

Visualizing 600 years of Ahom Kingdom

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Approval Sheet

The Interaction Design Project II "Visualizing 600 years of Ahom Kingdom" by Supriya Dutta(Roll Number: 176330002) was made in partial fulfillment of Master in Design Degree in Interaction Design at IDC School of Design, Indian Institute of Technology, Bombay.

Guide: _____

Chairperson: _____

Internal Examiner: _____

External Examiner: _____

Declaration

I hereby declare that the project "*Visualizing 600 years of Ahom kingdom*" was carried out by me under the guidance of Prof. Venkatesh Rajamanickam, at IDC School of Design, Indian Institute of Technology, Bombay, India.

The interpretations made are based on my reading and understanding of the text, other resources are cited and acknowledged.

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Abstract

Ahoms dynasty were the most celebrated in assamese history. With a successful reign of 600 years they were able to enrich Assam with agriculture, architecture, cultural richness and different scientific interventions. Historical records of Ahom dynasty are available in very rich textual formats. However, these texts are designed primary for historians and doesn't inspire a casual read.

The aim of this project is to transform the textual accounts of history to a more accessible medium. An exploratory approach was made to convert the data available into a data-driven story narrative, and help audience drive their own inputs from the visualizations.

The project in the form of a interactive website is expected to reach more audience. The users will be able to interact with the data and derive their own inferences about the kingdom.

The output designed is launched as an desktop based interactive website, where people are invited to interact with the data and draw inferences from it. The prototype is evaluated through a evaluation plan prepared; feedback received is used in further improvement of the project through various stages.

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Introduction

The kingdom of Ahoms established during 13th century entails an important part of the assamese history. Six hundred years of the kingdom created a glorious chapter in Assam. Ahoms were the descendants of Tai or Shan race who came from Mungmao, currently in Yunan province of China. The leader of the race, *Sukapha*, was the prince of *Mung khumung jao*. In 1215 he left *Mungmao* with a group of nine hundred soldiers, fifteen elite members, two elephants and three hundred horses[1].

Birth of the kingdom

Sukapha on his way to the Brahmaputra valley of Assam, conquered Khamjang area of Nagaland. He established his leadership by occupying Namrup, Tipam, areas between Disang and Dikhow River and areas occupied by *Moran* and *Borahi* communities. In 1253 he established the capital of his occupied territory at Charaidau, Assam. After him were 38 kings of Ahom who helped establish the kingdom of 600 years[1][2].

Administration system:

Referring to the administrative rules in Mungmao, *Sukapha* made two powerful officers (called *Patra Matri*), the *Borgohain* and *Buragohain*. They played the role of both counselors and ministers, and were given responsibilities and powers second to the king. During the time of King *Suhungmung*(1497-1539), a new post was introduced namely *Borpatragohain*, and added to the *Patra Mantri*.



Kareng Ghar(Palace) at Sivsagar, Assam

During the period of King *Pratap Singha* (1603-1642) two posts of officers *Borbaruah* and *Borphukon* were created. *Borbaruah* was commissioner level officer of greater area from Kaliabor (Middle Assam) to Sadia (Upper Assam) and *Borphukon* was the commissioner of Kaliabor to Gauhati (Lower Assam). These two officers help the ministry in execution of activities such as collection of revenue, rules and regulation, justice, conduct of soldiers and relationship with neighboring areas.

Boarder area was controlled by *Gohain*, the officer to the level of frontier Governor or political agents. *Suhungmung* (1497-1539) created the post of three *Gohain*: *Sadiyakhuwagohain*, *Morangikhuwagohain* and *Solalgohain*. *Sadiyakhuwagohain* was the in charge of the entire area of Sadia in upper Assam. *Morangikhuwagohain* was the in charge of Morongi area near the Dhansiri River of present Golaghat district, and was responsible for controlling the hill tribes like Naga, Mikir and Kacharis. *Solalgohain* was in charge of Darang area of lower Assam, primarily appointed to check Bhutia and Daphala tribes.

The administration system was divided into political and civil departments. The Officials of the former was called *Gohains*, and the later were called *Sora Phukans*. Later part of the time-period, the administrative system comprised of 26 officers. The king, called *Swargadeo*(meaning, Ruler of heaven) was the head of the administration system.

With the acquisition of more geographical area in the kingdom, different measures and powers were introduced.

Ahom administration system was peculiar of its time. The composition of different officers in the system helped them sustain a period of 600 years. They were first of their time in Indian history to include women as a part of their administration system. Women from the Royal family were called *Kuwaris* and formed a council called *Kuwarir mel*. Each of the members in the council was allotted separate responsibilities and powers[3].

In this project, an attempt was made to explore the administration system and its effects on their 600 years of reign.

Objective

Historic accounts of the said kingdom is often presented textually and through other mediums (such as movies and series). These accounts are dense in information, designed primarily for historians, hence doesn't inspire a casual read. Structuring the resources available into a visual narrative structure, is expected to make readers understand and visualize better. It can make the historic timeline of the above kingdom, easier to differentiate and draw conclusions from.

The focus of this project is to create a web-based interactive rich data-driven story narrative of the Kingdom, to bring out different spheres, such as historic events, timelines, administration systems and interventions that shaped 600 years of their success.

Research

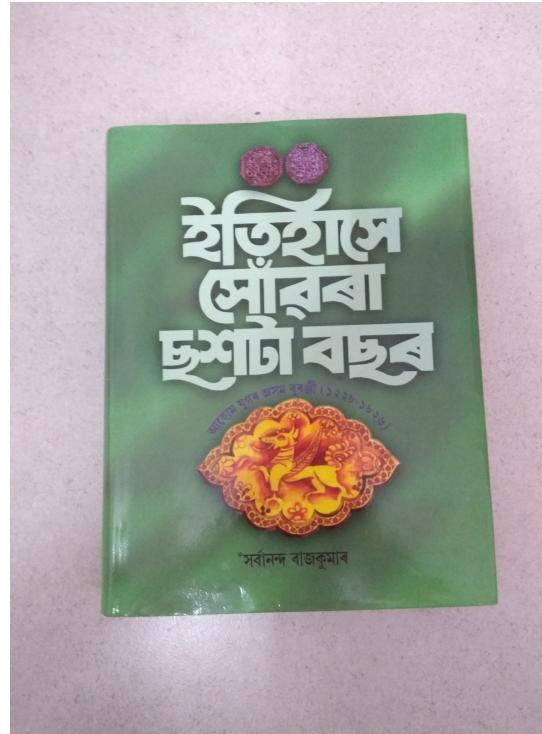
Data-sets:

The book, "*Itihase Suwara Sohota Basar*"^[1] is the primary source of data, used for creating the visualizations. This contains a detailed description about the Ahom kingdom with different dimensions. The main topics discussed in the book are as follows:

**administrative,
social,
cultural,
religious,
economics and**

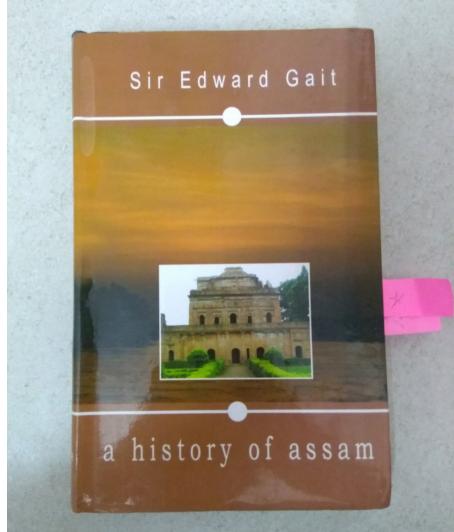
commercial aspects of the time scientifically analyzed and written by Sarbananda Rajkumar and published by Makhan Hazarika on behalf of M/s Banalata. The version of the book used is of November 2017, third version.

This book includes excerpts from different historians and their views on the timeline of the events. It also states the difference of opinions historians have regarding the timeline of those events.

