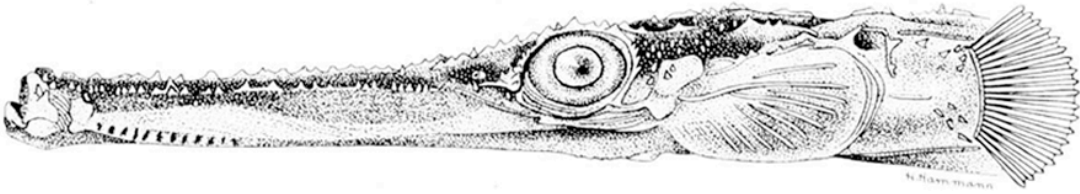


# *COSMOCAMPUS*



Project Report  
Tim White & Luke Mason

27/7/11

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# 1. INTRODUCTION

## 1.1 Summary of the Aims of the Project

(From the original proposal)

### **AIMS AND OBJECTIVES:**

To provide a grounding in authoring for AR with a form-based front-end for adding Points of Information (POI)

To produce a campus-based AR Layar (<http://www.layar.com/>) either constructed from narratives and data determined by the group or potentially working in tandem with the department's Writing for Performance module.

To publish and publicise the Campus Layar for all university staff and students

Cosmocampus is supported by the Open-space Learning in Real World Contexts project that explores the educational possibilities of Augmented Reality (AR). The project was funded from October 2010 to July 2011 and was undertaken by Dr Tim White and Luke Robert Mason, both from the School of Theatre, Performance and Cultural Policy Studies. Initially intended to be incorporated within Dr White's Performing Online module that ran during the Autumn Term 2010, the funds were not in place in sufficient time to allow early purchase of the hardware to offer a viable session with the student group.

With Dr White on study leave in the Spring Term and Summer Term commitments and lack of appropriate student groups to work with, the decision was made to continue work on the project in advance of the submission deadline with a view to offering sessions on using AR as a creative tool in Autumn Term 2011. Consequently, the project has evolved rather differently than anticipated, having been developed in the absence of a student group to stretch and confound the assumptions that accrete when developing work in isolation. Rather than sustain a narrative mired in the Slough of Despond, the following report charts the development of the project as it evolved and offers an exciting and diverse range of possibilities for how the work might evolve from this initial funding stage.

## 1.2 Personnel

### Dr Tim White

Associate Professor in the School of Theatre Studies at the University of Warwick, Tim's interest in the pedagogical possibilities of emerging technologies has most recently been realized in a second-year Aspects of Theatre and Performance module, Performing Online. Previously Tim has developed telematic systems to assist with the MAIPR (MA in International Performance Research) course, linking sites in Warwick, Amsterdam and Tampere. Tim has a background in web and database design.

### Luke Robert Mason

Luke recently graduated from the Theatre Studies department with a first class degree. Throughout his three years his enthusiasm for and knowledge of the digital domain has informed a number of practical projects. Most recently Luke organised the highly successful Virtual Futures 2.0 conference at Warwick, (see <http://virtualfutures.co.uk/> ) bringing together luminaries from many disciplines to consider the technological extension of the human condition. Luke is currently employed at Warwick as an Online Content Assistant at Warwick.

### **1.3 Revised Agenda**

A lack of students to tease out the questions that can be asked of Augmented Reality shifted the focus toward establishing a framework that would illustrate how the technology can be used in a meaningful and informative fashion for the staff and students at Warwick (Cosmocampus) and instigating a platform that would remove some of the hurdles (technical and financial) that would accommodate exploration of the possibilities of AR (Crashmocampus).

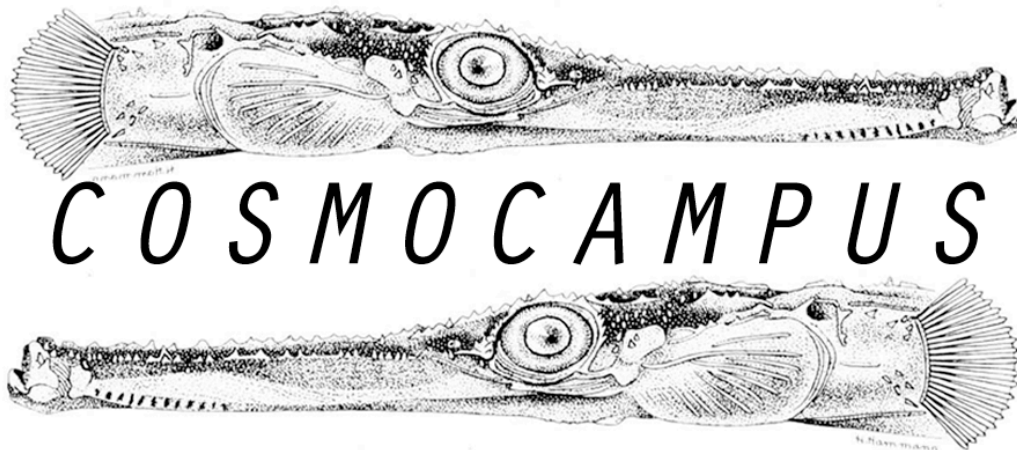
The project purchased three smartphones that arrived in the last week of November. The rest of the term was spent scoping out possible authoring platforms to produce AR work and to assess the capability of the purchased phones for in the project.

During the Spring Term the project was in abeyance as a consequence of Tim White's study leave. In the final week of the Summer Term, a schedule was drawn up to produce two platforms – one a live showcase, the other a testbed for work to be undertaken in Autumn 2011 and beyond.

### **1.4 The Two Projects**

During the lifespan of the project new initiatives in the field of AR have emerged, not only in terms of technological advances but also with regard to the number of companies offering AR applications on which authors can publish their work. From the outset it was felt that the project should both address the absence of an AR application covering the University Campus and that a means to use the technology in less predictable and more innovative ways should be established. The different characteristics of these two approaches is set out in sections 2 and 3.

## 2. COSMOCAMPUS



### 2.1 AIM

Cosmocampus draws on existing data drawn from Warwick's Interactive Campus Map - <http://www2.warwick.ac.uk/about/visiting/maps/interactive> and the static Campus Map - <http://www2.warwick.ac.uk/about/visiting/maps/campusmap/> and makes this available in a handheld device. Currently it has around 115 Points of Interest (POIs) that correspond to the buildings and services on the campus. It is very much a first iteration of the idea, future developments of which will be discussed below.

