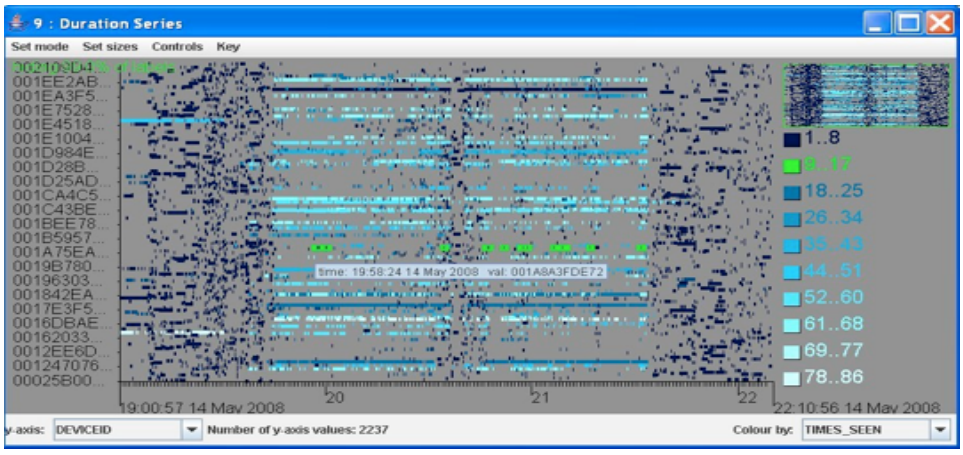
Visualization of Spectator Activity at Stadium Events

The ideas
The goal of this project is to provide an information visualisation tool that can be used in the analysis of the data given, to give insight into the activities of spectators, the relationship between an individual spectator and the crowd as a whole and the suitability of stadium environments for applications based on infrastructure such as mobile ad hoc networks (MANETs)[1]

This entire project works on the beginning of *The Augmented Stadium Project*, that is how the data was collected.

There are a couple products already out they try to do this function (DRS, Replayer, Cityware, Crawdad). The problem with these tools is that they focus less on the visualization while this one will be able to show everything in a single image.

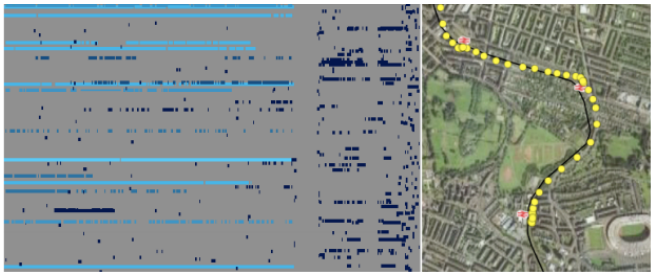
Bluetooth Devices
A image to show all the devices that gave off data through bluetooth while inside a stadium. The image is zoomed in while the entire graph is displayed in the top right.



In the graph there are horizontal bars that display unique data sets for each device. The highlighted green bars in this picture are shown as an example of what kind of details someone could acquire when hovering over the data. The numbers on the right display how often the device was in use during that time as well as color coating the bars to make it easier to visualize.

Using the GPS
Through Google Maps and the GPS system in the device is logging where it is being used.

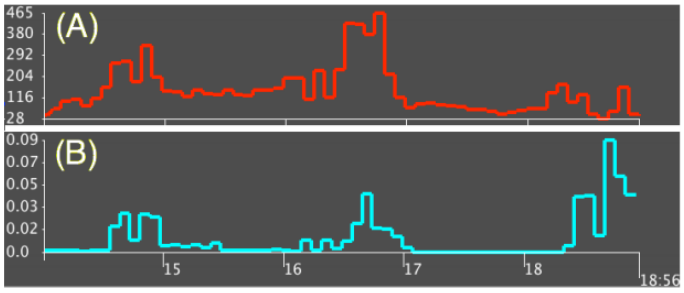
[1] MANET is a self-configuring, infrastructureless network of mobile device that are not connected through wires



The device is using both the bluetooth and GPS information to display this. In this image, A is displaying how often a device is logged where light blue indicates for a long time and darker blue indicates for a shorter time. However, in B the image is showing where in relation to the time the device is located. The yellow circles indicate where, on Google Maps, the image logged its information.

Devices in crowds

Using MANET we can see where a device is in relation to other devices giving a sense when the device enters the crowd and when the crowd becomes more and more dense as well as the physical speed of the device.



(A) is the number of unique devices surrounding the one device. **(B)** is the speed at which the device is going. This information could be used to help designers determine what kind transportation used, by foot or vehicle, and how often the device is surrounded by similar devices.

Improvements

The devices themselves cannot store a lot of data in a single device. The maximum amount of unique devices a single device can receive information from is 33. Through better hardware the researchers hope to increase this. A small improvement on the GPS would be to make the map a heat map to get better and specific results. The creators of this visualization are not complete in their work, they do plan on expanding how to better display data and gather more information at the same time.