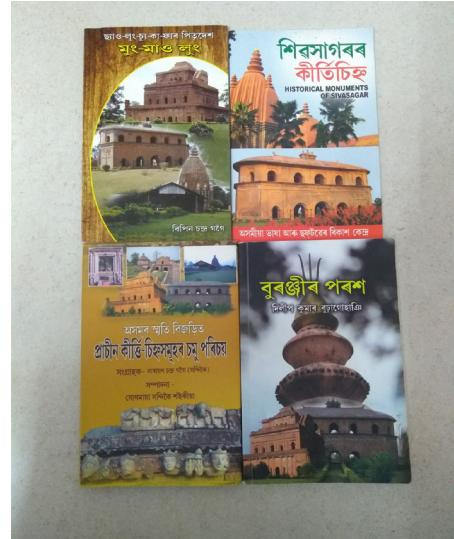


"Itihase Suwara Sohota Bosor" by Sarbananda Rajkumar

A history of Assam by Edward Gait



Other books used for the study



Many of the Ahom priests and nobles kept Buranjis or chronicles which contains reliable narrative of their reign. The resources chosen for this study are based on such accounts.

- A History Of Assam by Sir Edward Gait[2]
- Historical Monuments of Sivasagar
- *Buranjir Pasas* by Dilip Kumar Buragohain
- *Prachin Kriti-Chihnasamuhar Samu Parichai* by Narayan Chandra Gogoi.
- *Chaolung Sukhaphar Pitridesh Mung Mau Lung* by Bipin Chandra Gogoi

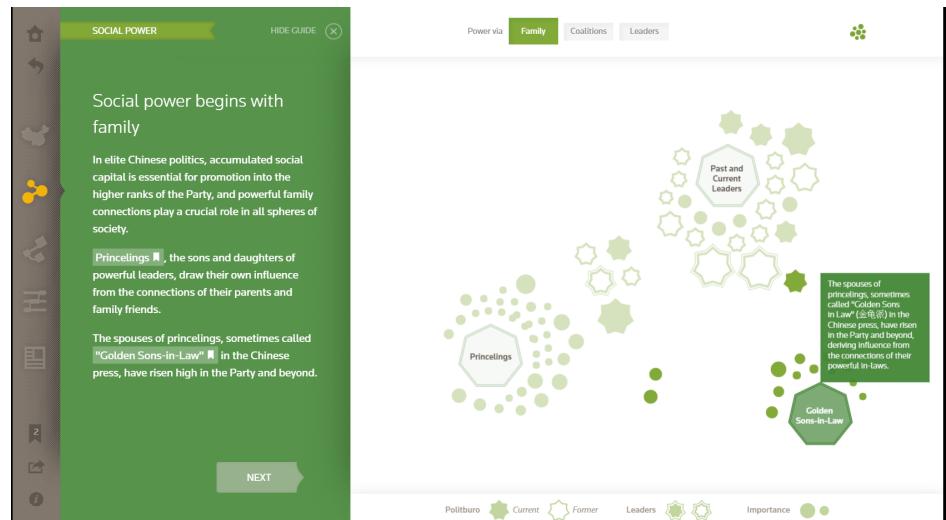
Case Studies

Connected China

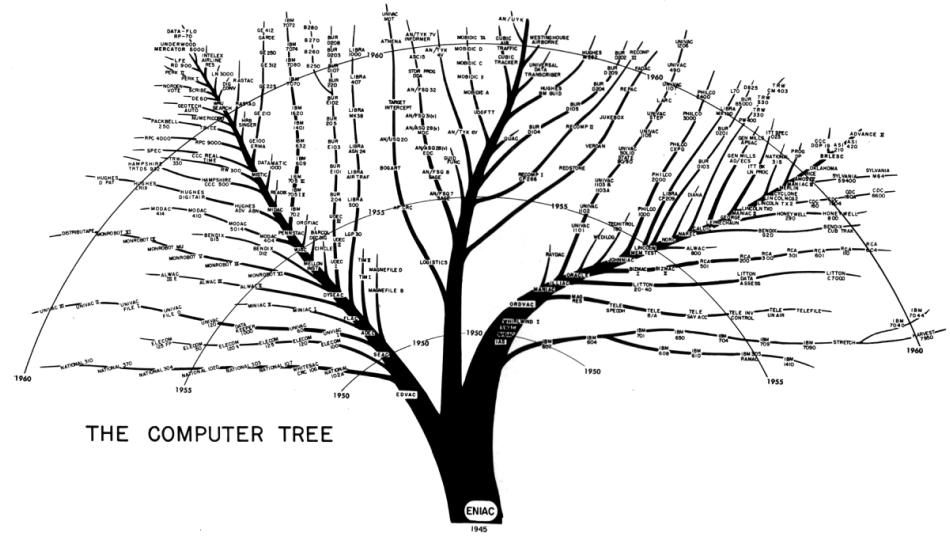
Connected China is an iPhone and web app, depicting the relationship between the administration system of China. It explores the relationships among different leaders and their influences[4].

Relevance to the project

With hundreds of people inside the administrative system, it becomes harder to visualize the relationships without getting into a clutter of cobwebs. In this project, Fathom clearly segregates the those complex relationships into easily understandable interactive visualizations. The striking feature about this tools is its step-wise guide for user. The guide build on the left side helps user to understand the work-flow.



Connected China by Fathom Information Design, <https://fathom.info/>



The Computer Tree

The Computer Tree by Karl Kempf from Electronic Computers : In this visualization(1357×769), Karl Kempf depicts the series of computers from 1945. the tree structure successfully depicts the different sets of devices that emerged with time and their timelines[5].

Relevance to the project:

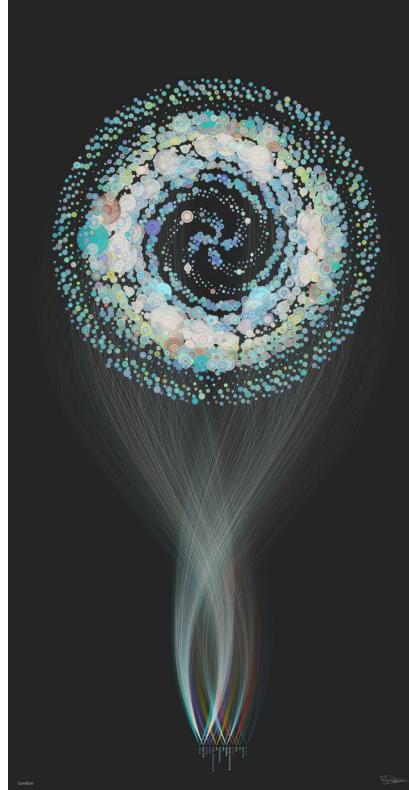
The Ahom kingdom had 39 kings in their period of 600 years and a big family. A similar tree visualization stating both the family members, kings, and their timeline would be better to understand.

Digital City Portrait-London by Brendan Dawes

As cited in Brendan Dawes's website, For the launch of 4g services in eleven UK cities a digital portrait of the city was asked to be made. Based on the data collected from three days by University College London this visualization shows the day before, during and after the launch. Each point represents one minute with a total of 4320 points in three days.

Relevance to the project

The administrative system in the Ahom kingdom consists of 162 chief positions, each with unique powers and roles to play. While some of those are similar, many need special attention to confine them into categories. The approach followed by Brendan Dewes to categorize three day worth of data into fifteen categories, with colors as an encoding medium can be a good way of representing the different roles played by the officers in Ahom administrative system as well.



Digital City Portrait-London by Brendan Dawes, <http://www.brendandawes.com/projects/ee>

ThePudding

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From the moment I sat down to listen the whole way through, I was done for...

O SEPTEMBER 2016
How Robert Glasper sampled Miles Davis on "Ghetto Walkin"

The Pudding

Pudding.cool is a website focused on creating visual narratives with the help of both textual and visual data. They are constantly seen to have used a form popularly known as web storytelling to demonstrate their data and stories associated with it.^[7]

Relevance to the project:

The lucid structure of web story telling used by Pudding is a very elegant way of giving the users visualizations along with data. A brief introduction presented in the form of text to the users, might turn out to be helpful instead of the visualizations alone.

Topics explored

For this project, I have worked on two topics from the kingdom. A brief description of these topics are as follows:

1. Kings.

The King was called *Swargadeo*, meaning Ruler from heaven. He was the supreme authority of the State. He was the decedent of *Su-Ka-Pha*, and was generally elected through primogeniture. However, the king could also be chosen through ministers(if the direct descendant was not eligible for the position). There were a total of 39 kings in their reign of 600 years.

2. Administration System

The administration of Ahoms were headed by *Swargadeo*, the king, assisted by his council of ministers. The king was the head of the administrative system. His election was generally by primogeniture. Depending on their responsibilities officials were given different titles and had amenities allotted to them. The officials in the administrative systems were not given any salary but were offered territories to rule within the kingdom, or *pykes*(corvee labor, foot soldiers). Depending on their position in the political hierarchy, both of these amenities would vary.

