MGI Visualization Portfolio

Ede-Wageningen Sustainability Map

1. Course Name and Code:
   Remote Sensing and GIS Integration (GRS60312).

2. App Description:
   It is a map on a website in the form of an application from the online ArcGIS export results.

3. Description of Users (Potential) and Their Needs (People):
   Users include local people and tourists who are interested in sustainability.

4. Description of Visualization Goals:
   The aim is to promote sustainable places in Ede-Wageningen for tourists and local people.

5. Tools Used for Implementation:
   Is an application from the online ArcGIS platform. Previously created in ArcGIS pro then exported on the web and also made into printed maps

6. Reflection on the Suitability of the People, Purpose and Process Components:
   The main users of this application are local people and tourists who are interested in sustainability, looking for information about sustainable places in the Ede-Wageningen area. A good understanding of who the user is helps in designing an interface that is easy to use and provides relevant information. Users may also consist of academics or researchers who need more in-depth data, so providing a more detailed layer of information can be an added value. The main aim of this visualization is to promote sustainable places in Ede-Wageningen. By having interactive maps that can be accessed online, this information can be easily disseminated to a wider audience. In addition, this goal supports local initiatives in increasing awareness about sustainability and supporting sustainable local tourism. Attractive and informative visualizations also help in attracting tourists and local residents to visit the places being promoted. The process of creating this application starts from collecting and analyzing data in ArcGIS Pro, then exporting it to ArcGIS Online to create an interactive map that can be accessed via the web. Apart from that, this map is also prepared in printed form (printed map) for those who prefer physical maps. This process involves steps such as geographic data collection, data processing, map creation, and application testing to ensure its accuracy and functionality. Using ArcGIS Online provides flexibility and ease in sharing and updating information.

Geo Data of Olist Marketplace in Brazil

1. Course Name and Code:
   Data Management (INF21306)

2. App Description:
   This is a map containing the population of Brazil, number of Olist customers, market penetration, delivery time and review score per state along with some statistical data in it which is made in graphs and tables.

3. Description of Users (Potential) and Their Needs (People):
   Potential users are for people who will build their online business on the Olist platform.

4. Description of Visualization Goals:
   The purpose of this visualization is to create insight for business people about geolocation data and statistical data.

5. Tools Used for Implementation:
   We get data from open source then process it in MySQL. In MySQL, data is then extracted which is useful for visualization on maps and statistical dashboards.

6. Reflection on the Suitability of the People, Purpose and Process Components:
   Potential users of this application are business people who want to develop their online business on the Olist platform, with the need for demographic information, market penetration, delivery times and review scores in various states of Brazil. The goal of this visualization is to provide valuable insights into geolocation data and statistics to help make better business decisions, such as identifying potential markets, evaluating delivery efficiency, and improving strategies based on customer reviews. The implementation process involves collecting data from open sources, processing data with MySQL, extraction for visualization, and presenting data through interactive maps and statistical dashboards.

Animal Occurrence Heatmap in Groenlo Area

1. Course Name and Code:
   Remote Sensing and GIS Integration (GRS60312)

2. App Description:
   This is a map containing 12 types of animals in Groenlo, Netherlands. The map is presented in the form of a heatmap for each type of animal.

3. Description of Users (Potential) and Their Needs (People):
   This map can be used by the municipality of Groenlo as data on the presence of various types of animals there. Scientists and biologists can also use this map as spatial data on the existence of animal types.

4. Description of Visualization Goals:
   This visualization aims to create a marker or area with a certain buffer in the game environment. A game project called ZooGo requires spatial data on the whereabouts of animals. This data is entered as a function in the AR game, so that if a player plays the game and approaches a place, a notification will appear that a player is in an area that is full of certain animals.

5. Tools Used for Implementation:
   To collect data we use a handheld GPS which collects points in the form of kml. Then the kml is processed using the Kernel Density method by creating 5 different classes.

6. Reflection on the Suitability of the People, Purpose and Process Components:
   People, including municipality Groenlo, scientists, biologists, game developers, and players, are integral stakeholders in this project. Their involvement aligns with the purpose of creating a heatmap of 12 animal species in Groenlo to provide spatial data for wildlife management and research. Additionally, the data serves the augmented reality game ZooGo, enhancing gameplay with immersive experiences triggered by animal occurrences. The process involves collecting data via GPS handhelds in KML format, processed using Kernel Density to generate a heatmap with 5 distinct classes, effectively visualizing the spatial distribution of animals in Groenlo.

Traffic, Property Prices, and EV stations Map in Delhi, India

1. Course Name and Code:
   Data Science for Smart Environments (GRS35306)

2. App Description:
   This map contains Delhi traffic score, property price, and density of EV charging stations. This map is made per post code. The darker the color on the map, the higher the value, price and density.

3. Description of Users (Potential) and Their Needs (People):
   These maps can be used by the Delhi Provincial government respectively. The Traffic score will be very useful to help create a private vehicle restriction policy. The property price map shows which areas are metropolitan areas, which is useful for business people in the property sector. The EV station location map is also useful for charging service providers, electric car users, and the government.

4. Description of Visualization Goals:
   This map was originally created as supporting geo data to analyze the relationship and connection between air pollution and various parameters.

5. Tools Used for Implementation:
   This map was created using an ArcGIS map which was originally processed from the Tomtom website, government websites, and several open sources.

6. Reflection on the Suitability of the People, Purpose and Process Components:
   This map fulfills various needs of different users in Delhi. For the Delhi Provincial Government, these maps provide critical information for designing more effective transport policies and better managing the city. For property business players, property price data supports accurate market analysis and property development in metropolitan areas. For EV charging service providers and electric car users, information about the location of EV charging stations is crucial for infrastructure planning and charging location selection. The purpose of this map includes air pollution analysis, which helps understand the environmental impact of parameters such as traffic score, property prices, and EV charging station density, as well as supporting transportation policy planning to reduce emissions and congestion. The implementation process uses ArcGIS with data from sources such as TomTom and government websites.

