

The Strength of the City

Challenge Rating: 3/5

MMU regularly collaborates on events, where we can enjoy a day or so with our local community, learn a thing or two and hopefully make people enthusiastic about the work we do.

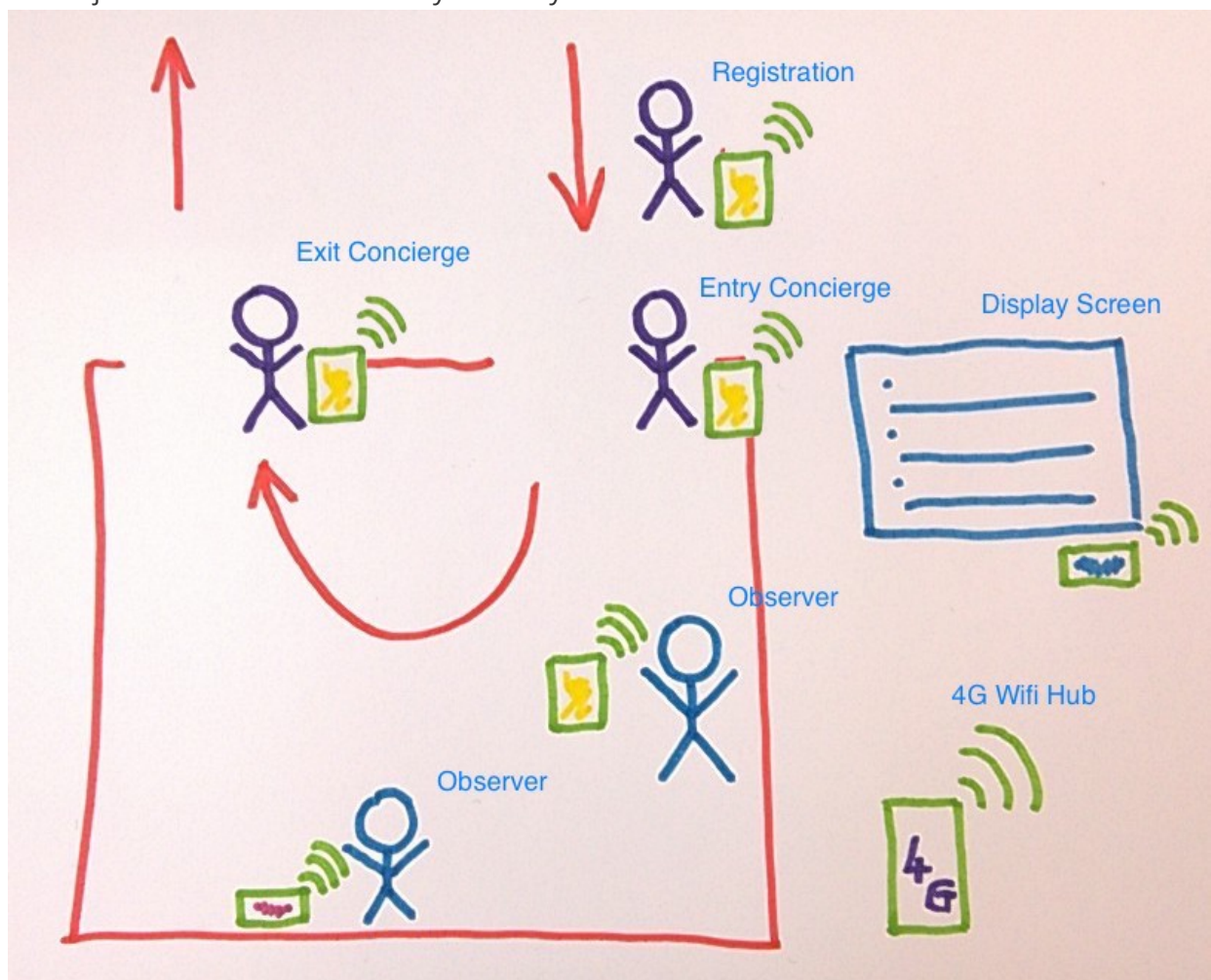
Manchester Science Festival is one those events. We are slowly putting together a fun installation we can take to it.

Here's what we're doing.

We go to MSF with an enclosure in which members of the public will participate in individual exercises in a competition to find 'The Strength of Manchester'. During the event, participant demographic and performance data will be taken, and added to a searchable database. The data will be made available to researchers.