### 2.2 DESIGN

There are a number of clients that enable you to author AR apps using online tools, such as Hoppala - <http://www.hoppala-agency.com/category/augmentation/>, buildAR - <http://www.buildar.com/> and Poistr - <http://www.poistr.com/>. Initial frustration with authoring a layer ('layer' is the term used by LAYAR to describe an AR application) from scratch meant that we gravitated toward using Hoppala as the off-the-shelf tool for construction but this, and other tools had limitations; specifically

#### 1. Cost

Hoppala is the most attractive cost-wise as it allows up to 100 augmentations (POIs) for free and links to Junaio, Wikitude and Layar). Beyond the 100 POI limit there is a minimum charge of 50 Euros. Other services charge on a per month and or per POI basis, as shown below:

BuildAR – 1<sup>st</sup> project: \$0 hosting, \$295 to publish. Subsequent projects: \$10/month to host, \$295 to publish

Poistr – no pricing model currently available

Poiz – ongoing charge: 9.95 Euros/month – 50 POIs or 49 Euros/month – 500 POIs

Visar – hosted service, pricing not available to general browser

Porpoise – server for Layar. A non-cost authoring environment

2. Non-extensible

The front-ends for the various services were welcoming but made certain assumptions about how the project would develop. Without access to the database or the code that linked the database to the Layar program it would not be possible to customize the authoring environment on a project-per-project basis nor to add additional functionality.<sup>1</sup>

3. Limit on POIs

As indicated in the section on cost, a number of tools put a limit on the number of POIs that can be added. This would impact on Cosmocampus if the next version became more granular (on a per room and/or per staff member basis).

### 2.3 Implementation

Persevering with writing a back-end from scratch I took advantage of some spare server capacity and created two websites with databases to house the projects, <http://www.cosmocampus.co.uk> and <http://www.crashmocampus.co.uk>

Building on the tutorial scripts found at <http://www.layar.com> I developed a backend written primarily in ASP with some PHP that communicates with a MySQL database. The authoring environment for Cosmocampus which was constructed first aims to be as close to existing tools as possible (up to the limits of my scripting abilities) and informs the decisions made for the second site. The following screenshots illustrate the means by which POIs can be added, modified and deleted in Cosmocampus:

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

<sup>1</sup> An example would be the Warwick Authors project. Having access to the database and the entry forms means that generic fields such as Description line 1 can be replaced with Book Author and that additional info can be added to tables so that when porting to another platform eg Google Maps, info not able to be displayed on the phone could be provided elsewhere.



( 115) POIs

[Add new POI](#)

LIST [Show as map](#)

POI	TITLE (Click to Modify)	ICON	CATEGORY	Delete
24	<a href="#">Millburn House</a>		Arts Faculty	<a href="#">DELETE</a>
25	<a href="#">Car Park 10B</a>		Parking	<a href="#">DELETE</a>
26	<a href="#">Library</a>		Academic Resources	<a href="#">DELETE</a>
27	<a href="#">University House</a>		Academic Resources	<a href="#">DELETE</a>
28	<a href="#">Cafe Westwood</a>		Catering Outlets	<a href="#">DELETE</a>
29	<a href="#">Scarman</a>		Conference Resources	<a href="#">DELETE</a>
30	<a href="#">Health Centre</a>		Health	<a href="#">DELETE</a>

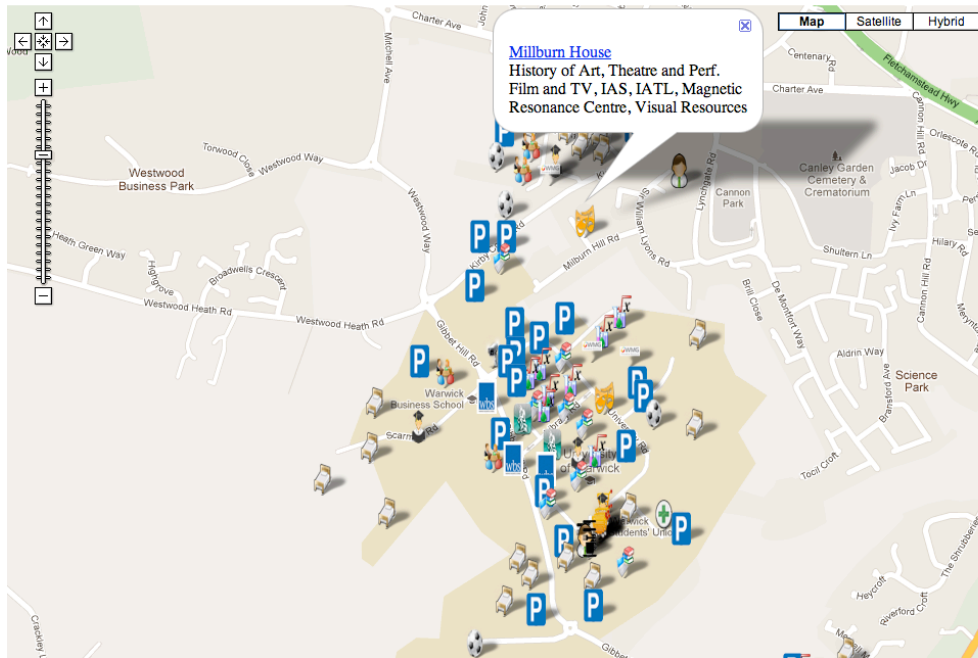
This is the main screen you see after logging in. It shows the existing POIs as a list, with their title, the icon assigned, the category and links to either modify or delete the POI. Future functionality would use AJAX to provide sortable columns



( 115) POIs

[Add new POI](#)

MAP [Show as list](#)



This is the same page showing POIs on a map. Clicking the URL in the info window allows you to edit the POI

Field	Value
title (max 150)	Millburn House
Category	Arts Faculty
Icon	
lat	52.3865261107
lon	-1.5612709522
Description1 (max 150)	History of Art, Theatre & Perf.
Description2 (max 150)	Film & TV, IAS, IATL, Magnetic
Description3 (max 150)	Resonance Centre, Visual Resources
<input type="button" value="Submit"/>	

When you click to modify a POI you are taken to this screen. You can modify any of the values on the left and alter the co-ordinates by dragging the marked on the main map which then updates the lat,lon values. The category (which determines the image is drawn from a drop-down list. The lower map shows all POIs. It is desirable to show these on the central map (in a different colour) but I'm still figuring out how to achieve this.



When you have modified the POI you can either return to the main admin page (as above) or else modify the actions associated with the POI by clicking the modify actions button in the top right.





[BACK TO MAIN ADMIN PAGE](#)

[Back to modify POI](#)

