Project 2   Marco Polo

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Abstract- Macro Polo is one of the most well-known European to travel the silk road. The book of "The travel of Marco Polo " had collected all of Polo's stories that happened in his adventure to the East. The book had a great impact on the world especially in the area of exploration. We implemented our project using the StoryMap application available on Arcgis.com. Before picking our application, our team created the story using MapSeries, MapTour, and Esri Cascade. We eventually selected StoryMap for its scrolling and navigation experience for the user. It provides a very easy to use web application, where users can interact with the map and can sequentially navigate through the various points in the narrative. While implementing the project the following interaction techniques were kept in mind: navigation, selection, connectivity, encoding, abstracting/elaborating, and reconfiguring. Through this project, the audience learns the adventurous and daring spirit of Marco Polo as he faced numerous trials and tribulations through his journey from Europe to China. Through our visualizations, the audience will learn the power of maps to illustrate a story in a very engaging and compelling manner. In the future, we can extend this visualization which includes Marco Polo's journey from China back to his home in Europe. We can also add other travellers who got inspired from Marco polo's adventures like Christopher Columbus, Vasco Da Gama etc.

Index Terms— Marco Polo, ArcGIS, Silk Road, StoryMap

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1.   INTRODUCTION

The silk road is one of most famous roads and was a huge factor in future of European and Chinese interaction. Marco Polo is one of the most well-known European to travel the silk road. The book of "The travel of Marco Polo " had collected all of Polo's stories that happened in his adventure to the East. The book had a great impact on the world especially in the area of exploration. He was the first European to travel far to the East in 1200 century. Macro Polo was able to bring the Western culture and religion Christianity to the East, but he also had brought the Eastern culture back to the West. Because of his book and his stories, many people started to be curious about the East. The stories influenced Christopher Columbas the most who later had discovered the New World America. Not just limited to curioursity and

culture, Macro Polo also brought back technology and different inventions to the East and the West. Polo introduced compass, paper currency, porcelain, raw silk, ivory, jade, spices and noodles to the East. In return, Macro Polo brought gunpowder and Christianity to the East which enabled Chinese to utilize gunpowder to make fireworks and develop combat and more advanced weapons to strengthen their military power. Macro Polo was such a significant historical figure in the world, so it would be very interesting to mimic his silk road path and stories through GIS and through using map visualization.

Macro Polo was born in 1254 in Venice. His family was a wealthy and cosmopolitan Venetian merchant family. Polo's father Niccolo and his uncle Maffeo Polo were jewel merchants. In the 13th century, Venice served as a gateway to Asia. Ships from the Miediterranean docked at its pork. Merchants and traders set sail from Venice through the Silk Roads to Asia for trades. During that period, merchant class expanded and Asian goods were becoming more in demand. Europeans longed for East Asian goods and had to see new routes. At the time of Marco's birth, his father Niccolo and two uncles were traveling for trading. His uncles and father made it all the way to Mongol capital of China and met the most powerful rules of the day, Kublai Khan. Kublai Khan was the Khagan of the Mongol Empire and the founder of the Yuan dynasty. Khan asked the Polo brothers to return to Europe and persuade the pope to send scholars to explain Christianity to him.

2. RELATED WORK

To illustrate Marco Polo's path from Venice to China, we drew inspiration from previous interactive maps, including one available on the Mariners Museum online exhibition called Ages of Exploration. Although this map was interactive and contained exact locations of Marco Polo's journey, it still failed to provide dates and auxiliary descriptions of Marco Polo's journey.

The e-book *Travels and Adventures of Marco Polo*[1] by George Towle, made available on the Heritage History electronic library, was very useful in our work. Although the book did not include a map, the content is presented in an interesting manner supplemented with detailed descriptions and illustrative pictures, providing deeper insight on Marco Polo's journey. Other written related work on Marco Polo's journey is the book *Marco Polo* by Sumitha Menon, which details his expeditions and travels through and beyond Asia.

Another invaluable online written resource was Silk-road.com, one of the most extensive and in-depth

websites that address important people and routes in the complete history of the Silk Road.

Lastly, another related work we found was part of Khan Academy's Big History course. This resource provides readers with a brief overview of Marco Polo's biography with pictures, timeline and map(not interactive). Our team found this to be very useful as it addressed interesting details of Marco Polo, such as receiving Kublai Khan gold passport or controversy surrounding *The Travels of Marco Polo*.

