**BSc in Computing**

**Team Project & Group Dynamics Module**

***PathFinder***

Proposal, Technical Project

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# INTRODUction

## PURPOSE

*Outline the purpose of the project, with a high level description of the product to be delivered, and the expected benefits.*

This project aims to create an indoor navigation application which can be used in any area, be it a building or outdoor area. The product should be able to show you your location and show you a path, along with any information, on the destination you have selected to go to.

This project is looking at using Bluetooth beacons, NFC tags, Barcodes and QR codes. The idea is that the project is not reliant on just one form of technology but will use many technologies to solve a navigation issues for people, in either buildings or outdoor areas. Building could be hospitals, colleges, museums, while outdoor areas could be pet farms, tourist attractions, walking trails, etc.

Since navigation can be done just using barcodes or QR codes, the main cost would be printing off unique codes, laminating the sheets and then placing them where required. This means users can scan the codes to receive information on where they are and what is there. If Bluetooth beacons or NFC tags are used, then this automates more of the application in that the user does not have to manually scan something but can instead just tap a NFC tag, or the app can detect the beacon, and then show the user where they are.

This will benefit anyone who routinely goes into large building like hospitals or colleges. Most verbal instructions can lead a person into somewhere they were not intending to go or back to where they started as there is such an extraordinary number of corridors and rooms within these buildings, it is very easy to get lost. This application will help solve that problem by offering a means to finding out where you are, with instructions on how to get you to your destination.

The basic idea is that each entrance will have a unique code assigned to it. Getting this code into the application will be done either by Bluetooth, NFC Tags, Barcodes or QR codes. The app will then download the map and way points / marked locations / destinations and allow the user to select where they would like to go. The app will then generate a list of directions for the user to follow. At any time, the user can scan, tap or be informed (via Bluetooth Beacons), where they are on there route.

## Background

*Describe the background information about the project, including a description of comparable competitive/existing products You should include any research you have done to date on the market area, for instance if the product was a game, you might discuss type of genre, major titles in that genre, market moves away/to the same.*

As we all know, GPS can’t be used in indoor environments, because signals from satellites do not move easily through solid objects such as brick, metal, stones & wood. All these materials usually used for making buildings & make it very difficult for GPS signals pin your location accurately indoors. That’s why we need to have IPS – Indoor Positioning System, which is the next generation of positioning technology helps to beat limitations of GPS. Indoor Navigations System technologies are being developed by Google, Microsoft, Nokia etc.

We did a research of current indoor GPS navigation systems on a market to understand better advantages & disadvantages of products and how we would make our system better than an existing systems on the market right now by trying to implement different solutions.

There is several types of wireless technologies are used for IPS: WLAN, Wireless Bluetooth techniques, Infrared (IR) techniques, Ultrasound techniques, Ultra-wideband (UWB), Ultrasonic system & Cellular based techniques. <https://www.hindawi.com/journals/js/2017/2630413/>

Infsoft company from Germany, which provides a leading indoor GPS navigation products such as Indoor Positioning, Tracking & Analytics solutions for businesses, is used to map out warehouses, to track in which zones of store customers spent most of the time for future store optimization & to guide automated vehicles in the same warehouses.

It is really useful to have indoor navigation system in big buildings, where people usually struggle to find the way, because it will save time and nerves.

*New plan for this chapter:*

* *~~GPS technology – why we need to have separate indoor navigation system?~~*
* *What companies used before & now? (technologies & techniques)*
* *~~Advantages & disadvantages of using indoor navigation system?~~*
* *List about 3 best indoor navigation systems offering companies, what products they are offering. Technologies used & pricing*

## Needs STATEMENT

*Provide a brief statement of the business or system needs, and state short-comings apparent in current organization/systems/products available in the marketplace which will be addressed by the project.*

This project aims to create an indoor navigation map for any building using an extremely low cut budget but will be able to deliver an effective and easy to use application, most business who offer the same type of application charge an incredible amount of money which is why most business who could use this application would never buy it.

The idea behind this app is to make something that is simple to use, simple to maintain and update, and easy for everybody to work with. Due to this, we are focusing on cost as one of the main targets for the project and this is being achieved by using Barcodes and QR codes, which can be easily generated and printed off.

Due to the low cost of implementing this solution, it is envisaged that large buildings that are constantly being used by the public, that there curators would see the advantage of having a system in place that would show to the user, where they are, where they can go and how that can get there, would reduce the number of enquires from the public to staff, on how to get to places within the structure.