Ahoms had a monarchic structure, however, a few positions in the administration system had the power to affect the king and his decisions. In the book "*Itihase Suwara Sohota Bosor*", Sarbananda Rajkumar mentions that even inside the monarchaic structure, they had democracy in certain level of the administrative system.

Data-set:

The current data-sets extracted are as follows:

Kings:

1. The family tree of the kingdom: It is observed that notable accounts of only male members of the family were recorded.

Number of Kings who ruled in this period of 600 years: 39

2. The timeline of kings: Timelines obtained from the book mentions the time of their crowning, period of reign and their death or resignation from the same. The accuracy of these timelines are arguable, as different historians have recorded it differently. In this category I am taking the data collectively agreed by Sir Edward Gait in the book A history of Assam and Sarbananda Rajkumar.

3. Territory: A detailed account of the territories occupied, lost, total area under the emperor is mentioned.

The Administrative system:

The administration of Ahoms were headed by *Swargadeo*(the king), who was assisted by his council of ministers. The Ahom administration was an elaborate system with each position holding different responsibilities. *Swargadeo* was the head of the administrative system. His election was generally by primogeniture. Depending on their responsibilities

officials were given different titles and had amenities allotted to them.

1. The political structure: The Ahom administration system was divided into different councils who had different roles to play. Each of the officials had powers which directly or indirectly affected the king and the kingdom.

2. Different Peoples and Influences: Although Ahoms had a monarchic structure, there were people who had significant influences over the king, his decisions and the kingdom. They had the power to elect as well as abstain the crowning of kings.

3. Territories under them: The officials in the administrative systems were not given any salary but was offered territories within the kingdom, which they would rule, or *pykes*(corvee labor, foot soldiers).

Concepts and Explorations

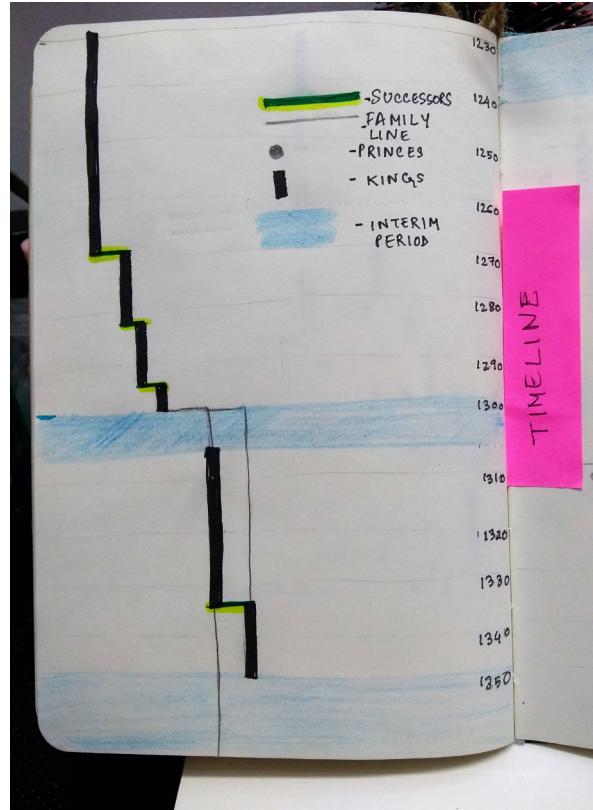
Ahom kings and their families:

The idea is to visualize different the descendants of *Su-Ka-Pha*, Ahom family members and Princes who became the rulers. The focus is to state each of these kings and their families in a simplistic manner without loosing the richness of the data.

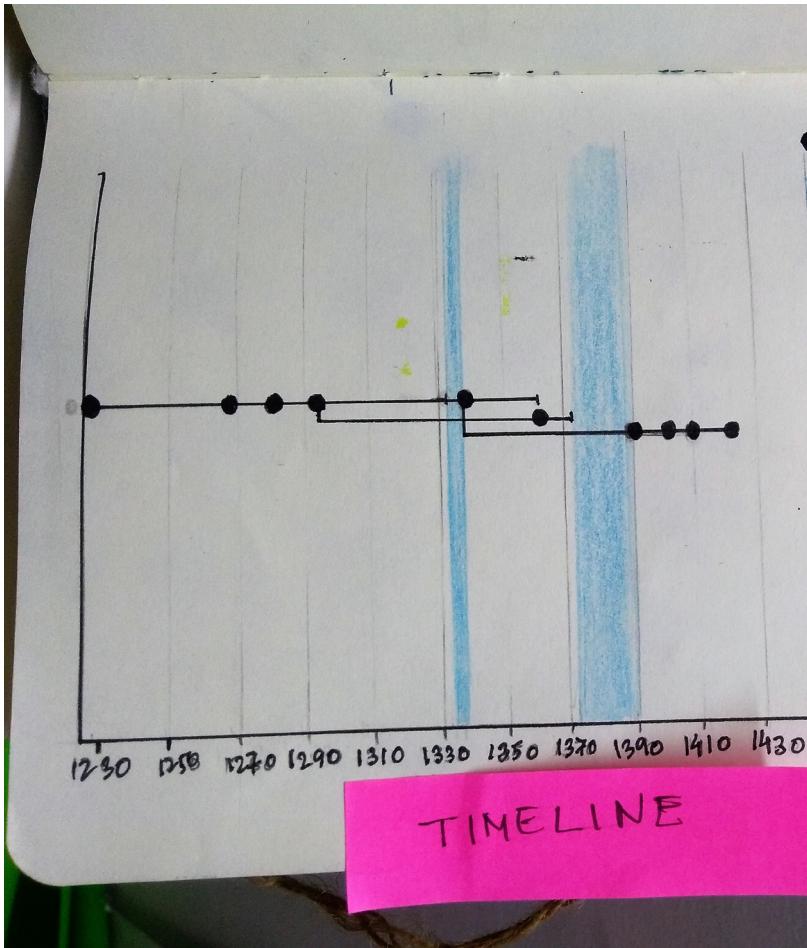
Concept 1:

The aim of this concept is to show different kings, their period of reign, their family members and siblings. The vertical black bars shows the Kings and their period of reign. The green line connects all the kings with their successors. The gray lines indicate the family members, and grey dots are the Princes(didn't become kings). The horizontal blue bar shows the period where no king were on the throne, but the kingdom was ruled by *Patra mantri* and *Pali Mantri*.

Limitations: The use of vertical bars as a king was not depicting the intended data. While name is a nominal variable, the addition of a quantitative variable(duration of reign) was creating a different effect.



Concept 1



Concept 2

Concept 2:

The visualization is set in a horizontal format. The x-axis represents the timeline. The black dots represent the kings and their periods of reign. The Green square represents the princes(didn't become kings). The blue bar represents the interim period where the kingdom was ruled by *Patra* and *Pali mantri*.

Limitations: While the representation was more suitable than the former in terms of timeline, it increased cognitive load on the user to derive the difference between the kings and their siblings. The relationship between the king and their kin were not properly understood by this visualization.

Concept 3: Geography of the Ahom kingdom

The visualization narrates the area that was under the Ahom kingdom, and how area under them expanded and collapsed. It helps in telling about both the successful and unfortunate years of kings. This interactive visualization is designed to show different areas conquered by different kings and the land area owned by the entire kingdom during their reign.

Limitations: This visualization doesn't give a clear comparison of the geographical area at different time periods. For the final output, data about the timeline was embedded.



Viz 1: Geography of the Ahom kingdom



Viz 2: Family

Viz 2: Family

Diving into families: kings, prince and their families. The visualization is a family tree depicting different kings(diamonds) and their siblings. Princes who were not chosen as kings were depicted using circles.