3. NARRATIVE

Marco Polo was born in the year 1254. Few months before his birth, his father Niccolo and uncle Maffeo left Italy on a trade trip to Asia. They were merchants at that time who traded expensive items like ivory, precious stones(From the west, they took perfumes, ivory , precious stones and glassware and from China - they got silk and spices and tea) but the reason behind their travel was more than only trade(Mission from the pope. To deliver a letter from Pope to the Mongol emperor asking for political lines). They returned back in 1269, and by then Marco Polo was 15years old, a bright promising boy, intelligent beyond his age who is everyone's favorite. He hardly knew his father until then. He was delighted to see them finally. Nicolo polo observed that Marco Polo has a keen interest in adventure and discovery. In 1271, his father and uncle were planning for a second trip to Asia and this time Marco wants to join them. The trip was initially planned for a brief stay but eventually they travelled in Asia for more than 20 years. The reason why this story is very exciting is because the polo family survived several dangers and hurdles (deadly sea voyage that took many lives in his company while taking Mongol princess to Persia in 1292) , robberies all through their journey until their return. In Spite of all this experience, they were able to successfully return to their homeland in 1295 as wealthy men. So wealthy that they had to sew expensive gems to their coats.

The route on the silk road that the Polo's took was as follows:
Venice : The Polo's set out from Venice in 1271 which was once a powerful trading post of the western world
Greece: Next they reach Greece
Acre: Also known as Akko, nowadays Northern Israel. Acre is a Syrian coast with towered walls, temples palaces and churches, narrow winding streets, lofty castles castles. Quite different from Venice and Marco Polo enjoyed the place.
His father Nicolo has a friend by the name Tedaldo who was a priest and he wanted to find out from his friend if it is possible for missionaries to travel eastwards along with them. Tedaldo said that they have no pope at that time and are in the process of choosing one and asked them to wait until then.

Nicolo agreed to wait if he allowed them to go to Jerusalem to get Holy oil from the lamp on the Sepulchure as a precious gift to Kublai Khan.

Jerusalem: Holy city where the Lamp of Sepulchure was kept lit from the time of Christ's death. The Polo family collected oil from that lamp and then Nicolo returned to Acre.

Ayas: (Gulf of Scandaroon) : Busy commercial port with bazaars and fortresses across the shore.
Marco and his father were preparing to leave for Armenia and at that time they received a message from Acre saying that the pope had been elected who was Nicolo's friend Tedaldo himself and whose name was changed to Pope Gregory. Pope Gregory made Marco Polo's dad and uncle be the envoy of the church to Kublai Khan and granted them two friars to accompany them Nicolo of Vicenza and William of Tripoli. He also gave them some vases and jars of crystal as presents to Kublai Khan on behalf of him.

Ayas: At this place, they came to know that Armenia, a country that they were about to pass, was invaded by the Sultan of Babylon. Hearing this, the two friars fearing for their lives aborted the mission and ran back to Acre.

Turcomania: The polo's travelled alone to Armenia and they should however have to meet the Saracen invaders and started on road heading towards north of Xur Comenia which is also known as Turcomenia. Marco stared at dusky complexions and picturesque attires of the natives. The natives also were amazed to see the travellers and were hospitable to them. Marco noticed that these tribes were very happy with very little that they have and also noticed them to be very lazy, and intoxicated.
At some places where they would stop by he'd also find some very energetic and skillful people and they were presented with the best dishes and luscious fruits that the region offered, hunting wild beasts on elephants etc.

Armenia: Armenia was very broad with fertile plains and very attractive. Here is where Marco Polo saw Mount Ararat and came to know that Noah's ark was still there and with some of its pitch they make amulets and wear as charm around their necks. Marco Polo listened to the details of this place with an open mouth.

Iraq: Then they travelled to the kingdom of Mosul with modern towns and villages that manufactured fine cloth with gold and silk that required a lot of skill and rapidity which is now called "Muslin cloth". The Polo's were delighted to

know that most of the people of Mosul were Christians at that time and were warmly greeted by the people of Mosul.

Kurdistan: The Polo's came to know that the occupation of people in this region was to rob and murder. The people looked very dark, and were fierce with long mustaches. They were accompanied by large no.of Mosul christians to protect them in this region.

Baghdad: Marco polo was delighted to reach Baghdad, a famous place about which he heard a lot from many Venetian merchants before. He found that Baghdad was ruled by caliph and the place was full of ancient monuments and a very busy place for trade with brilliant bazaars . He found a variety of cloth made of silk, gold cloth and brocade. The people here looked very luxurious and they met lot of captivating storytelling musalman here

Persia: Now known as Iran. Marco Polo noticed the different way of dressing, manners and customs of the people living here. Persia had a lot of fortresses, palaces and the people living here mostly survived on dates and salt fish. This is the place where the Polo's first tasted bread, drank strong wine made out of dates and spices. Marco also found this place as one of the hottest places on earth with very high temperatures.