<h3>CURRENT POI</h3> <p>Millburn House (52.3865261107,-1.5612709522) History of Art, Theatre &amp; Perf. Film &amp; TV, IAS, IATL, Magnetic Resonance Centre, Visual Resources</p>  <p>MAP</p>  <p>Map data ©2011 Tele Atlas</p>	<h3>ASSIGNED</h3> <p><b>ACTION 1: Website</b> Label:History of Art Link:<a href="http://go.warwick.ac.uk/arhistory">http://go.warwick.ac.uk/arhistory</a> Range Trigger: n/a Range Trigger only: yes <a href="#">DELETE ACTION</a></p> <p><b>ACTION 2: Website</b> Label:Theatre Studies Link:<a href="http://go.warwick.ac.uk/theatrestudies">http://go.warwick.ac.uk/theatrestudies</a> Range Trigger: n/a Range Trigger only: yes <a href="#">DELETE ACTION</a></p> <p><b>ACTION 3: Website</b> Label:IATL Link:<a href="http://www2.warwick.ac.uk/fac/cross_fac/iatl/">http://www2.warwick.ac.uk/fac/cross_fac/iatl/</a> Range Trigger: n/a Range Trigger only: yes <a href="#">DELETE ACTION</a></p> <p><b>ACTION 4: Website</b> Label:IAS Link:<a href="http://www2.warwick.ac.uk/fac/cross_fac/ias">http://www2.warwick.ac.uk/fac/cross_fac/ias</a> Range Trigger: n/a Range Trigger only: yes <a href="#">DELETE ACTION</a></p> <p><b>ACTION 5: Website</b> Label:Film and Television Link:<a href="http://www2.warwick.ac.uk/fac/arts/film">http://www2.warwick.ac.uk/fac/arts/film</a></p>	<h3>ADD ACTION 6 (Max 21)</h3> <p><b>Link to Website</b> Label <input type="text"/> URL <input type="text" value="http://"/> Auto Trigger Range (m) <input type="text"/> Auto Trigger Only <input type="checkbox"/> <input type="button" value="Submit"/></p> <p><b>Make phone call</b> Label <input type="text"/> phone tel: <input type="text"/> Auto Trigger Range (m) <input type="text"/> Auto Trigger Only <input type="checkbox"/> <input type="button" value="Submit"/></p> <p><b>Send email</b> Label <input type="text"/> email <input type="text" value="mailto:"/> Auto Trigger Range (m) <input type="text"/> Auto Trigger Only <input type="checkbox"/> <input type="button" value="Submit"/></p> <p><b>Send sms</b> Label <input type="text"/> email <input type="text" value="sms:"/> <input type="button" value="Submit"/></p>
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This shows the modify actions page for Millburn House POI. All current info on the POI is shown on the left and already assigned actions in the middle column (with the option to delete them). The right hand column has boxes for each of the four possible actions – website, phone call, email and sms. The AutoTrigger range and Auto Trigger Only fields are not used in Cosmocampus (and will be removed) – for other projects these allow you to set the distance at which certain actions become available to the user.

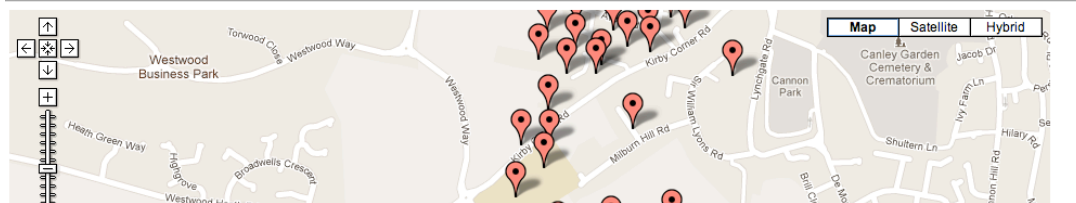
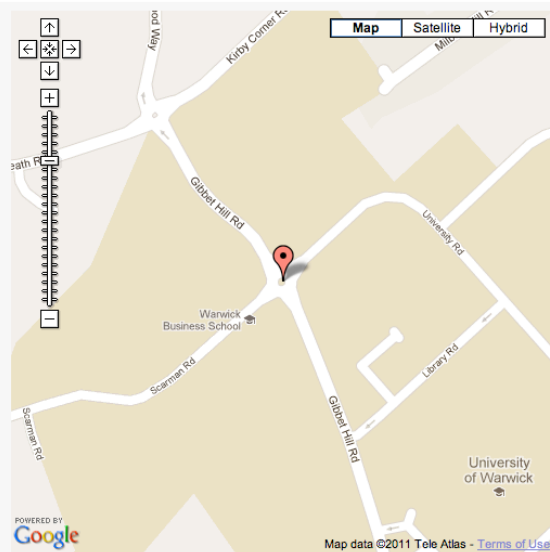


[BACK TO MAIN ADMIN PAGE](#)

Field	Value
title (max 150)	<input type="text"/>
Category	Academic Resources
lat	52.38285326639036
lon	-1.5653029829263687
Description1 (max 150)	<input type="text"/>
Description2 (max 150)	<input type="text"/>
Description3 (max 150)	<input type="text"/>
<input type="button" value="Submit"/>	

LIST OF POIs added (alphabetical)

Arden



To add a POI you are taken to a screen similar to the Modify screen but differing in that most fields are empty (or hidden and prefilled) and the marker defaults to the Gibbet Hill Road roundabout. Again, it would be good to have existing and new POIs shown on one map and to avoid duplication a drop-down list of entered POIs is provided below the form.

Cosmocampus is a vanilla interpretation of the functionality provided by Layar, an AR software publisher, selected over competing services (such as Junaio - <http://www.junaio.com/> and wiktude - <http://www.wiktude.me/w4/wme/map.jsp>) because of its broad take-up amongst smartphone users, in part a consequence of being pre-installed on a number of Android smartphones.

Each POI in Cosmocampus has

A location (in latitude and longitude) eg 52.345678,-1.34567

An icon (that represents the POI on screen) sized at 110x110, 76x76 and 56x56 pixels depending on proximity eg



icon for Shops and Services

A title that indicates what it is eg University House

A category<sup>2</sup> that indicates the type of building eg Sports Resources

Three lines of descriptive text<sup>3</sup> eg

Single Study bedrooms - UG

39 week lets

82GBP per week in 2010/11

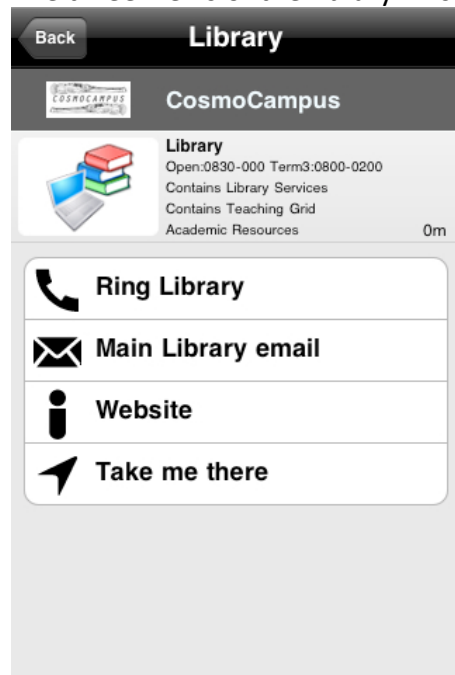
A dimension – this can be 1 (point), 2 (image) 3 (3d object) – Cosmocampus uses points

An image for display in the list view of 100x75 pixels eg



Image for Arts Faculty

Actions – one or more options linked to a POI. These can include linking to a webpage, sending an email, sending a text, making a phone call, playing a sound, playing a video, providing directions (“Take me There”) and a number of other functions. Cosmocampus uses webpage, email and phone functionality currently. The three views of the library (list, map and camera) show this below:

