UNIVERSITY OF LIVERPOOL

COMP702

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Project Title - 3D Global News Application

Student Name: Fiza Shaikh

Student ID: 201711687

DEPARTMENT OF
COMPUTER SCIENCE

Statement of Ethical Compliance

Data Category : B
Participant Category : 0

I confirm that I have read the Ethical guidelines and will follow them during the project. Further details can be found in the relevant session of this proposal.

Project description :

An innovative project called the 3D Global News Application aims to give users a distinctive and interactive way to access and explore news stories from all over the world. The main concept is to locate news stories according to their geographic locations using a 3D globe interface. Users can engage with this globe by clicking on different points to access news stories that correspond with their personal interests, including languages they prefer, regions they are interested in, and topics of interest. Users will be able to explore and navigate a 3D globe within the application. Every news item will have a pin on the globe that corresponds to its location. Users have the ability to personalize their news feed by indicating their preferred languages, regions, and topics. In order to display news stories that are relevant to the user's preferences, the application will filter them. This smooth and entertaining method of getting access to international news is achieved by clicking on a pin, which takes users to a detailed news article. To guarantee accurate and current content, the application will compile news from several credible sources. Furthermore, the application will support multiple languages to cater to a global audience. Users can select their preferred language from a wide range of options, and the application will adjust the interface and news content accordingly. The user interface (UI) will be designed with a focus on usability and aesthetics. It will feature intuitive navigation, visually appealing graphics, and smooth animations to enhance the user experience. To ensure accurate and up-to-date content, the application will aggregate news from several credible sources. Within the application, users will be able to explore and navigate a 3D globe. Additionally, every news story will include an external link, allowing users to access the original page for a more detailed news article, ensuring they can delve deeper into the stories that interest them.

Aims and requirements :

Aims –

- Create an Interactive News Interface in 3D With Unity3D: Develop a virtual globe system by which an interactive globe can be created that directly leads the user to news articles regarding the place.
- Customized News Experience: Based on the parameters chosen by the user, restrict the presented news items by languages, areas of the world, and topics of interest.
- Smooth User Interaction: Users must be able to easily move around in the world and, at the same time, read detailed news by clicking on hyperlinks.
- This will ensure first and foremost an ‘easy to use interface’ for the end users/clients.

Requirements –

- Design a Unity3D mini application on a 3D terrestrial globe where the users can navigate through.
- Place the news articles on a globe as pins or markers or hotspots depending on the area they belong to.
- For this purpose, several manned RSS feeds and APIs from several international reputable news sources should be collected.
- Ensure that the global news content has real-time updates.
- Order news articles on the globe based on selected criteria by the user.

Key literature and background reading :

To build the 3D Global News Application successfully, it is mandatory to understand existing research, methods, and technologies. This part sets the groundwork for the techniques and concepts that shall go into the application by listing down critical literatures and background read that have informed the implementation of the plan.

a. **Unity3D Documentation:**
The used interactive interface in the form of 3D globe has been designed based on Unity3D technology. Creating an application that can communicate with the user through graphics and other belongings depends on the scripting, graphic and GUI design knowledge, all of which are illustrated in the Unity official documentation with detail. Again, in Unity3D a developer enjoys the advantage of a rich documentation base and it will go a long way in handling the technical issues involved in developing the 3D Global News Application. This secures a viable and effective final product solution that is easy to use. There are several guides and reference sections on how C# scripting, which is the language predominantly used on Unity, in the Unity3D documentation. For the purpose of designing a convincing 3D globe, the fundamentals of unity's graphics pipeline is vital knowledge. In the documentation, specific details on how to render, shader programming and ways of enhancing the graphics performance have been explained. Below is the list of UI components that can be found in Unity3D together with their brief descriptions oriented on creating user-friendly and responsive interfaces. As for the globe and such active parts as pins and news cards, one must study Unity's animation system.

b. **Real-Time 3D Rendering:** Since the Unity3D 3D Global News Application requires the use of real-time 3D rendering, it is significant to comprehend basic principles related to the field. Real-time rendering is the production of the picture or image in the shortest possible time with the aim of achieving a refresh rate of 30- 60Hz for creating dynamic user interfaces. The stuff like rendering pipeline, lighting and shading, materials and textures, level of detail (LOD), and culling strategies are recognized as some basic concepts. Literature in these fields comprises Tomas Akenine-Möller's "Real-Time Rendering," alongside with Unity documentation. At the same time, the ideas introduced in the article enable the application to look good while also running efficiently, thanks to such methods as LOD techniques for rendering 3D globe and the PBR method for realistic lighting.