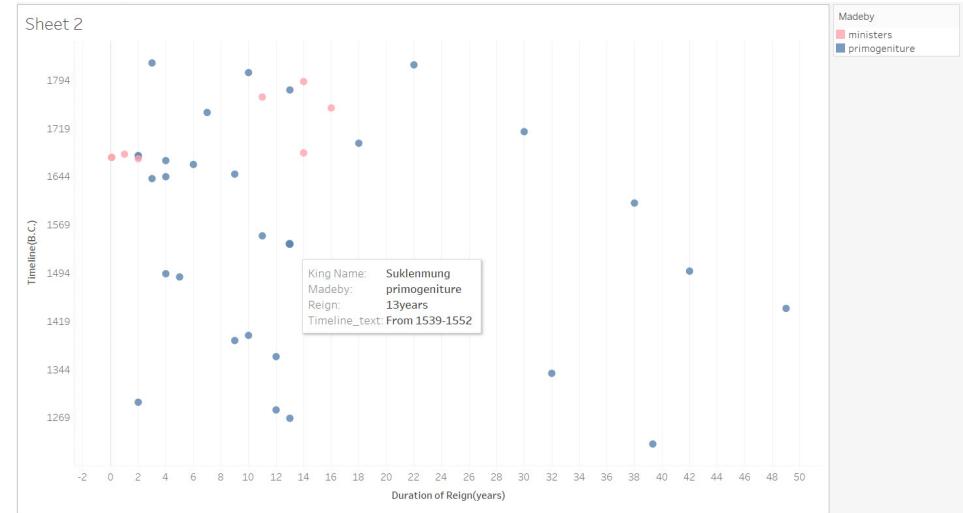
With timeline in the x-axis, the hierarchy goes forward in the horizontal direction.

Limitations: Horizontal display of the family was not familiarer with the audience. For the final output a vertical family tree visualization was made.

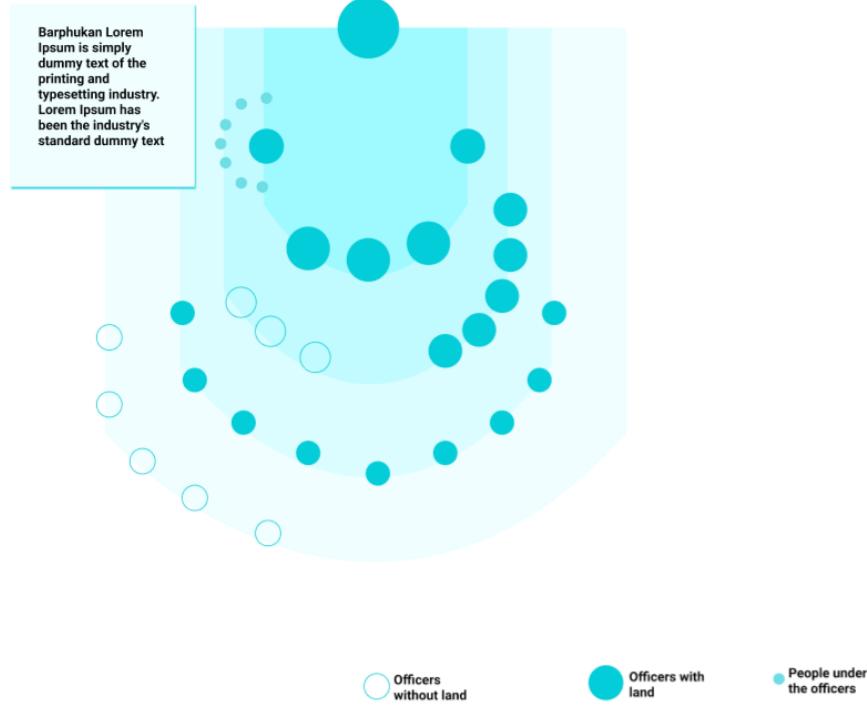
Viz 3:Process of Ection of kings

Kings were elected through primogeniture. However, when the direct descendants were felt not worthy of the responsibility, the ministers could depose him off and elect someone else from the royal family, with the blood line. With such a huge power vested in the hands of officials, they were sometimes misused. Many(who had this power), often involved themselves with the election, which resulted in unfortunate years for the kingdom. This viz tries to see the trend in the duration of a king's reign elected through primogeniture vs through the ministers.

Limitations: This visualization lack in information about the deposition of kings elected through primogeniture, or when ministers were able to both depose and elected kings. For the final output, these data were embedded.



Viz 3:Process of Ection of kings



Concept 1

Administration:

The Ahom administration system had several layers. I have decided to break this topic into different parts to understand the system better.

Depending on what their positions in the system were, they were given different positions in the Politics. The officials with higher position were more closer to the king, had better amenities and more influence. Some of the officials based on their ranks were given a distinct territory, of which they were the rulers.

Concept 1: Visualizing the political hierarchy

Different ranks in political hierarchy is depicted using different levels of blue background. The filled circles are the people with territories, and the circles with only outlines are without it. This interactive visualization in its first layer shows the primary officials. When clicked on them, the officials with subordinates comes in to display.

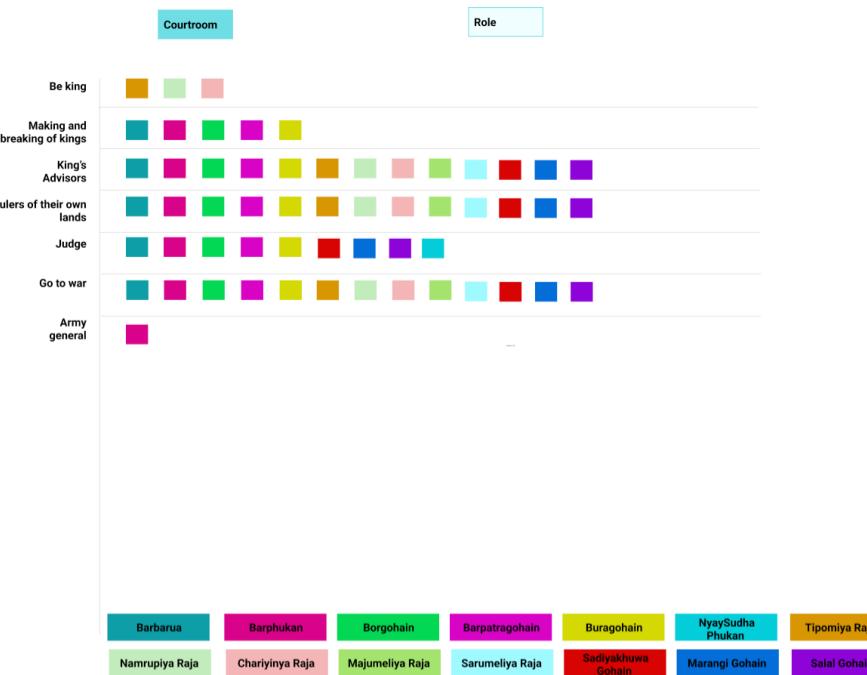
Limitations: Positions of the officers were not communicated well through this visualization. People could not differentiate between different positions of the administration system.

Concept 2.1: Visualizing powers and roles of the officials

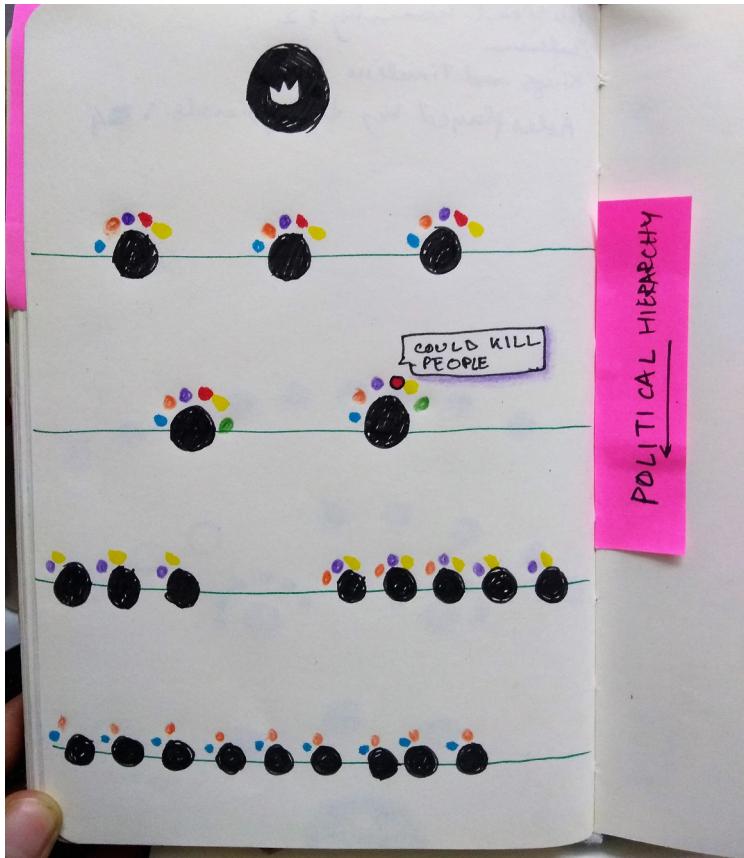
Powers and responsibilities possessed by the officials were divided into seven(7) categories. They were then depicted through the y-axis. Officers in the administration system were given separate colors. Colors, used for different officers were made into rows corresponding to the power they had.