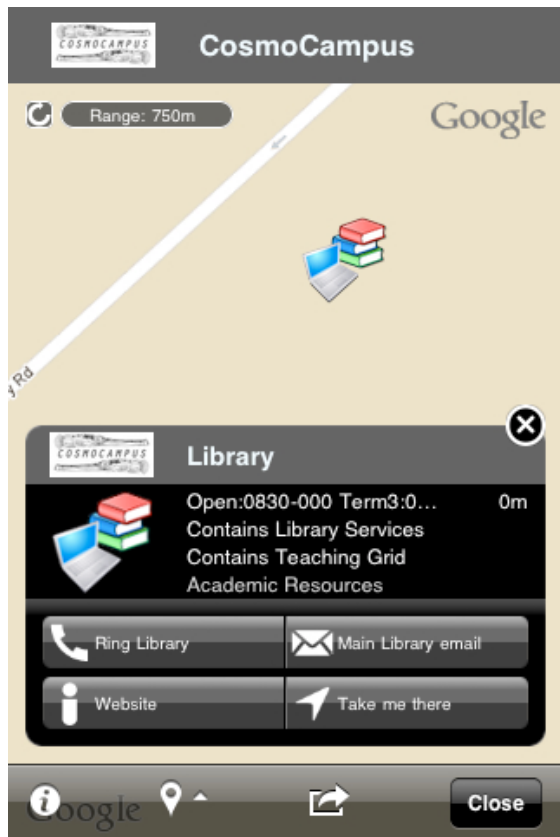


List view

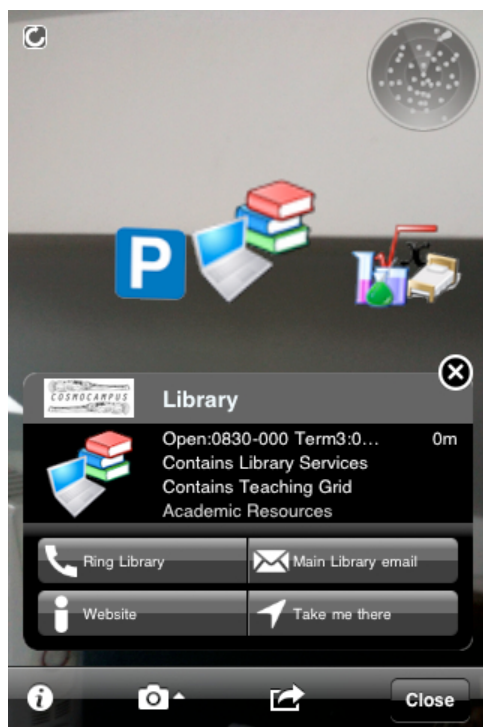
---

<sup>2</sup> This is actually referred to as an attribution but for the purposes of Cosmocampus it has been used to group POIs

<sup>3</sup> One of the pitfalls of portability is a lack of display space; though the database is configured to accept 150 characters per line of text, only the first 35 are visible on the iPhone display.



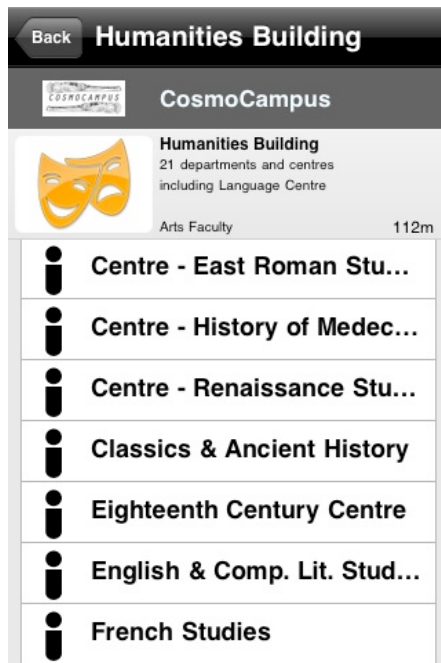
Map view



Camera view

The camera view is worth a further look as it shows the unique perspective gained by a mobile device. In the top right is a radar display of all POIs within range (the range can be set by the user). A maximum of 50 POIs can be shown at any one time,

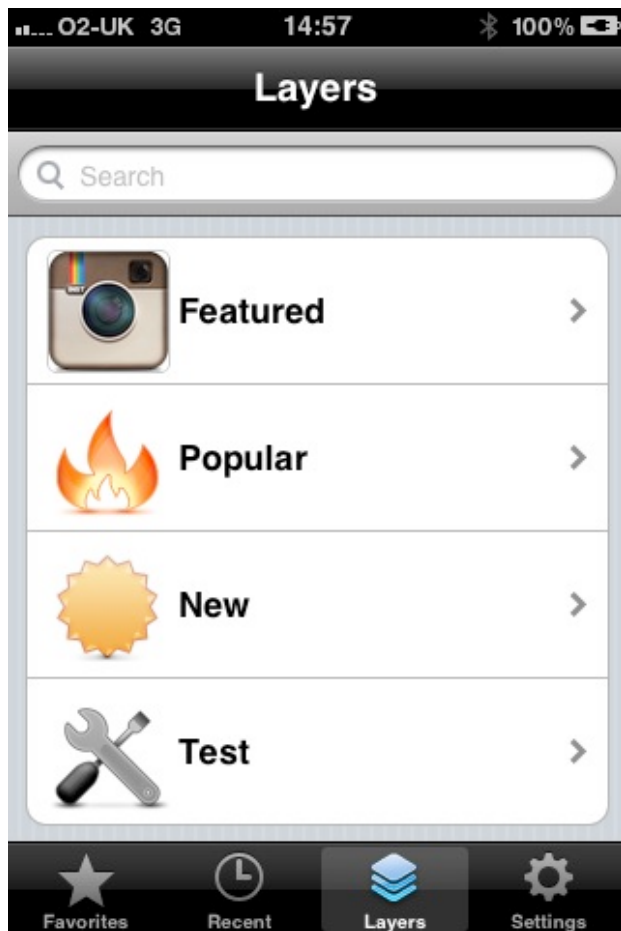
sorted by proximity to the user. In the middle right is a distance indicator (showing 0m which indicates that the phone is located in the library). For buildings with multiple departments and services the current Cosmocampus provides a weblink for each item, as shown in the list view for the Humanities Building (the list scrolls to accommodate all items)



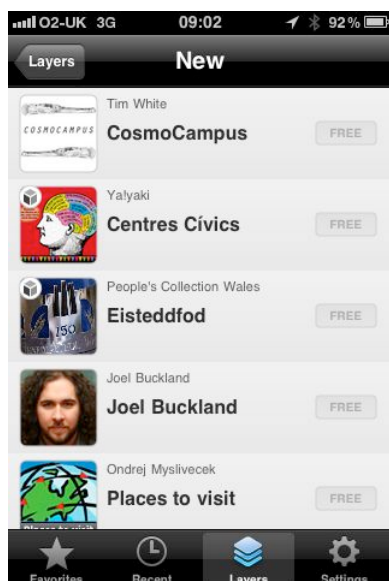
Scrolling list of links

Though the project is designed for mobile use, because the design was undertaken by writing a custom authoring environment rather than a proprietary model, the data can be extracted and combined in non-mobile form, such as the Google Map that is shown on the project homepage - <http://www.cosmocampus.co.uk/>