Badakhshan: Now known as Afghanistan, Marco found that people in this region were excellent archers and very skillful hunters with warlike tastes. The men wore skins of beasts and women dressed with their heads covered in hoods, long sleeves and dressed in long floor length dresses. Marco fell extremely ill here but recovered with the help of local doctors.

Afghanistan was an area full of cross-traveling , with many of the ruins. At this time when Marco came, the Islam has already settled here . Palmyra was already destroyed very much when Marco was about to cross the Afghan desert.

Polos then reached Pamir Mountains, which Marco Polo described in his book as "the highest place in the world", with the word "Pamir" appearing in the history for the first time[Menon]. This is indicative of the daring and pioneering spirit of the Polo family as they made it through a country that was unknown to Europe at the time. Here, he also encountered very indigenous & unique mountain sheeps with very large and beautiful spiraling horns, which he later mentioned in his book Travels of Marco Polo. The mountain sheep in this area were named Marco Polo sheep after him.

They finally reached the Gobi desert, which covers 500,000 miles southern Mongolia and Northern China. This alone separated Marco Polo and his companions from reaching China! Their journey was very demanding and

required courage and endurance. Along with overcoming the vastness of desert, Marco Polo also faced challenges, including shortages of foods,getting lost from his companions, and overcoming vastness of desert. According to him, "This desert is reported to be so long that it would take a year to go from end to end; and at the narrowest point it takes a month to cross it. It consists entirely of mountains and sands and valleys."[6]. Despite the numerous challenges, Marco polo was able to cross the Gobi desert safely.

After crossing the Gobi desert, they reached Suchow (Dunhuang) city where Marco Polo stayed for a year. This location is known as Gansu Province in present day China. The Dunhuang oasis was a very important stop on China's ancient Silk Road, connecting the East and West. It also controlled the entrance to Hexi Corridor, an important historical route connecting North China and Central Asia [5]. Marco Polo was stunned by the vibrant culture of international trade at Dunhuang, known for being an economic and cultural hub.This was also a place where Buddhism flourished- the city was surrounded by Buddhist temples and grottoes.
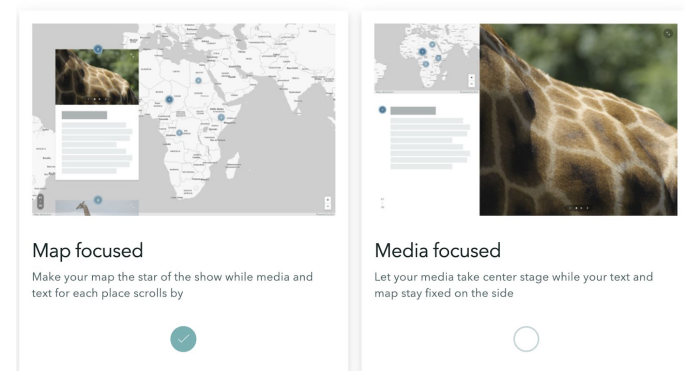
In 1274, Marco Polo reached Cathay, the Empire of China. Marco Polo arrived to Shanghu, also known as Xanadu, was the summer palace of Mongol Yuan dynasty of China. Later, the capital moved to the former Jin dynasty capital, Beijing. The Polos family met the emperor of Cathay Kublai Khan. Kublai Khan was excited to see the Polos' brother again. Marco Polo's father Niccolo and Maffeo presented the privileges and letters which the Pope had sent and also the holy oil. Kublai Khan was greatly impressed by the young Marco Polo's intelligence. All of them were kept as an emissary and ambassador in China, especially Marco Polo who served at the Khan's court and was sent on a number of special missions in China, Burma and India. A few years later, Polo got promoted for his work and served as a governor of a Chinese city Yanzhou at least 3 years. He claimed he was the tax inspector in Yanzhou which was recorded in the book *The Travel of Marco Polo*. Everything went very well for the Polos family. The Polos acquired great wealth in jewels and gold. While Kublai Khan enjoyed having the Polos as his subjects and diplomats, the Polos asked to leave in the late 1280s, after 15 years in China. Kublai Khan was in his 70s, and the Polo family began to worry about what would happen to them when Kublai died. However, Kublai really enjoyed their company and was reluctant to release them. Their chance to return to European came in 1292, Mongol princess was arranged to get married in Persia. Kublai finally agreed to let them go and assigned them one last task to escort the Mongol princess to Persia. In the year of 1295, they made it back home to Venice by sea.

