expensive Everbrite thought it would be a good idea to have an extra portal where you could see all the steps your wristband is. If your band were to be stolen and lost you can report it to Everbrite. The convenient part about these wristbands that check in is extremely easy all you have to do is hold your wristband next to an iphone and it scanned you in, this reduced wait times by 60-70%.

Security is a big problem when it comes to all these people putting credit cards and funds on these wristbands. Everbrite is the only company who has allowed people to put there credit card on a wristband for easy purchases. With the combinations of both the tickets and credit card purchases on the wristband it gives festival organizers a full 360 view on the festival. With the upcoming years and the progression of technology we will see how much more advanced this technology will become.

How does this relate to our proposal of how event organizers will give out free stuff to people at the concert? Well, if the concert organizers have a full 360 view on what's happening they would be able to put all this information into a random generator and pick fans who are at certain concerts. Since the wristbands having a GPS tracking system it would be easy to choose people who are at certain stages, instead of picking from everyone where the winner may not be a fan of that artist. When people are kicked out for misbehaving or for some unknown reason it would recognize this and remove them from the selection of people who could win free prizes. This RFID system is definitely the future of music festivals with technology continuing to develop, and we will see what comes of this in a few years.

As with any large gathering of people, music festivals often bring in a crowd that can cause significant problems for local law enforcement. From boating violations to trespassing, if it's possible to get into trouble for something, it has more than likely been done at Ultra Music Festival. Hosted in Virginia Key this year, NBC 6 Miami (2019) stated that "the event saw a slight increase in number of people arrested during the three day festival". With about 35 people arrested and 10 of those people being charged with felonies, this years festival had seen the most crime since 2017. And while this is substantially less than the 67 arrests that occured in 2016, these arrest numbers still pose a problem for festival hosts who want to put on a safe experience for their clients.

Now while crime will always exist with the use of crowd tracking and data mining, it will be possible for festival hosts to reward good behavior and deter crime within their events. A plausible idea could be working with the Miami police to get a list of arrestees within the event grounds and possibly remove those names from any possible free raffles or prevent them from

purchasing tickets to the event next year. On top of that RFID bracelets with personal information on them could also assist in helping police locate certain people within the venue as they could see where the person had last scanned their bracelet.

With these measures in mind the last thing that festival hosts could do to increase public safety with data mining is to notify people nearby instances of crime about their surroundings. For example if an instance of battery happened to be reported at stage 1, everyone who used an RFID wristband to check in around stage 1 could be notified and be told to look out or leave the area. Festival hosts could also possibly deactivate criminals RFID bracelets on the fly and prevent them from accessing certain parts of the festival in order to increase public safety.

In an article written by Festival Insights, author Marino Fresch focuses on the effective use of wristband technology in music festivals. It discusses several ways that the technology is implemented and can be used, which is extremely helpful as it relates directly to our ideas about wristband technology being used to help run the music festival most efficiently. Some of the more interesting uses of the wristband technology include location services that allow for the tracking of heat maps to determine where people are gravitating towards on a given day of the event, and also LED lights which allow the audience to participate in the light shows coming from the stage. Another feature mentioned in this article that could be incorporated into our wristbands is one that would allow you to tap wristbands with a new friend you meet at the festival, which would automatically link the two of you on social media. The many ideas presented in this piece relating to wristband tech are all useful to us as we decide how to incorporate the tech into our own festival.

For those accustomed to outdoor festivities tailgates and music festivals, you can easily recognize the many similarities they have in common. For starters they are open air experiences that revolve around people gathering for entertainment and consuming some less than healthy substances. So, when new innovations come in streamlining how tailgates work it's only fitting that these changes can be adopted for music festivals as well. One of these new changes comes from Lamar University where the university is striving to add more fan friendly activities like giveaways and raffles for fans who regularly attend the tailgating fields according to Matt Faye of the Beaumont Enterprise. On top of this, increasing turnout to football games at Lamar University decreased the price of season parking passes for the tailgate fields in order to make tailgating for affordable for local families who in the past were often bought out by rowdier college kids.

In conclusion, RFID technology will in be instrumental in helping monitor music festival traffic for a variety of reasons. The major goal of our implementation of RFID technology came from a desire to make merchandise giveaways easier for bands that this same network uses to monitor festival-goer traffic, and can also be used for a plethora of other purposes. From reducing wait times, to assisting police solve crimes, and tracking criminals RFID technology will not only create a more efficient venue but also a safer venue.

Works Cited

Associated Press. “Number of Arrests During Ultra Increases Slightly in 2019.” *NBC 6 South Florida*, NBC 6 South Florida, 1 Apr. 2019, www.nbcmiami.com/news/local/Officials-Crack-Down-on-Illegal-Boat-Charters-During-2019-Ultra-Festival-507935671.html.

Brooks, Dave. "Eventbrite's RFID Technology Helps Festivals Enhance Consumer Experience." *ampthemag.com*, May 2016, www.ampthemag.com/the-real/eventbrite-rfid-technology-helps-festivals-enhance-consumer-experience/.

Cherif, Amina. “A Lightweight and Secure Data Collection Serverless Protocol Demonstrated in an Active RFIDs Scenario.” *ACM Transactions on Embedded Computing Systems (TECS)*, ACM, dl.acm.org/citation.cfm?id=3274667.

Faye, Matt. “LU Announces New Tailgate Experience.” *Beaumont Enterprise*, Beaumont Enterprise, 15 Apr. 2019, www.beaumontenterprise.com/sports/lamar/article/LU-announces-new-tailgate-experience-13769888.php.

“RFID Applications.” *Music Festival RFID Solutions by PDC*, 2018, musicfestivalsrfid.com/rfid-services/applications/.

“The Future Tech of Music Festivals.” *Festival Insights*, 15 Aug. 2017, www.festivalinsights.com/2017/08/future-tech-music-festivals/.