Thus the viz was, A matrix. The y axis displays the power and amenities. The officials with those powers are depicted in the x-axis. Different colors are used for different officials.

Limitations: With 26 officers in the political part of the administration system, it was harder to assemble a color palette. Hence this concept was dropped.



Concept 2.1



Concept 2.3

Concept 2.3: Visualizing powers and roles of the officials

The officials displayed using black circles are arranged in order of their political hierarchy. Similar to the earlier visualization seven categories were used to depict the powers and responsibilities. The y-axis depict their political hierarchy.

Limitations: While this arrangement was better than the previous, colors used as an encoding to depict different responsibilities were increasing the cognitive load among users.

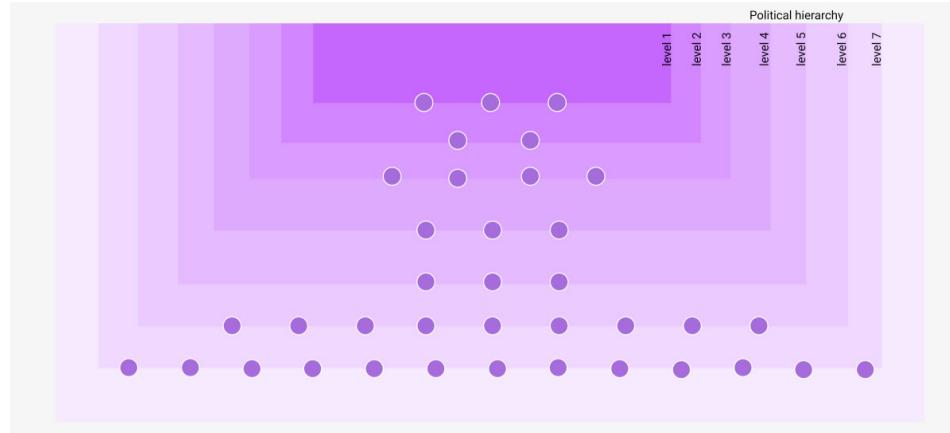
Concept 2.4: Visualizing powers and roles of the officials

People who helped the king to rule, their powers, influence on the king and kingdom. There were a total of approximately 161 officers(including both political and social service)and kings who paid taxes to Ahoms in return for their security, were part of the administrative system. Depending on their position they were allotted different amenities and resources. The roles played by these officials were grouped together into nine(9) groups: Could execute people, Army general, King's advisers, Gave king approval, Had territories under them, Had pykes, Could elect and depose kings, Rulers of their area, Judge. Colors represent powers and responsibilities that officials had. The interaction embedded in the visualization is designed to show both powers owned by individuals and also the individuals associated with powers through different views.

Limitations: The groups made from the powers and responsibilities were not adequate for the visual representation. The representation were not able to communicate with viewers and interpreting wrong information.



Concept 2.4



Viz 4: Administration System

Viz 2.5: Administration System

This visualization talks about different officials with their political hierarchy. The higher is the color saturation, higher will be the political powers of the officers

A similar representation is used in one of the final visualizations after a few iterations done on the same.

Viz 2.6: Election

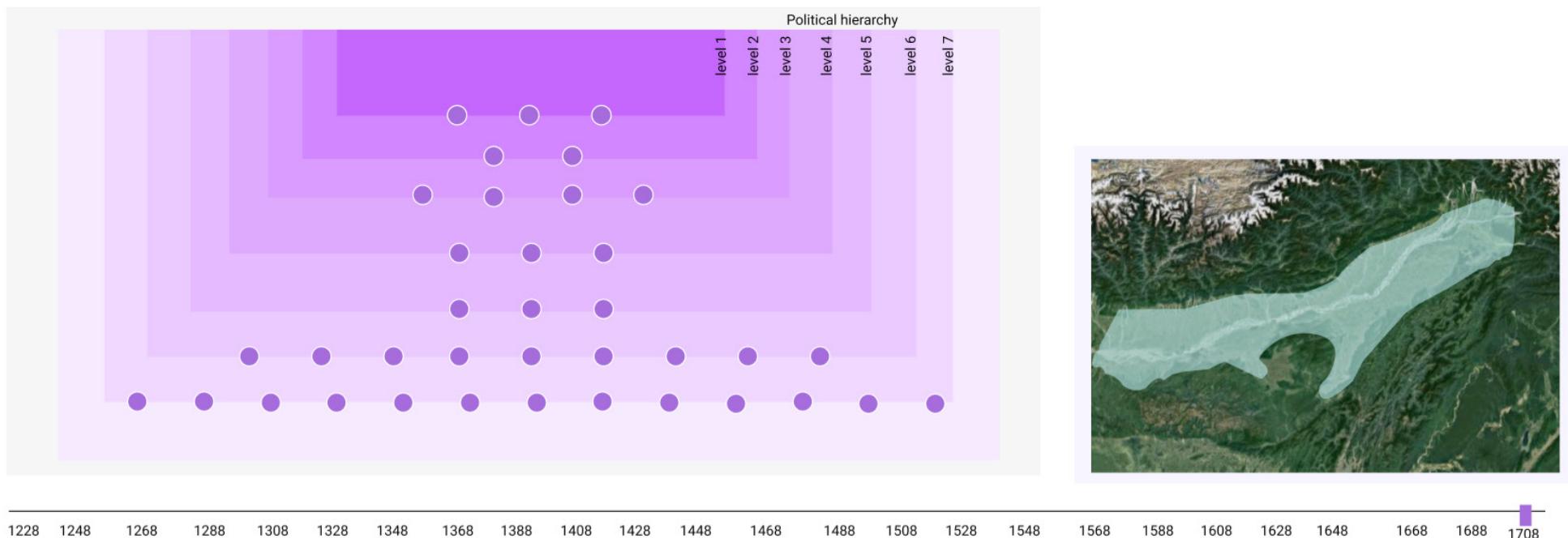
Officials in the administration system were appointed depending on their caliber. They however had to belong to certain class of society or group. Higher posts were generally offered to ahoms, in the lower half of the hierarchy people from different tribes were also included. The columns represent different groups that a person could belong to while holding the positions in the administration system represented through different rows.

Users were able to understand the matrix. After a few iterations and more exploration on the color scheme, similar visualization is used for the final output.



Viz 5: Election

Viz 6: Administrative system over the period of 600 years



Viz 2.7: Administrative system over the period of 600 years:

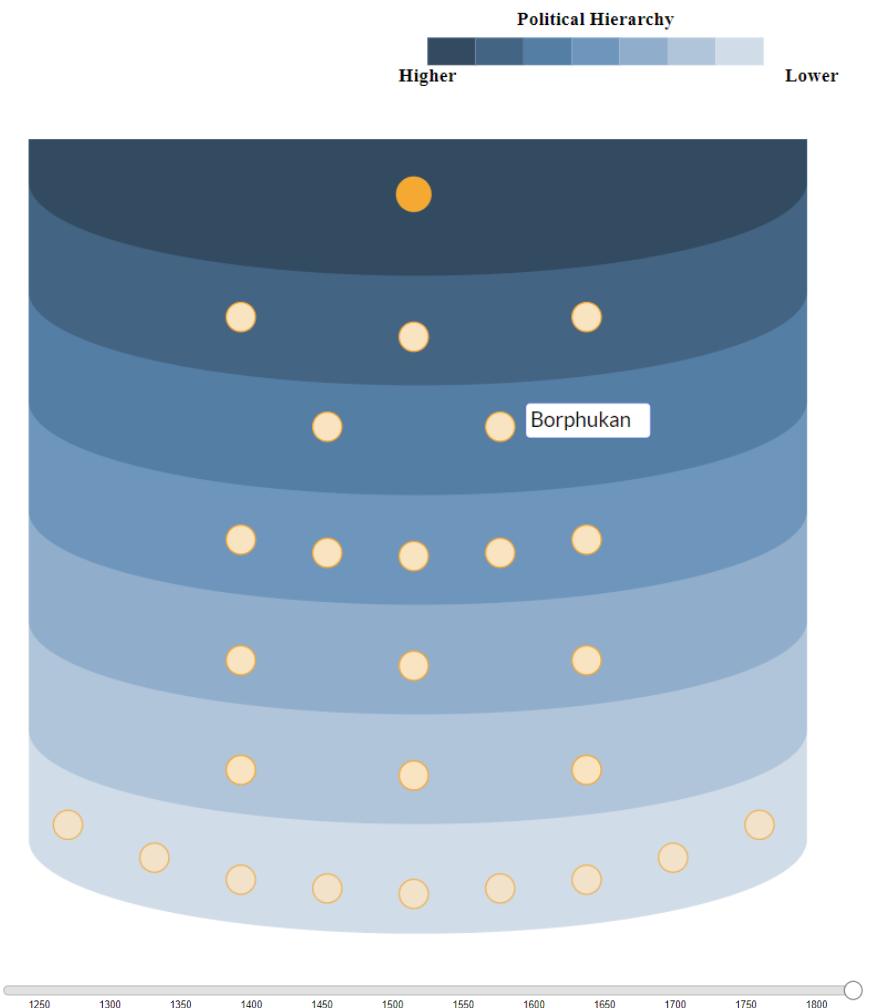
Timeline bar is used to display the change in the system through the period. When compared with the geography of the kingdom, we can observe a trend in introduction of new posts and the geographic area of the kingdom