4. IMPLEMENTATION OF STORY

Before implementing our ArcGIS StoryMap, we implemented our story with various applications. We made sample applications with Cascade, MapTour, and MapSeries. Details of what we learned through that process is discussed in the "What did you learn" section. We specifically compared the affordances and interactive techniques offered by each. We eventually selected StoryMap for its scrolling and navigation experience for the user. It provides a very easy to use web application, where users can interact with the map and can sequentially navigate through the various points in the narrative.

<u>StoryMap Steps</u>
To implement StoryMap itself, we first imported the dataset to create the map and saved it to our ArcGIS Online account. We then went to storymaps.arcgis.com,signed in and created a new storymap. This then launched the storybuilder. For StoryMap, there are three layouts available: GuidedTour, Slidecar, and Slideshow. We decided to go with the GuidedTour Beta layout because we wanted to present a linear narrative and embedded multimedia, where each story point had a geolocation. From there, we selected "Map focused" since we wanted our emphasis on the locations and tour of Marco Polo.
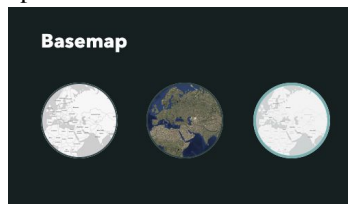

Map focused
Make your map the star of the show while media and text for each place scrolls by

Media focused
Let your media take center stage while your text and map stay fixed on the side

After creating the cover and adding a picture/title, we then started to build our narrative. To create an new point on the tour, we just had to select the green circle in the lower right corner . Then, we would click on "Add Location" and search the specific location. Since some of the locations were ancient names, we researched and found their names in the present day and used those to select the location. We then added pictures, videos and description to better facilitate our storytelling.
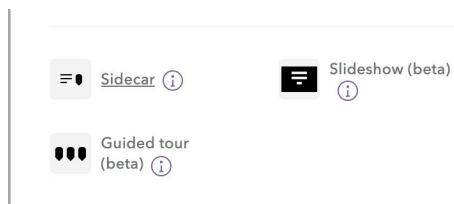
<u>Interactive Techniques</u>

While picking the application we wanted to proceed with and implementing our narrative, we decided to keep the interaction techniques in mind. ArcGIS offers following interaction techniques:

1. Navigation techniques- StoryMap allows users to zoom in and out of the map, scroll up and down to easily navigate through the story/ various locations.
2. Selection - users can select certain regions of interest to highlight important points.
3. Connectivity- GuidedTour allows users to connect multiple story points on one cohesive map. More specifically, we linked multiple pictures for each location on the map in order to provide various views.
4. Encoding- There are many graphical attributes a user can use on ArcGIS to encode a point representing a location. We decided to use red numbered icons/symbols to help the audience/potential users to better visualize the order for the sequence of events.
5. Abstracting/Elaborating- Guided tour can provide an overall, abstract view of all points. But for the curious user, there is also an option to select a point for greater detail of an event or location.
   Moreover, ArcGIS provided us with an option to pick the level of detail by selecting from multiple baseline maps.

6. Reconfiguring- We reconfigured the layout and decided to proceed with Guided tour. ArcGIS further gave us configuration options to proceed with MapFocused vs MediaFocused layout for Guided Tour, as mentioned before.
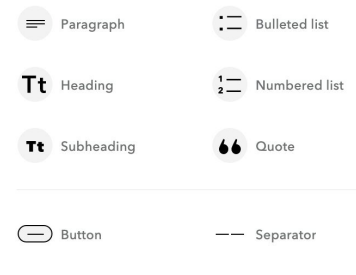

Affordances

While implementing our narrative, we kept the following affordances in mind: we wanted an application that allowed users to view(and enlarge) the media(pictures and video), click on various locations, zoom in/out of map.