c. **Geographic Information Systems (GIS):** The 3D global news application will need Geographic Information Systems GIS, to gather, accommodate, analyse, and map geographical information. Vector and raster data which gives detailed features and images of geographic data and coordinates and map projections which ensures that the geographies give out accurate information are some examples of core concepts. For the identification of the patterns and trends, GIS integrates data from multiple sources such as satellite image and Application Programming Interface (APIs: Google map) along with the spatial analytical techniques. The enhancement of the geographic data makes the comprehensibility of the results easier and better through graphical presentation and cartographic skill. There is the material basis for these GIS techniques in the form of, for example, the work of Paul Longley 'Geographic Information Systems and Science' that contain all the background knowledge necessary to apply the techniques ensuring the accurate news location, a comprehensive integration of data, and an authoritative and engaging interaction with the audience.

Development and implementation summary :

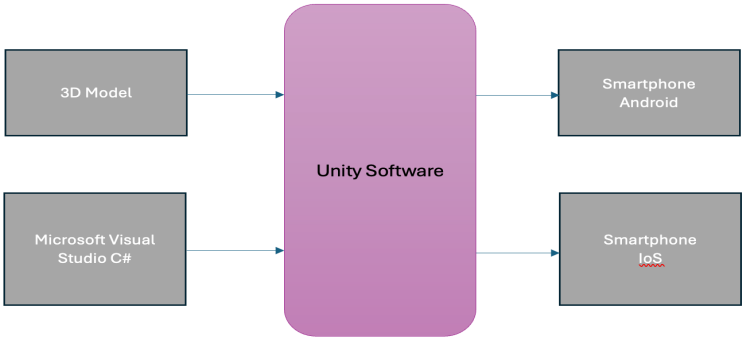
The main development platform for the 3D Global News Application will therefore be Unity3D and the implementation languages for the major functionalities of the application are C#. Cross platform was chosen because of Unity3D cross platform development support and it provides a solid base for interactive 3D visualization. Regarding scripting languages, C# is preferred in Unity3D we because of efficient performance, high efficiency, and ease to use. Interactive 3D Visualization is one of the strongholds of Unity3D and the Unity3D editor offers over-hyped interactivity which is suitable for such an application like 3D Global News Application. Playing with a 3D globe with the ability to zoom in and out as well as rotating it to view different regions and countries concerning excited news can also be arranged. People are allowed to filter the news feed basing on the sources, category, and the geographical location of the event. The possibility to use the application under Windows, macOS, Android, and iOS increases the audience of the targeted service.

Development Environment and Tools :

- **Unity3D** was chosen, because of the efficient 3D graphics processing, an easy-to-use interface and a healthy support by the community. Unity3D itself integrates a vast number of resources, assets store, and documentation for the users that help in speeding up the development and involvement of complex functionalities.
- **C#:** This scripting language used by Unity3D to handle the complex logics as well as the instructiveness in a more optimal way.
- **Visual Studio** is thus an IDE used in the development of computer programs for writing, editing, and debugging of computer codes in C#.

Implementation Plan :

1. Initial Setup and Research: Download needed plugins and libraries and prepare the environment for working in Unity3D project. Expand the view on news aggregation APIs and geocoding services as well as web mapping APIs.
2. Development of Core Functionalities: The application of the 3D globe visualization should be made by dint of rendering features of the Unity3D. Include options of an account that would enable a user to select the news they want to be displayed or make choices for later use.
3. Building User Interfaces: Design and develop a simple tool bar where and end user can modify settings, read news articles, and travel the globe.
4. Integration of Advanced Features: Also incorporate the live nutritional content alert and real-time updates for news articles. To prime the location spotlight, furnish complex filtering solutions and geospatial tools that call for focus on the news trends.
5. Evaluation and Improvement: Some tests that can be achieved include the unit tests, integration tests, and the user acceptance tests to ensure that the functionalities and performance are up to the required standards.
6. Deployment and User Feedback: Deploy the application on the targeted environment including desktop, mobile and web environments. Gather feedback data from the users and improve the application’s layout with regards to metrics and feedback received.



Data sources :

The 3D Global News Application will use various data sources to combine and demonstrate global news stories in real-time. The project's main tasks will be integrating open-source geographic datasets, processing text that is accessible to the public, and retrieving data from APIs.

- APIs for News Aggregation:

  Used APIs: NewsAPI.org
  Data Retrieved: Information Titles, synopses of articles, release dates, names of sources, URLs.
  Acquisition Method: The Unity3D application integrates JavaScript to make API requests.
  Permissions: With due credit, APIs grant access to news data for non-commercial use. In accordance with the terms of use of the relevant services, API keys will be obtained.