The Strength of Manchester Data Acquisition System

The following schematic illustrates the flow of participants through the event. The schematic shows just 2 Observers. There may be many more.



Registration

On entering the event, participants will be given a visit token by a concierge. The token will uniquely identify them for the event.

Entry

On entry to the enclosure, the concierge will ask each participant to complete an entry survey. The survey will ask them questions about their attitude and experience prior to the event. The survey will be run on a tablet app, and will associate their answers with their event token. The concierge will handle entry of the participants answers.

Performance Capture

Each participant will visit several stations within the enclosure. Each station is dedicated to a single exercise. There may be more than one station servicing each exercise, in order to process participants as quickly as possible.

Each station is run by an observer who will be responsible for ensuring participants perform the exercises consistently. The measurement will be recorded on a tablet, which will send it to a central facility. The app will be very responsive. The time to record the measurement will be minimal.

Each observer will:

- operate an instrument which will be reset for each participant.
- record the participant's visit token before they begin the exercise.
- record the one-time measurement, representing the participant's performance.

Exit

On exit from the enclosure, the concierge will ask each participant to complete an exit survey. The survey will ask them questions about their attitude and experience post the event. The survey will be run on a tablet app, and will associate their answers with their event token. The concierge will handle entry of the participants answers.

Event Display

During the event, a large display screen will show a leader-board of the top-scoring participants.

System

The primary development is to be able to accumulate population performance data at a single event.

This will be done by the use of specially prepared apps, designed around a flow of participants, with the following priority:

1. performance data
2. survey data

It may not be possible to survey all participants at the event, due to the length of time a survey will take to complete. However, the system is designed that many concierges, registrars and observers can be supported: on encountering a participant, the app user enters the shortcode identifier of the participant, then their data, and then uploads it in the shortest possible time.

Following, is a list of the apps needed, and their function, the website needed to display results, and the data facility needed to store them.

Administration App

This is used prior to the event, and sets up the activities and surveys to be expected at the event and how the activities will be scored. Once this is done, all other apps can see the event data, and can be set-up easily.

Function: Set up an Event

Create (Read, Update, Delete) an Event. Add event name, description, location, start and end date

Function: Set up Performance Attributes

Create (Read, Update, Delete) a performance attribute: Add attribute name, description, units
Add attribute scoring ranges (score value and threshold) - for evaluation purposes.

Function: Build the Event

Add and remove performance attributes to and from an event. Add and remove surveys to and from an event.

Registration App

This is used by the Registrars, and will provide a shortcode identifier for a participant, to be used around the event enclosure.

Function: Register a Participant

Create (Read, Update, Delete) a participant. Add participant nickname.

Function: create a Participant Code

Obtain a short-form (5 digit) participant code, unique within the event. (The short form code can be combined with the event id to get the full participant Id)

Concierge App (Entry)

This presents a survey to be answered by a participant, on entry to the Event

Function: Setup

Used before the event List and select from the available events, the event being held List and select from the available surveys, the survey to be used at the event

Function: Survey a Participant

Used during the event Enter the shortform code of the participant Present a survey to be answered. Upload the survey results.

Concierge App (Exit)

This presents a survey to be answered by a participant on exit from the Event

Function: Setup

Used before the event List and select from the available events, the event being held List and select from the available surveys, the survey to be used at the event

Function: Survey a Participant

Used during the event Enter the shortform code of the participant Present the survey to be answered. Upload the survey results.

Observation App

This allows the speedy evaluation of a single action performed by a participant. Data is entered by the Observer.

Setup

Used before the event List and select from the available events, the event being held. List and select from the available attributes the attribute to be observed during the event.

Per observation

Used during the event Enter the shortform code of the participant Enter the value of the attribute observed Upload the value.

Leader board Web Site

This is a web-based UI which will connect to the data facility. It can be used in display mode (i.e. full-screen monitor) or as a website.

Front Page

List and select from the available events

Running

Show a list of all event participants (paged per 100) and their scores.

Search

Select from an list of events, and search for your nickname or participant to get individual performance readings.

Data Facility

The data facility holds the definition of all data, and provides an easily-searchable schema for the accumulated observation data.

The Data facility will be split into separate parts:

- Survey definitions and anonymous answer data
- Attribute definitions and anonymous performance data
- Event definitions and shortform identifier lookups and nicknames

Survey definition and answer data will be freely searchable, by clients having an access code. All data is linked to a unique participant identifier. Security is minimal. The definitions and performance data will be freely searchable, by clients having an access code. All performance data is linked to a unique participant identifier. Security is minimal. The event definitions data provides a lookup from participant identifiers, to shortcode data used at each event. It has minimal security.