After incorporating user feedback from the qualitative evaluation, similar visualization was used for the final output.

Insights obtained

From the explorations done on the two topics mentioned, some interesting insights came out, that can be summarized as follows.

1. The political part of the administration system which started off with a few people, grew to a council of 26 members. When compared with the geographic area of the kingdom, it was observed that, with the increase in new posts were added to the administration system during those time-periods which saw considerable amount of area expansions.



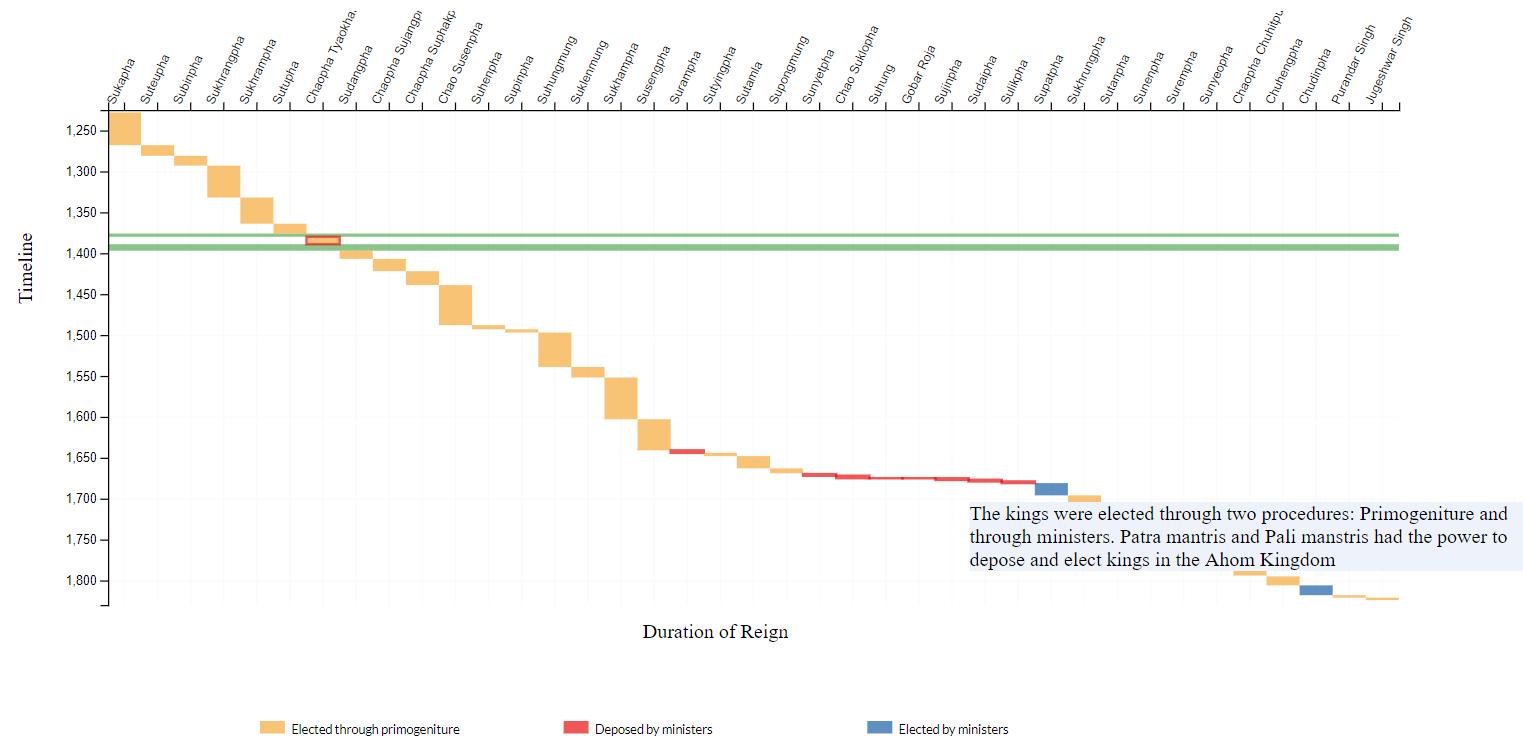


2. Officers elected to the administration system were chosen from different families. For a post, say *Borgohain*, the next eligible person from the same family of *Borgohains* were selected. After plotting the officers and their families in a matrix form, it was observed that, most important and higher ranks were allotted only to Ahom people.

3. Duration of reign of 39 kings when plotted into a chart, where it was observed that the duration of reign of kings on the later part of their time-period, is considerably less than the former. On encoding the visualization, with the cause for such a short period of reign, it was observed that ministers played a very important role in their duration of Reign.

In Ahom kingdom, Kings were elected through two procedures: Primogeniture and through ministers. Five

ministers (*Borgohain, Buragohain, Borpatragohain, Borphukan* and *Barbarua*) had the power to both elect and depose a king. This was done depending on the eligibility of the king. However, from the visualization, we can conclude that by the later part of the timeline, ministers started exploiting their powers and electing Kings based on their preferences. This might have been one of the reasons why in the later part of the history the kingdom grew weak internally.

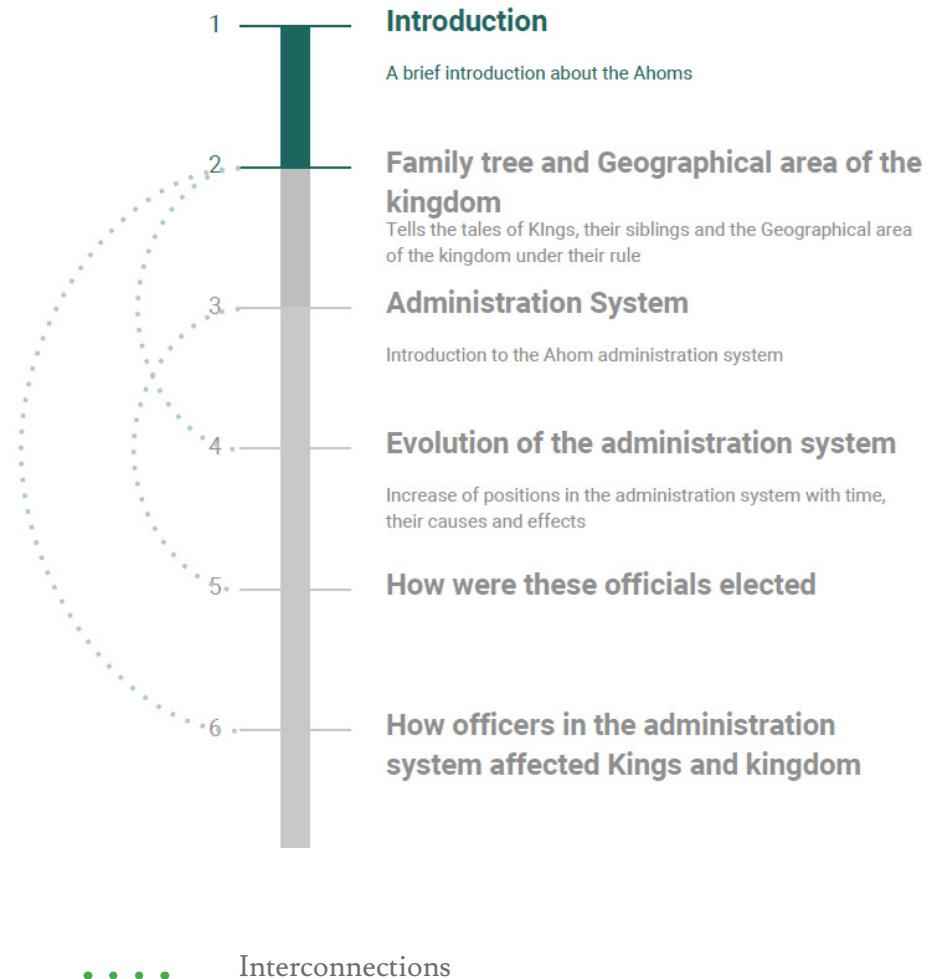


Narrative and data used

Narrative:

The focus of the web-based narrative was to give a glimpse of the kingdom of the Ahoms. For this project two topics, the family and their administration system was chosen. The story narrative was divided into four primary visualizations. Sections in the story narrative was designed to be inter-related, encouraging users to look for relationships and derive inferences from them.

The story starts with a brief introduction of the kingdom and their administration system. As the story progresses we can see different insights come into view. Three primary insights drawn from the research were displayed, however the visualizations are expected to help users draw their own unique conclusions from the same.



Data set obtained from all the resources were divided into different sections. A total of 4 visualizations were used to describe the tale of the kingdom. Two topics, family and the administration system were the focus of the narrative story. Datasets used for the visualizations are as follows:

Family tree and the geographical area of the kingdom

- King
- Princes
- Period of Reign
- Geographical area of the Kingdom under the king

Administration system

- Officers in the political half of the administration system
- Responsibilities and powers of different officers
- Political hierarchy
- The growth of the administration system

Officers and the families they were chosen from

- Represents Families officers were elected from

Election and deposition of Kings

- Duration of Reign of king
- Election and Deposition

List of Interactions and Information architecture

Family Tree and Geographic area of the kingdom

- Family introduction
- Names of Kings and Princes on hover
- Brief introduction about the Kings on click>opens a separate guide tab
- Timeline slider to help understand the growth of kingdom with time

Administration system

- Names of each officers in the administration system on hover
- Brief introduction about the officers on click>opens a separate guide tab

Evolution of administration system with time and map

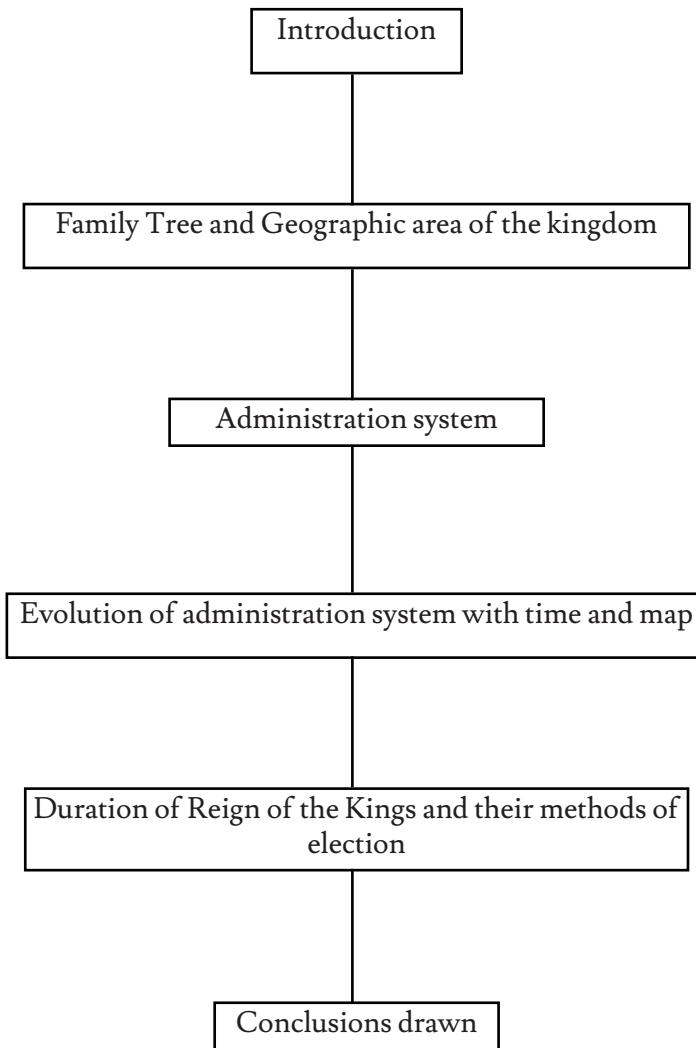
- Timeline slider to help understand the growth of the administration system with time and geographic area of the kingdom
- Families officers could belong to
- Highlights to show and separate the families officers belonged to
- Storytelling feature is used to help user understand the viz as the story progresses.

The visualization changes with the text.

Duration of Reign of the Kings and their methods of election

- A brief overview of the King and his time-period is displayed on hover.
- Storytelling feature is used here as well to help user understand the viz as the story progresses.

With the story that goes with the viz, visualization zooms in to show the details about two kings. This was done to show the effects of drastic measures that were taken at that period of time



Exploration with colors

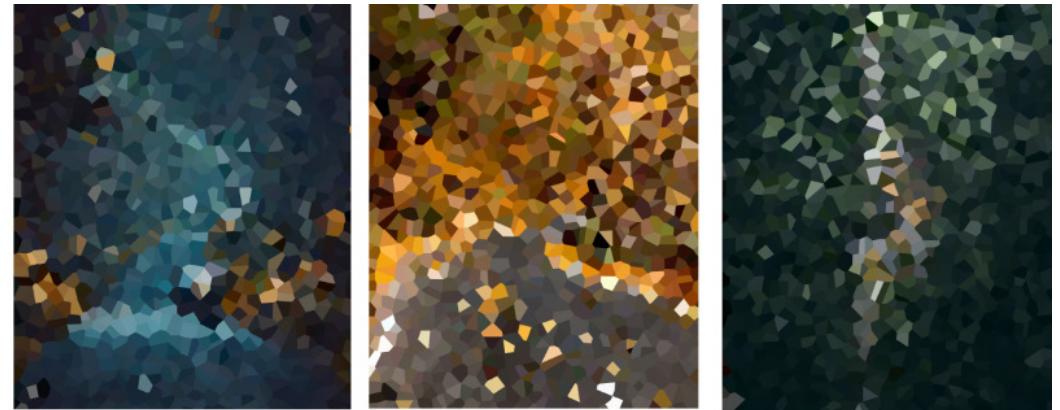


Fig: Color Palette

Tools used

Figma and Tableau:

Figma is collaborative interface design tool. This tool was used to design the initial concepts of the visualizations and the complete prototype. Tableau is a free visualization tool, also used to explore different initial visualizations[8][9]

D3js:

For final implementation of the visualizations d3js was used.[10]

QGIS:

Polygons for the maps were made using QGIS. The map of India in wps format was extracted from mapbox studio, and then drawn upon to display the geographical area of the kingdom[11]

Mapbox:

Mapbox studio and mapbox gl library were used to create the maps. For finalising on the map styles, mapbox studio was used. Mapbox gl was used to render the final visualizations involving maps.[12]

Final visualizations

Viz 1: Family and geographic area of the kingdom

The visualization is composed of two parts. First displays the kings and princes(sibings), and the second contains the geographic area corresponding to that timeperiod.