Testing and evaluation :

Technical Testing: An undertaking testing strategy shall be conducted to ensure that the functions of the 3D Global News Application are well functioning. The following phases will comprise the testing:

1. **Unit Testing:** These are to ensure that the various components of an application including the 3D rendering, the APIs, and the user interfaces are working as they supposed to be. To ensure that each of the software modules developed in Unity3D environment meets its required functionality, unit test developed in C# will be made.
2. **System Testing:** This testing includes the effective handling of the user-interface, updating of the news data and surface the news on the globe construct.
3. **Performance Testing:** We can test the application's performance and its ability to work under different conditions and scenarios was tested. This involves testing of the performance of the application in terms of how is reacts to system inputs, its render performance, and how it utilizes resources when deployed on various platforms/devices.
4. **User Acceptance Testing:** To make sure the application satisfies the needs of its target audience, beta testers will be chosen to represent a variety of user demographics. Testers will be required to carry out standard user tasks like browsing news articles, navigating the 3D globe, and adjusting their preferences.

Evaluation

To ensure the project meets its original requirements, a structured evaluation process will be followed:

1. **Requirements Verification:** Every prerequisite specified at the beginning of the project will be checked and compared to the features that have been added into place. To systematically ensure that all necessary and desired features are present and operating as intended, a checklist will be developed and followed up regularly.
2. **User Feedback:** The beta testers feedback will be examined to find any problems or potential areas for development. The application will be checked rigorously for any bugs. Developer will check it from all aspects
3. **Bug Tracking and Resolution:** A bug tracking system will be used to record any problems or defects found during testing.
4. **Continuous Improvement:** The application will go through iterative improvements based on the evaluation results.

User Acceptance Testing (UAT): During a predetermined time frame, trusted acquaintances will be invited to use the application as part of User Acceptance Testing (UAT). Things like looking up news articles, navigating the 3D globe, and adjusting their news preferences will be required of the participants.

Ethical Considerations:

I declare that I've read the University of Liverpool Ethical Guidance and will follow its policies throughout the duration of my project.

- The data being used in this project falls under **category B** i.e., Anonymous data about humans or animals from open sources or public APIs.
- Datasets will not be generated via surveys, experiments or any other activity involving humans or animals. Data that contains personal identifying information will not be used.
- The project will not involve any experiments with human subjects, human tissues, or animals.

Human Participant Category – 0 i.e., No Human Participants used

BCS Project Criteria:

Criteria :	How my project satisfies it :
An ability to apply practical and analytical skills gained during the degree programme	During my degree I've done courses in Computational Intelligence and Computer Science. This project will allow me to practically apply the theoretical things that I've learnt in these courses.
Innovation and/or creativity	The most creative part of this project is that it's the user's imagination and creativity on how they put the application to use.
Synthesis of information, ideas and practices to provide a quality solution together with an evaluation of that solution	My project incorporates the use of Unity 3d. This ensures a robust, efficient, and user-friendly final product.
That your project meets a real need in a wider context	This application will provide a comprehensive, personalized, and engaging way to access global news. It enhances information access, supports educational initiatives, promotes user engagement, and ensures the delivery of accurate and timely news.
An ability to self-manage a significant piece of work	The project will take approximately 10 hours of my time every week and will run for the entire duration of the final year of my studies. During this period, I will manage my time and work efficiently to make a viable contribution to this project. I feel that the project undertaken is significant and complex enough to justify the time being spent on it.
Critical self-evaluation of the process	In my final dissertation I will extensively reflect on my performance over the entire duration of the project.

UI/UX Mock-up:

The 3D Global News Application's UI/UX design attempts to offer a user experience that is both intuitive and visually appealing. The primary goals are news story visualization on a 3D globe that is straightforward, user-friendly, and efficient. An early mock-up of the user interface is shown in this section, emphasizing important functions and user interactions.

Main Screen:

- **3D Globe Display:** Central feature displaying the Earth, with news story markers indicating locations of relevant news events.
- **Navigation Menu:** Positioned on the left side, includes options such as Home, Preferences, Saved Articles, and Settings.
- **Search Bar:** Located at the top, allowing users to search for specific news stories or keywords.
- **News Feed:** A vertical list on the right side showing a summary of news articles that are displayed on the globe.
- **Interactive Markers:** Clickable markers on the globe that open a pop-up with a summary of the news story and a link to read more.
- **User Preferences:** Accessible through the navigation menu, allows users to set their news preferences (e.g., topics of interest).