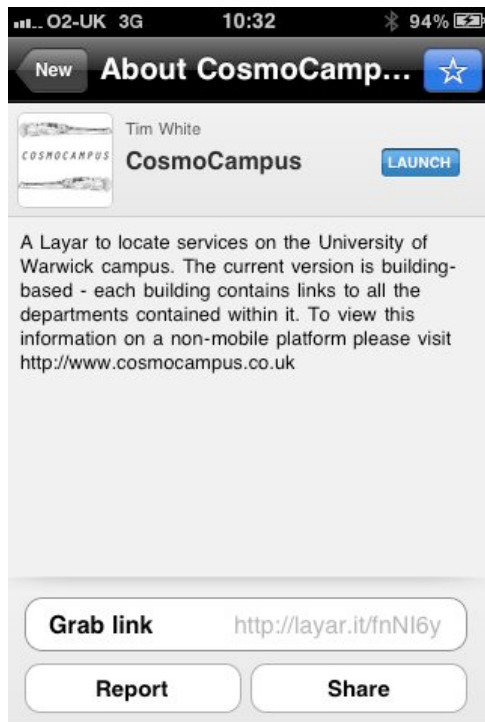
## 2.4 Using Cosmocampus



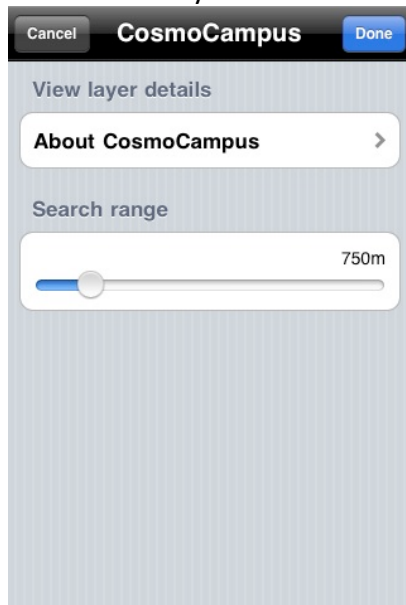
Cosmocampus is now published and live. You can find it by launching the Layar app on a smartphone and then either typing in the first few characters to search for it or else (currently) click the New button (see above) and it will be listed



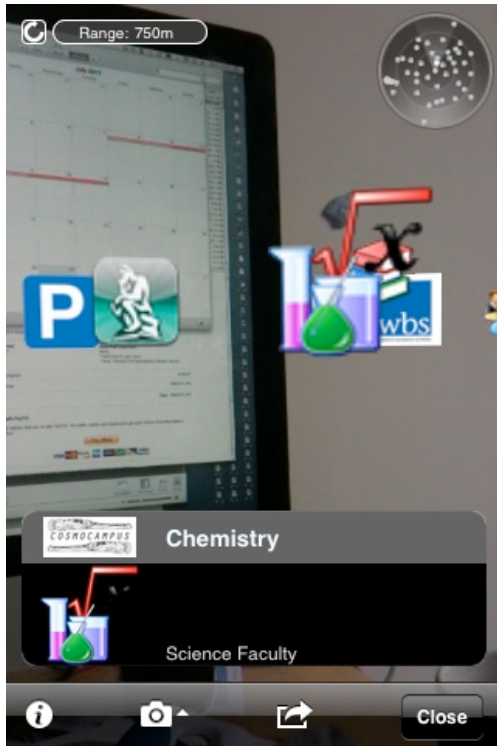
The app is free and is launched by clicking its name



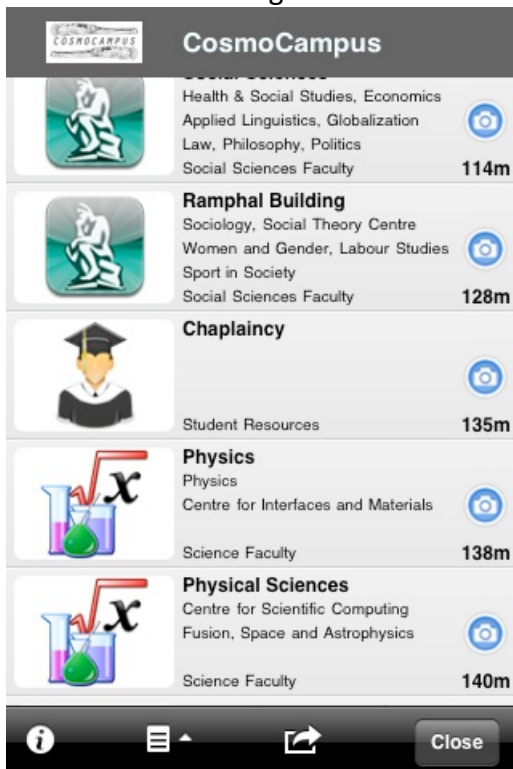
Selecting the layer takes you to an 'about' screen and clicking launch goes to a set-up screen where you can limit the range of the search.



Layar shows a maximum of 50 POIs so there is no advantage in setting the slider at its maximum 5km when in the middle of the campus as not all POIs will be visible



This is the camera view. It is possible to fix the co-ordinates of the phone rather than being based on where you are – a useful function when developing as you can test the application without being in situ. Here, from my study is a view from the library toward the Chemistry department, beyond to WBS with a Social Sciences building to the left and a Parking area to the far left.



Switching to list view I can determine how far I am from various buildings. By clicking on them I can visit the department's website or display a route map to get there (or



if I were actually on campus I can return to the camera view and head in the direction of the icon).

As with any smartphone app and particularly one that encourages you to follow a route as the crow flies it is probably worth including a warning on the About page regarding the proximity of reality in the form of cars and other people that may intervene between you and your destination!

## 2.5 Deployment

Cosmocampus is now live. You can launch it directly on a smartphone by clicking this link - <http://layar.it/fnNI6y> (launcing it on anything else will take you to a webpage with information on the project and a variant of its logo that currently incorporates the Warwick and IATL logos - <http://www.layar.com/layers/cosmobeta>

As the easiest way to understand the service is to use it, the following screenshots are likely to provide as much frustration as elucidation. It is possible to alert people to a layer from within the application that provides a direct link to the specific layer. Clicking the link on a smartphone will either launch the layer or else invite the user to download the free Layar app.

Cosmocampus

Guide to the buildings and services at University of Warwick

Published by: Tim White

Price: Free

Link: <http://layar.it/fnNI6y>

See more great layers and download the Layar Reality Browser for iPhone, Android or Symbian at <http://www.layar.com>

Default invitation email

## 2.6 Proposed Teaching Sessions and Future Developments

I have contacted the web team at Warwick regarding collaborating with them on further developing Cosmocampus and integrating it with existing location-based provision on site. Aside from being useful in its own right it provides a useful demonstration of AR that staff and students can relate to and I would hope to formulate a session next term for staff and students who would be interested in adding to the service in the following ways

1. Working with a department to map and provide pertinent links (and audio, pictures and video if appropriate) to locations specific to them
2. Discussing with staff and students ways in which the service could be enhanced and identifying current pools of information that could be incorporated into the service. Currently the interactive campus map shows partial information on free workstations that might be integrated but other areas would be to tie specific locations to dynamic information such as department news, availability of staff (scripting in office hours and changing the status of an office from busy or vacant as appropriate), mapping exam times and spaces (again making use of the fact that the data is held on a database that is readily accessible and therefore POI data can be modified either by form entry or automated via a script on the server

### Future developments

In addition to those suggested above there is the possibility of extending Cosmocampus to other institutions. This may require making some of the categories more generic (Warwick Business School for example might revert to Business School) and adding additional categories but the data pulled from the database would be limited in range such that Warwick's campus map would not clash with that of Birmingham and so on. As with all data, if the structure is coherent and offers flexibility of use and the interface for adding and amending it is clear then the likelihood of adoption of Cosmocampus as a standard by which Universities are mapped in AR is much increased.