How far have we got?

Last year's Live Project (Thanks [RatchetC!](#)) gave us:

- Administration App
- Registration App
- Observation App
- Data Facility

Your Project

This year, we want to get to a functional system, by adding a leader-board, which is actually a searchable website of results. It can be used equally well on a giant display screen at the event, or a by someone who wants to see how they did when they get home.

Here are some examples to give you an idea of what we mean:

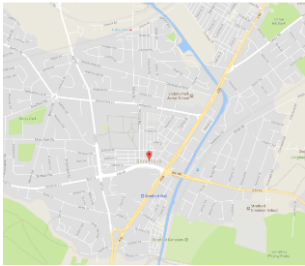
First, searching for a leader-board, for the current event:

Leader Board			Manchester Science Festival 2017			Strength					
Rank	Name	Score	Rank	Name	Score	Rank	Name	Score			
1	Gus	993	16	Magician	804	31	Zero	675			
2	Dawg	976	17	Stir	803	32	Slayer	674			
3	Shrimp	971	18	Cococo	786	33	Skinny	671			
4	Stone	959	19	Ducky	775	34	Boots	644			
5	Sparky	947	20	Old Buck	770	35	Flip	632			
6	Sandy	933	21	Cyclops	752	36	Skippy	618			
7	Sparrow	931	22	Jacket	743	37	Twitch	598			
8	Turk	918	23	Hammer	724	38	Major	590			
9	Moose	902	24	Twinkle Toes	712	39	Shorty	575			
10	Gator	898	25	Wonder	704	40	Cookie	566			
11	Herring	867	26	Bigby	701	41	Hawkeye	562			
12	Butcher	866	27	Killer	696	42	Aqua	559			
13	Nanna	839	28	Artsy	695	43	Princess	551			
14	Gentle	827	29	Stuffy	694	44	Boomer	529			
15	Silence	821	30	Barber	687	45	Fortuna	512			
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Next, look for the nickname of a person, so you can see their results:

Leader Board			Manchester Science Festival 2017			Strength			Pretzel		
Rank	Name	Score	Rank	Name	Score	Rank	Name	Score			
1	Gus	993	...	...	...	91	Stout	61			
2	Dawg	976	...	...	...	92	Speef	57			
3	Shrimp	971	...	...	...	93	Dizzy	54			
4	Stone	959	...	...	...	94	Shark	42			
5	Sparky	947	...	...	...	95	Pretzel	34			
6	Sandy	933	94	Shark	42	96	Black Magic	21			
7	Sparrow	931	95	Pretzel	34	97	Cyclone	15			
8	Turk	918	96	Black Magic	21	98	Fish	12			
9	Moose	902	...	...	...	99	Gonzo	8			
10	Gator	898	...	...	...	100	Rose	5			
11	Herring	867	...	...	...	101					
12	Butcher	866	...	...	...	102					
13	Nanna	839	...	...	...	103					
14	Gentle	827	...	...	...	104					
15	Silence	821	...	...	...	105					

Now, click on the entry, to get the full breakdown of their event performance:

You	Your Performance				What this means
<p>Name: Pretzel</p> <p>Age: 35</p> 	Measurement	Description	Units	Value	
	Body Mass	Body Mass, using scales, without shoes	Kg	80	Rank: 95/105
	Height	Height using ruler, without shoes	m	1.8	Rank for age 34 - 36: 27/ 28
	Jump Reps	Number of spot jumps over 1.0m before failure		40	Rank for 1 mile radius : 5/7
	Jump Peak	Peak spot jump height during session	m	1.2	
	Leg Force	Peak leg extension force	N	800	
	Curl Force	Peak bicep curl force	N	400	

Development

You will certainly need to use RatchetC's source code to create and deploy the apps, so you can populate the Data Facility.

You will need to look at the data which you have and how it is created and stored together.

You will need to create a NodeJS server, to create the leaderboard data, and wrap it in a REST API.

You will need to create a single page web app, using AngularJS, to display it.

Experience Areas

This project will allow members to gain and exercise knowledge and experience in the following areas:

- Project Management
- Javascript, AngularJS, Node.js
- RESTful web services
- Platforms-as-a-service: Restlet, Heroku

Possible costs

n/a

Equipment or Accounts needed

- developer accounts to Heroku service, Restlet Cloud