From the designer perspective, we wanted our team to be able to embed multiple links and pictures to supplement the textual information. We wanted to be able to select specific locations and add colored and numbered icons/symbols to represent the locations. StoryMap also allowed us to embed and customize slideshows, which was very useful for us as it allowed us to seamlessly integrate various information we wanted to present. Other useful affordances we used during

implementation included were adding numbered list, bulleted list, paragraphs, subheading, and separators:

5. DISCUSSION

The audience learned the power of maps to illustrate a story in a very engaging and compelling manner. They also learned the story of Marco Polo and that he was born in Venice in a merchant family who does trade with all parts of the world especially China. When Marco Polo was 17years, he set out on an adventurous journey to China along with his father Nicolo and uncle Maffeo. They also get to learn about Marco polo's personality who is very curious and always looking for opportunities to trade and adapt to many changes along his journey. In today's modern times, we made it very easy to travel from one corner of the world to the other corner by inventing many comforts like airplanes, trains, cars etc. But the audience will get to learn the hardships that are faced by ancient travellers who have no such comforts and their only way to travel is by road or sea always travelling with fear, looking for basic necessities like food, shelter and water etc at every stop in their journey. Through this story, the audience learns about Kublai Khan the Most Powerful man who is also known as the Great Lord of the Lords and that he was the grandson of the king Genghis Khan. Also they learn about different cultures, landscapes, trade items, food and weather that differ from place to place.

6. FUTURE WORK

In the future, we can extend this visualization which includes Marco Polo's journey from China back to his home in Europe. We can also add other travellers who got inspired from Marco polo's adventures like Christopher Columbus, Vasco Da Gama etc. Another addition could be visualizing Marco Polo's life events after return which tells stories like how a book was written about him and his final years etc.

7. WHAT DID YOU LEARN

Kai Kwan Poon

I learned how to use ArcGIS. It is a very nice and expensive software. I find it is very useful and the graphics are user

friendly. We did try different templates and made a comparison. I find each template has very nice different features. I also learned how to use the storytelling technique to tell a story. I applied the setting, exposition, rising action, climax, falling action and resolution sequence for telling a story. Most importantly, I learned so much about history, especially, the story of Marco Polo and the silk road. Due to this project, I have researched many backgrounds and history about silk road. I learned that in ancient times, China was such a prosperous country. Because of the silk road, the Western and Eastern cultures have influenced each other and the influences lasted forever.

In order to pick the best map, our group tried various ArcGIS StoryMap applications, including Map Series, Map Tour, Esri Story Map Cascade, and Story Map. On my end, I tried to generate the template by using MapSeries. I watched a few tutorials online and youtube videos to investigate all the potential features for the Series template. I learned ArcGIS could insert video, map, and pictures on the slides show which is very interesting. I also explored different ways to import the map into the template with different labels options.

Kiran:

By implementing Esri Cascade, I learned that Cascade allows one to present a linear multimedia narrative with an immersive and full-screen scrolling experience. I learned that in order to create an ArcGIS app, one must first implement the map in ArcGIS maps, where one can customize the map by changing the basemap and adding details with icons/symbols of different colors and styles. One can then go to "My Content" and select "Configure App".

After trying out different templates and apps, our team decided to go with ArcGIS story map for its clean, simple and beautiful design. Compared with ArcGIS Map Tour and Map Series, ArcGIS had a better scrolling experience while allowing us to maintain the overall context. ArcGIS story map also allowed us to integrate multimedia content.

Overall, ArcGIS is very impressive in the breadth and variety of applications available as well as the interactive features available, such as the ability to integrate media (pictures and videos).

Praveena:

I learned about many cool features in ArcGIS especially Guided tour beta, Story map cascade and Story map series. I implemented a Guided tour story map which takes the audience on a tour from one place to another in a particular

order. I also learned that there are two kinds of guided tour maps available on ArcGIS. One is 'Map focused' and the other is 'Media focused'. Map focused divides the display of the story into two parts with images, text and media on the left side panel and the rest of the screen which focuses on the map to show the current location. As users scroll on the screen, the story map guides the audiences from one point on the map to the other where the places are visually described with story, pictures and video. On the other hand, Media focused story maps have text, geographic locations on map displayed on the left panel and the images are displayed on the rest of the screen allowing the audience to experience a different kind of a journey when compared to that of map focused. Since our story is about Marco polo's adventurous journey that needs a lot of narrative of geographic locations, we implemented map focused narrative. I also learned that guided tours also provide flexible design allowing the users to change from map focused to media focused and vice versa at any point of their tour in an interactive and easy way by clicking on the gear icon on the side. I also learned that a Guided tour builder has a panel that slides at the bottom which allows the user to rearrange, add, delete the tour locations. We can also add multiple images at any single tour stop. I also learned that while adding the locations, we can also set the zoom level while adding a location on the map. Apart from ArcGIS, i got a chance to explore the history of Marco polo and his family and also got to know more about his travels around the world. I really enjoyed story telling with the help of clean visualization with pictures and videos using ArcGIS.

8. References

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