### 3. CRASHMOCAMPUS



#### 3.1 Aim

Originally conceptualized as the dark twin of Cosmocampus, Crashmocampus is also its more ebullient sibling. In fact it can have as many personalities as it has authors as it is intended to be an extensible platform for 'doing stuff' in AR. Whereas Cosmocampus is at the end of a road that led fairly directly from development to publishing to the wider world, Crashmocampus may result in published layers or may be used by smaller communities in a temporary group of testers (say a seminar group, a research team or other collective) whose main priority is to explore ideas. It is hoped that the most beneficial of these will then go through to exist as standalone layers but the central aim is to foster a collection of contributors from across disciplines and from student and staff bodies to explore how AR might be used. To this end the Crashmocampus website is being developed as a blog that makes available feeds and pertinent info on AR as well as acting as a repository for Crashmocampus AR projects. To seed the site a Warwick Authors project has been initiated. Currently the backend is not too dissimilar to that for Cosmocampus but the following screenshots provide some indication of the specific customization that has taken place

### 3.2 Design

The main departure from Cosmocampus is that Crashmocampus is intended to house multiple projects. The workflow would be

1. Student and/or staff group discuss an AR project and we agree basic aims and functionality sufficient to tailor an authoring environment (which could be as simple as using an existing environment but changing field names and creating a workspace and database to house the work to as much as thinking how the proposal might be accomplished and finding or writing new tools to accommodate this with the new information being shared on the Crashmocampus blog)
2. The group work with the environment, gather data and interactivity and tweaks to the environment are made as this proceeds
3. The group use the project either within a small community or else move it from Crashmocampus onto a different resource in advance of it being published as a public layer. The development layer would remain and would continue to function as a testbed but would not be locked down to the extent of the publicly available layer (which should not, better or otherwise, fail as a consequence of wondering what happens if...)

### 3.3 Implementation - Warwick authors case study

The initial project was inspired by the powerful but unsubstantiated slogan 'Intellectual Capital' that appears on banners lining University Road; wouldn't it be good to illustrate this by showing the work that is undertaken on campus and perhaps to give a sense of what is going on where, by creating avenues of publications lining the main thoroughfares on campus. To this end I began with Milburn Hill Road and lined part of it with book covers from Theatre and Film and TV to test the premise. The intention is to produce banners floating on each of the main university roads that users can explore as they wander around campus.



MAIN MENU

Logged in as tim  
[Log out](#)

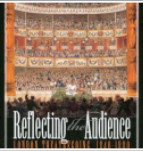



[Return to Main Menu](#)

Current Projects				
NAME	CREATED	AUTHOR	STATUS	EDIT
warwickauthors	7/25/2011 2:34:49 PM	tim	Development	<a href="#">EDIT</a>

The main menu comprises a list of projects and their status. Currently there is just Warwick Authors in development.



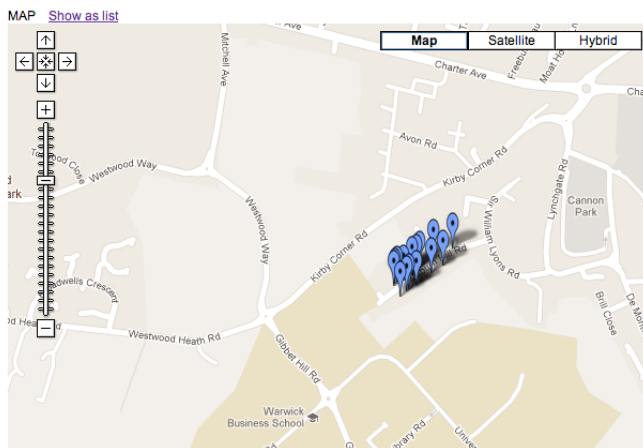
[ADD POINT OF INTEREST](#)

LIST <a href="#">Show as map</a>					
POI	BOOK	TITLE (Click to Modify)	AUTHOR	CATEGORY	Delete
54		<a href="#">Reflecting the Audience: London theatregoing, 1840-1880</a>	Jim Davis	Theatre	<a href="#">DELETE</a>
55		<a href="#">Performing Democracy: International Perspectives on Urban Community-Based Performance</a>	Susan Haedicke, Tobin Nellahus (eds)	Theatre	<a href="#">DELETE</a>
56		<a href="#">Naked Thoughts That Roam About: Reflections on Theatre by John McGrath</a>	Nadine Holdsworth	Theatre	<a href="#">DELETE</a>
57		<a href="#">Theatre of Estrangement: Tharu Performances</a>	Silvija Jestrovic	Theatre	<a href="#">DELETE</a>

The project home screen shows book covers rather than category icons. The POIs are assigned categories (based on department) but this layer places images at the locations specified. There is a limit to the amount of memory available to smartphones and so these images are capped at a maximum size of 256x256 (with sizes of 128x128 and 32x32 to represent publications further away).



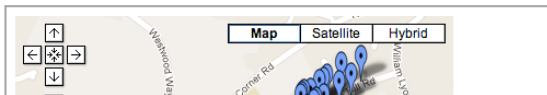
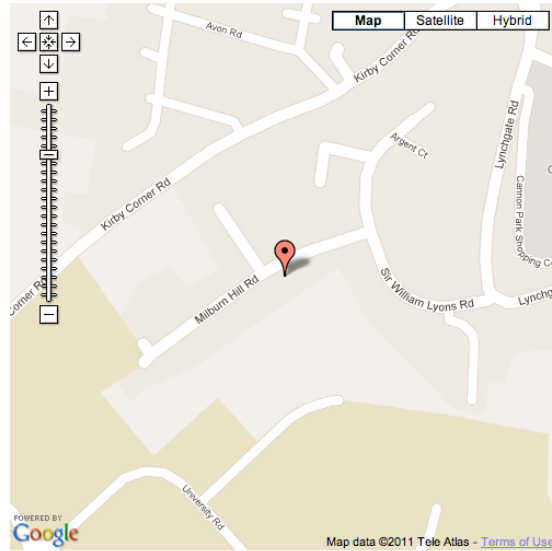
[ADD POINT OF INTEREST](#)



Showing the list of POIs as a map illustrates the nascent parade of covers lining Millburn Hill Road, Theatre on one side and Film on the other. Zooming in on this map will reveal a less than even placement of these (which can be tweaked by dragging the markers around with greater proficiency – it would be possible to write some code to space them evenly but Warwick’s thoroughfares were not designed by Romans so it becomes more complex to follow their undulations)