Virtual Reality Game of Wageningen

1. Course Name and Code:
   eXtended Realities and the Future of Communication (GRS60312)

2. App Description:
   This is a virtual reality game set in Wageningen. This game has several missions, one of which is to visit several places in Wageningen, such as certain buildings, where pop ups and explanations will appear about them.

3. Description of Users (Potential) and Their Needs (People):
   This game has the potential to be used by tourists and local people to learn more about the city of Wageningen.

4. Description of Visualization Goals:
   The aim of the visualization is to create an immersive visualization and experience using VR games in the city of Wageningen. Also to promote the city of Wageningen to tourists.

5. Tools Used for Implementation:
   Unity game engine is the software used to create this game. The C# programming language is the main programming language for creating functions such as pop up windows, detect locations, detect objects, and display the front layer.

6. Reflection on the Suitability of the People, Purpose and Process Components:
   The project is aimed at two main groups of users: tourists visiting Wageningen and local residents with varying levels of knowledge about the city. The development team needed to have a deep understanding of game design, VR development, and knowledge of Wageningen to create an authentic experience. The purpose of use is to introduce the city of Wageningen through an interactive VR experience, provide information about important places, and increase interest in local tourism, while the development goal is to create a deep and immersive visual experience using VR technology to attract the attention of tourists and local residents. The development process began with planning a VR game design that involved identifying important locations and buildings in Wageningen, followed by implementation using Unity and C# for features such as pop-up windows, location detection, and front-end layer management. Testing is done regularly to ensure the VR experience runs smoothly.

SOC Objective Comparison Maps

1. Course Name and Code:
   Spatial and Temporal Analysis for Earth and Environment (GRS33306)

2. App Description:
   This map contains an objective comparison between the SOC map that we have and several other map sources. Here we compare objectively where each map will go by averaging all the values and comparing each value to each other.

3. Description of Users (Potential) and Their Needs (People):
   This map is useful for soil data repositories

4. Description of Visualization Goals:
   The purpose of this visualization is to learn how to compare one value with another if we have many sources.

5. Tools Used for Implementation:
   All maps are displayed in R. For our own map, we created it in R as well while other SOC maps were obtained from various sources

6. Reflection on the Suitability of the People, Purpose and Process Components:
   People involved in this stage are those engaged in spatial and temporal analysis for the environment and earth (GRS33306), including students, researchers, and professionals in earth and environmental sciences. Their primary need is to objectively compare data from various map sources for academic or research purposes. The purpose of this visualization is to facilitate learning and understanding of the process of objectively comparing values from different map sources. Utilizing R as the primary tool supports the educational goals and teaching objectives of the GRS33306 course. The process involves using R to create visualizations where maps generated from internal (SOC) and external sources are objectively compared by averaging their values, reflecting the effective use of tools aligned with learning goals and analytical needs.

Finding Denmark's Next Top Crop

1. Course Name and Code:
   Spatial and Temporal Analysis for Earth and Environment (GRS33306)

2. App Description:
   This scientific poster was created to find out which locations in Denmark are suitable for planting several types of plants for the future

3. Description of Users (Potential) and Their Needs (People):
   The users are farmers in Denmark

4. Description of Visualization Goals:
   The purpose of the visualization is to find out areas that are suitable for planting wheat and barley under IPCC conditions of 2.6 and 8.5.

5. Tools Used for Implementation:
   For all the maps we used R to visualize them

6. Reflection on the Suitability of the People, Purpose and Process Components:
   The scientific poster "Finding Denmark's Next Top Crop" effectively targets farmers in Denmark as its main users by focusing on determining suitable locations for growing wheat and barley in the future. The aim is clearly defined to provide information about optimal locations based on IPCC 2.6 and 8.5 conditions, which is highly relevant to the practical needs of farmers to increase agricultural efficiency and yield.

Deforestation Prediction in Borneo, Indonesia

1. Course Name and Code:
   Geoscripting (GRS33806)

2. App Description:
   This is a dynamic online map of predicted deforestation in Indonesian Kalimantan

3. Description of Users (Potential) and Their Needs (People):
   This map can be used by the Indonesian government to create its latest policies in processing forest resources. It can also be used by international organizations regarding biodiversity, forest protection, animals, etc. to monitor deforestation that occurs in Borneo.

4. Description of Visualization Goals:
   This visualization is used to find out predictions about how big the potential for deforestation is in certain areas which are depicted with orange pixels as a sign that the probability of deforestation will be greater.

5. Tools Used for Implementation:
   To create this visualization, the R programming language and Folium were used.

6. Reflection on the Suitability of the People, Purpose and Process Components:
   Deforestation Prediction in Kalimantan, Indonesia, developed in the Geoscripting course (GRS33806), is a dynamic online map that aims to estimate deforestation trends in Kalimantan, Indonesia. Potential users include the Indonesian government which plays a role in policy making regarding forest resource management and international organizations focused on biodiversity, forest protection and wildlife conservation to monitor deforestation in Kalimantan. The main aim of this visualization is to predict the likelihood of deforestation, with high-risk areas highlighted in orange pixels, thereby aiding the decision-making process based on data-driven insights. Implemented using the R programming language and folium for visualization, this application ensures accuracy and ease of use for users in depicting and analyzing deforestation trends.

   By visually predicting the risk of deforestation through orange-coded pixels, the application supports decision-making processes that are important for forest protection policies. The development process, leveraging R for powerful data analysis and folium for interactive mapping, underscores the app's effectiveness in providing accurate insights while ensuring accessibility and usability.