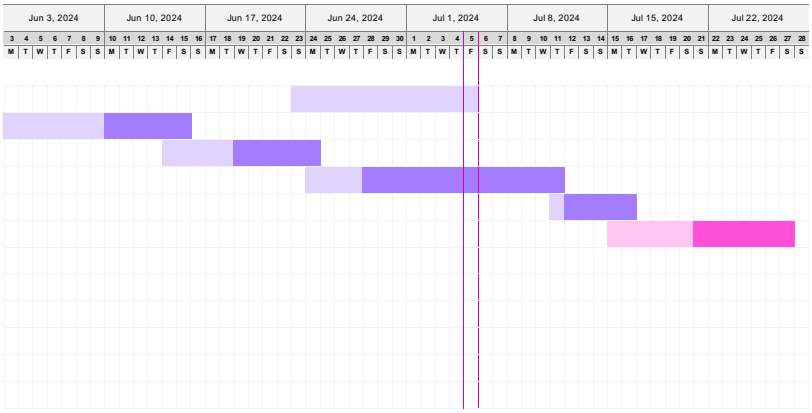
Project plan:

3D Globe News

Project start: Mon, 6/3/2024

Display week: 1

TASK	PROGRESS	START	END
Initiation			
Project Proposal	100%	6/23/24	7/5/24
Background Research	60%	6/3/24	6/15/24
Requirements Analysis	50%	6/14/24	6/24/24
Initial Design and Mockups	25%	6/24/24	7/11/24
Development Setup	25%	7/11/24	7/16/24
Core Development	20%	7/15/24	8/17/24
Testing and Debugging	0%	8/2/24	8/18/24
Unit Tesdting and Feedback	0%	8/9/24	8/25/24
Final Adjustmets	0%	8/25/24	9/5/24
Dissertation Writing	0%	8/21/24	9/9/24
Project Presentation Proposal	0%	8/9/24	8/19/24
Final Review and Submission	0%	9/9/24	9/19/24

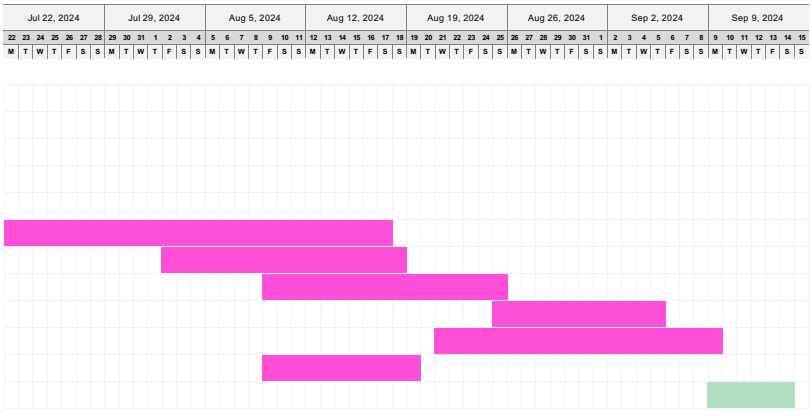


3D Globe News

Project start: Mon, 6/3/2024

Display week: 8

TASK	PROGRESS	START	END
Initiation			
Project Proposal	100%	6/23/24	7/5/24
Background Research	60%	6/3/24	6/15/24
Requirements Analysis	50%	6/14/24	6/24/24
Initial Design and Mockups	25%	6/24/24	7/11/24
Development Setup	25%	7/11/24	7/16/24
Core Development	20%	7/15/24	8/17/24
Testing and Debugging	0%	8/2/24	8/18/24
Unit Tesdting and Feedback	0%	8/9/24	8/25/24
Final Adjustmets	0%	8/25/24	9/5/24
Dissertation Writing	0%	8/21/24	9/9/24
Project Presentation Proposal	0%	8/9/24	8/19/24
Final Review and Submission	0%	9/9/24	9/19/24



Risks & contingency plans:

Risks	Contingencies	Likelihood	Impact
Hardware Failure	Regular backups, use of cloud storage, redundant systems	Low	High
Software Failure	Thorough testing, regular updates, maintain up-to-date libraries	Medium	High
Running Out of Time	Set realistic milestones, regular progress reviews, prioritize critical tasks	Medium	Medium
Programming Problems	Code reviews, pair programming, maintain good documentation, consult experts	Medium	Medium
Integration Issues	Early and regular integration testing, modular development	Medium	Medium
Security Breaches	Implement security best practices, regular security audits	Low	High
User Acceptance Issue	Continuous user feedback, beta testing phases	Medium	Medium
API delays	Implement caching, use fallback mechanisms, ensure degraded mode operation, monitor API performance	Medium	Medium
Unforeseeable Personal Circumstances	I will, to the best of my abilities try to finish this project within the given time. There might be some unforeseeable external circumstance that might cause me to fall behind of schedule.	Low	High

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