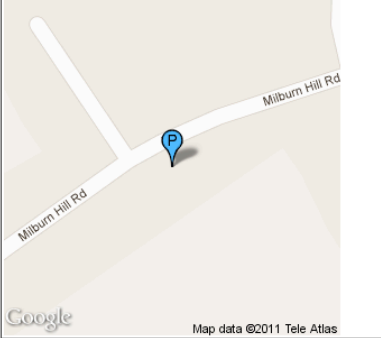
Field	Value
Book title	Quentin Tarantino (On Director:
Department	Film & TV
lat	52.386208524449536
lon	-1.560530662536621
Author (s)	Ed Gallafent
Year	2006
ISBN	0582473047



Here the POI entry screen reflects the requirements of the project – author, year etc (it would be possible to add additional fields to the point of emulating Endnote but you can only display three in the application so the additional data would only be warranted if the project was a cross-platform one). The final ISBN field is used to do some clever stuff on the next screens



[Edit book details](#)

Book Details	
Title	Quentin Tarantino (On Directors Series)
Department	Film & TV Arts
Author(s)	Ed Gallafent
Year	2006
ISBN	0582473047
	

Select New image from computer

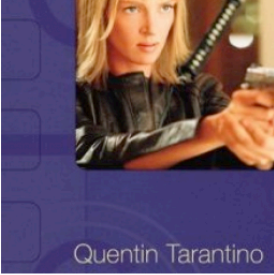

Gallafent.jpg

Having entered the basic details the user now has to upload a book cover. It would obviously be better to include an option to grab an image from the web as well as a local computer – this will be added. Once the file is submitted the backend runs a script that converts the file to a .png and creates three different sized version – 256x256, 128x128 and 32x32 all named according to the unique ISBN and with a suffix denoting size. The rectangular images are made square by cropping from the middle out and padding where required. Having done this the script takes the ISBN to generate an action to link to the book details on Amazon. There is a better non-branded alternative at <http://isbndb.com/> that Luke identified but the programming interface generates an XML file, which I have temporarily forgotten how to parse, so for the minute it will remain with Amazon though it will be easy to switch this over by writing some SQL to change where the links point (in the hope that my memory returns).



[BACK TO MAIN EDIT PAGE](#)

[Back to edit details](#)

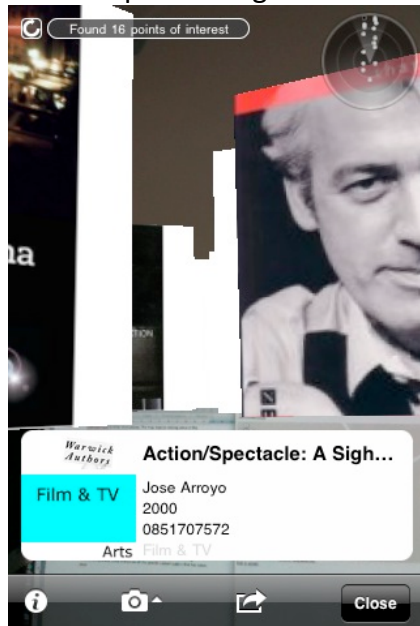
<p><b>CURRENT POI</b></p> <p>Quentin Tarantino (On Directors Series) (52.3862085244,-1.5605306625) Ed Gallafent 2006 0582473047</p> <p><b>Film &amp; TV</b></p> <p>Arts</p> <p><b>BOOKCOVER</b></p>  <p><b>MAP</b></p> 	<p><b>ASSIGNED</b></p> <p><b>ACTION 1: Website</b> Label:Book details Link:<a href="http://www.amazon.co.uk/dp/0582473047">http://www.amazon.co.uk/dp/0582473047</a> <a href="#">DELETE ACTION</a></p>	<p><b>ADD ACTION 2 (Max 6)</b></p> <p><b>Link to Website</b> Label: <input type="text"/> URL: <input type="text" value="http://"/> <input type="button" value="Submit"/></p> <p><b>Make phone call</b> Label: <input type="text"/> phone tel: <input type="text"/> <input type="button" value="Submit"/></p> <p><b>Send email</b> Label: <input type="text"/> email mailto: <input type="text"/> <input type="button" value="Submit"/></p> <p><b>Send sms</b> Label: <input type="text"/> email sms: <input type="text"/> <input type="button" value="Submit"/></p>
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This is the action screen with the first link already created. For the purposes of this project a second link is provided to the staff member's homepage.

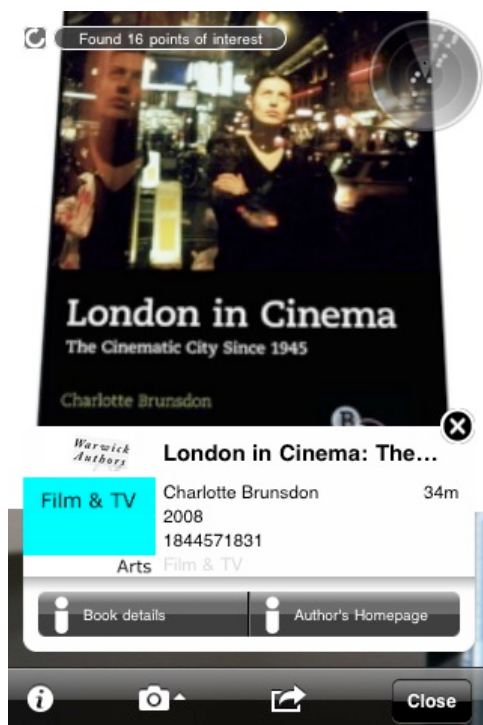


### 3.4 Using Crashmocampus

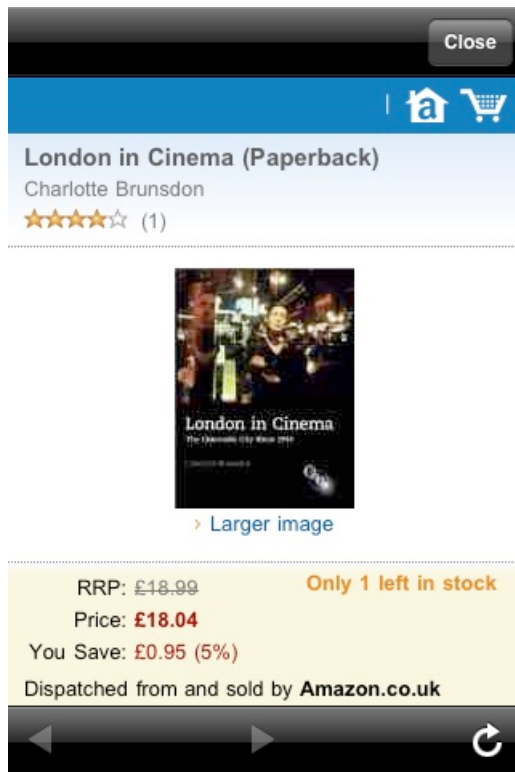
More screenshots, this time taken from another virtual location (i.e. still in my study but now pretending to be on Millburn Hill Road).