## scope

*Outline the scope of the project, and identified what is to be included, and what is excluded*

## Project Members

*In a table provide information on the team members and their agreed roles within the project. The list should contain any information that properly identifies the person, their role within the project, how to reach them and what are their responsibilities.*

| **Team Member** | **Role** | **Contact Information** | **Responsibilities** |
| --- | --- | --- | --- |
| Kevin Dunne | Champion  Developer | Student Email | Back End Database, research, Literature Review, Web based design, Web front-end, App Development |
| Christopher Costelloe | Developer | Student Email | Web based design, Web front-end, App Development |
| Kate Pavlenko | Designer  Developer | Student Email | Database, Web based design, Web front-end, App Development |

# Proposed TECHNICAL APPROACH

## Requirements

*Present the requirements as understood at this time. The requirements should consider user (features to be implemented) and system requirements. Include a high-level diagram such as a use case system diagram or block diagram to capture the situation being addressed if appropriate.*

## Application mechanics

*Outline the constructs of rules or methods designed for interaction with the game state, thus providing gameplay.*

## prototype/storyboard

*Provide screenshots of your prototype (built in Construct 2), or the storyboard.*

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## Architecture Design

*Explain the technology to be used in the project. Describe hardware, software, or network components as relevant and as understood at this time. Draw a high-level architecture diagram to illustrate the proposed system components and the relationships between them. Outline any alternatives considered, and state your reasons for choosing these particular components*

## Implementation

*Outline which development methodology have you chosen to follow, and the reasons for the decision*

The Development Methodology that we has a group have decided to implement is the Agile development module, the reason we chose this methodology is because since we have started this course this is the development methodology that has been constantly praised and we have been told that this is now becoming the industry standard.

This has lead each of us to research and study the agile module over the previous years and to base the majority of our projects around this method which has now become second nature to us, this is the reason we has a group have decided to use this development methodology.

## Quality Assurance Plan

*Describe the potential risks related to the software quality. Outline how you intend to manage these risks.*

# Expected Project Results

List deliverables expected to be produced for the project

## MEASURES of SUCCESS

*Describe an assessment plan that will identify the success/suitability of the project. List a measure and an acceptable value range. A measure should also correspond to the stated objectives of the project, for example one of your objectives is a “highly responsive game”, you need to consider whether to use 30fps or 60fps, and a suitable measure of success would be 3/60th.*

# project management

## DEVELOPMENT METHODOLOGY

The development methodology to be used to deliver the project will be Scrum Agile – Sprints, which is time limited iterations of continuous development cycles. Sprint is a planned amount of work to be done and reviewed by team. Duration of a Sprint usually up to 2-4 weeks. To help implement this development methodology, we are going to use also Gantt’s chart and Backlog. Gantt’s chart is a visual way to track tasks across the project’s lifecycle. Using Gantt’s chart and Backlog is a helpful way to capture and plan our work.

*More about Sprints, pros & cons*

*Gantt’s chart & backlog description in details – how to use in Agile Software Development*

## schedule

Project plan:

1. Project overview / proposal
2. Requirements:
   1. Database (SQL)
   2. Web Based front end
      1. HTML (JavaScript)
      2. CSS
      3. Java servlets
      4. PHP
   3. Android App
      1. Java
      2. SQL
      3. Other (?) to be identified
   4. PC Based App (C++)
      1. To be determined
   5. iOS App
      1. if we’ll have time
   6. Hardware
      1. Bluetooth Beacons
      2. NFC Chips
      3. Printer (for QR Codes / Bar Codes)
   7. Other requirements
      1. Maps and details of areas on maps

**Team Member: Kevin**

**Technical Review:** Scope, Implementation, Schedule.

**Literature review:** Hosting and Pre-Existing Technologies.

**Team Member: Kate**

**Technical Review:** Background, Prototype/Storyboard, Development Methodology

**Literature review:** Bluetooth and NFC research.

**Team Member: Chris**

**Technical Review:** The Points Kate and Kevin aren’t covering.

**Literature review:** QR Code Generation.

**Deadlines:**

* The deadline for the Technical Review is the 21st of October.
* The deadline for the Presentation Document is the 22nd of October.
* The deadline for the Literature Review is the 31st of October.
* The deadline for the CA for our team assessment is the 30th of November.
* The deadline for the code upload is the 27th of January.
* The deadline for the final project documentation is the 1st of February.
* The deadline for the project demonstration slides is the 22nd of February.

**Note:** These dates can be subjected to change.

*Attach a project plan (in Gantt chart format) for the project. Identify the major components/tasks/milestones that will need to be met, and the deadline date for the same.*

*Here, we are looking to see that you have thought through your project and have a handle of what will be involved in your project and are being realistic in allocating time to achieve this.*

*If you are choosing Agile development, the primary purpose of this methodology is to enable developers to react to changing requirements faster, and updating a Gantt chart will slow this process down. However you should still include a timeline that identifies any pre-sprint work, and includes deadlines/milestones dates. Sprints can be shown as ‘phase’ bar. You should however include your prioritized Feature Breakdown Structure.*

## Budget

*Unless there are budget considerations beyond using your own or department resources, enter “No budget required.” Otherwise include needed items.*

## communication & collaboration plan

*Provide a synopsis of your communication plan. How often will you meet? How will you delegate tasks to be completed? How will you share information? What collaboration tools will you use?*

# References