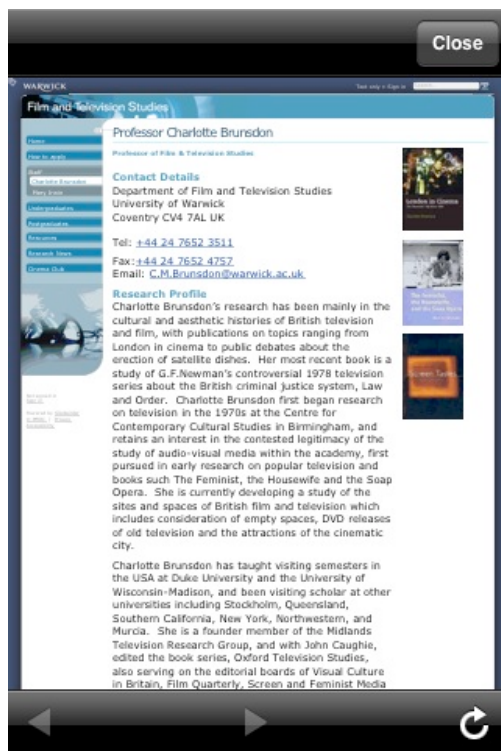
On the right the cover from Nadine Holdsworth's book on John McGrath, on the left and currently detailed in the info window below the edge of Jose Arroyo's Action Spectacle, behind them a succession of other Warwick publications (this looks much better when they are floating in space rather than in a screen grab)



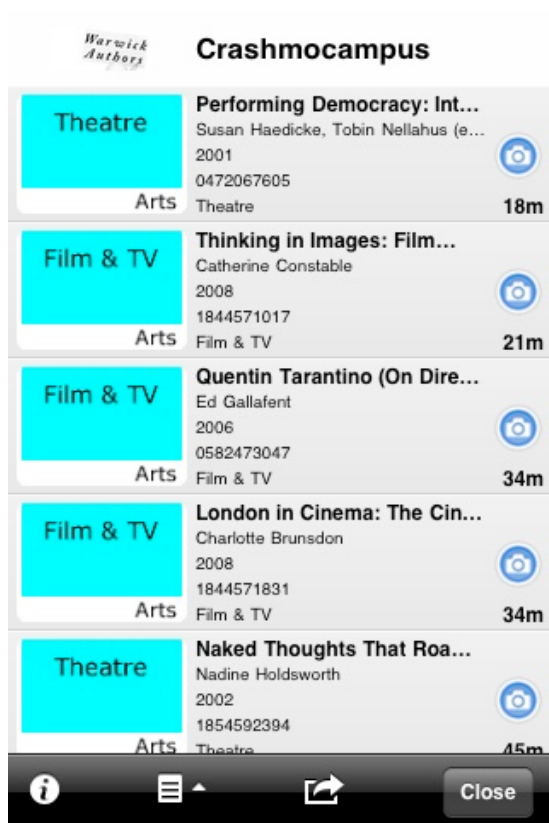
Still in camera view, having clicked on Charlotte Brunson's book I can see the links to Book details and to her homepage



Clicking on book details brings up Amazon’s mobile-optimised listing for the book



Clicking on Author’s Homepage goes to the Warwick page for the author. In both instances the user can return to Layar by clicking the close button



the list view shows the icons used to delineate categories and the limitations of 35 character info lines



Finally, the map view shows the uneven placement of POIs either side of the road (to be addressed)

### 3.5 Proposed Teaching Sessions and Future development

I think that a session on Crashmocampus would be usefully preceded by one on Cosmocampus to illustrate what AR is. Most likely the open-ended nature of Crashmocampus will lend itself to self-identified groups with specific requirements rather than a general audience. I am intending to propose working with Susan Haedicke from Theatre Studies whose Street Theatre class is predicated on working with the specifics of location but with this and indeed other speculative projects I would rather respond to the needs and interests of the group rather than impose a project upon them. I illustrate some possible areas for exploration below (some of which were behind the motivation to undertake this project but, for want of a group to work with are still at the incubation stage)

1. In the course of investigating means to automate image conversion and resizing I came across a means to convert text to .png image files on the fly. This would allow a user to send an email or text message to a link that logs the location from which it is sent and then adds the text as a post-it note at that location. Thus a user could create a trail of clues/messages as they wander through campus. A further refinement would be to allow them to determine whether these clues/messages were public or more secret (setting the trigger range to say 20 metres so that they would only be revealed once another user were close enough.
2. The ability to log the user's location allows for challenges such as generating a pursuer (monster, threat etc) or a target (reward) whose location could vary by the addition of a script that modified their co-ordinates by say 100m every 5 minutes and would only be revealed once the user were within a predetermined range. Mindful of the fact that this does not take into account solid obstacles such as buildings or restricted areas, these dynamic elements would move within bounds corresponding to open spaces such as Tocil Woods.
3. Mashing up the service with Google Calendar to allow the generation of personal or public calendars geolocated in the display. A personal calendar might show lecture/exam locations over a range from a day to a week, whereas the many public seminars and lectures across campus could be similarly mapped into a layer.
4. Although I've ascertained that the audio and video functionality work I have not incorporated them in either project. They offer scope not only for personal travelogues through the space but also can be interwoven with textual information to develop a character that the user feels they are interacting with, delivering instructions in a whisper or commands with disdain. Using audio would be a good way to create a tour of artworks on Warwick campus akin to the audio guides found in galleries with the audio being triggered once the user is in front of the work.
5. As mentioned, it is possible to use 3d models in Layer which would lend themselves to recreating the former appearance of the campus and any structures that no longer exist. Unlike the Warwick authors project which is set to always orientate the image to ward the viewer, 3d models can be fixed

in an orientation that corresponds with the way in which they did or should face so that the viewer can walk round them.

6. Timed experiences are possible with the logging facilities provided by the server. The user could be instructed to start at a specific point and either locate some hidden (and potentially moving – see 2.) POIs with their start and finish time being logged and compared to those of other users. Time might also be used to switch icons on services from open to closed or to remove them completely so that a user does not visit a POI that is not open or available.

#### 4. CONCLUSION

The project has moved to the brink of exploitation, with a meeting scheduled for 1st August with Steve Carpenter (E-Learning Advisor) and Richard Harrison (Events and Enquiries Manager) to discuss further development, dialogue with the Warwick web team in train and the dissemination and evolution of the work in sessions to be undertaken next term. It is not where we had hoped it would be by this stage but nevertheless it is well-placed to capitalize on the new academic year. In the proposal we asked three research questions:

How do you devise an experience for users rather than an audience?

What are the challenges of writing a site-specific but time-independent experience?

What areas of activity eg gaming, information delivery, performance scenarios are best suited to AR?

The first of these has been answered or at least been foremost in the conceptualization and realization of the authoring environment that bends to the requirements of the users instead of expecting them to accommodate the fixity of existing tools. It would be presumptuous to offer answers to the final two questions as they are yet to be asked in situations where the presumptions of the authors are not the only voices to be heard.