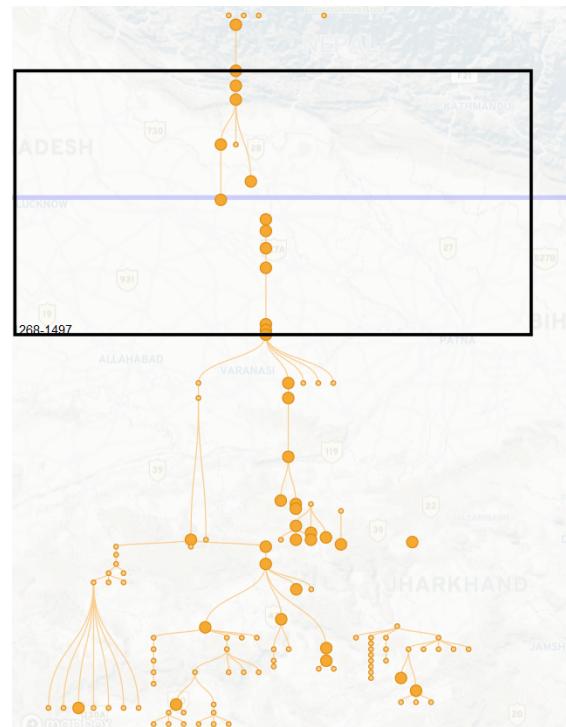


Fig: Viz 1

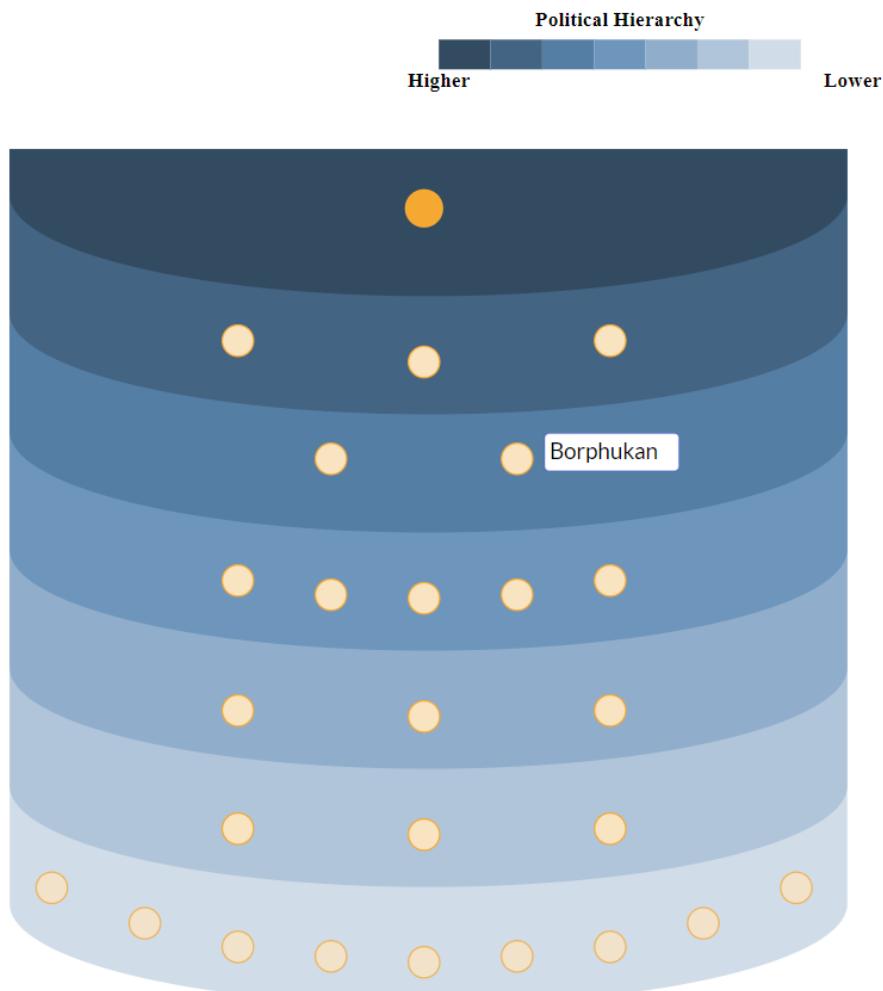


Fig: Viz 2

Viz 2: Administration system

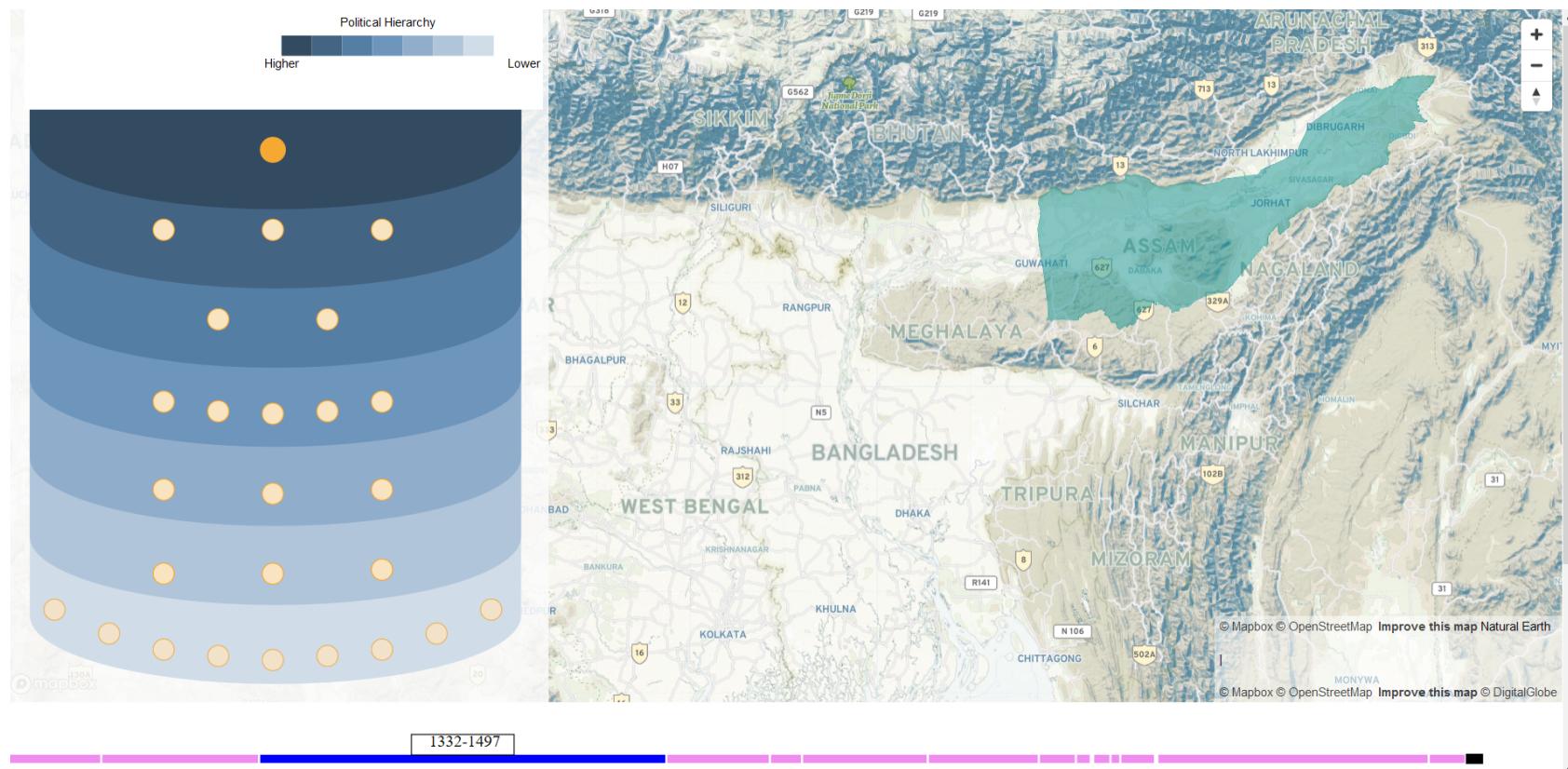
This describes the structure of the administration system. Color scale is used to define the political hierarchy in the administration system. People in the higher order had more powers and responsibilities than the lower. The first orange filled circle depicts the king.,

Interactivity:

On hover each element displays the name of the official. To know more about them, the user can click the same

Viz 3: Evolution of the administration system

This visualization depicts the growth of the administration with the expansion of the kingdom. It displays the relationship of the area acquired and the introduction of new posts into the administration system



Interactivity:

Time period can be adjusted to see the change in the area occupied by the kingdom and the introduction of new positions into the administration system

Fig: Viz 3

Viz 4: Positions in the administration system and the families they could belong to

In the x-axis is the names of the families and the y-axis contains the positions in the administration system, arranged according to the hierarchy

Interactivity:

As the story progresses, the user can see changes in the visualization with mouse scrolls.

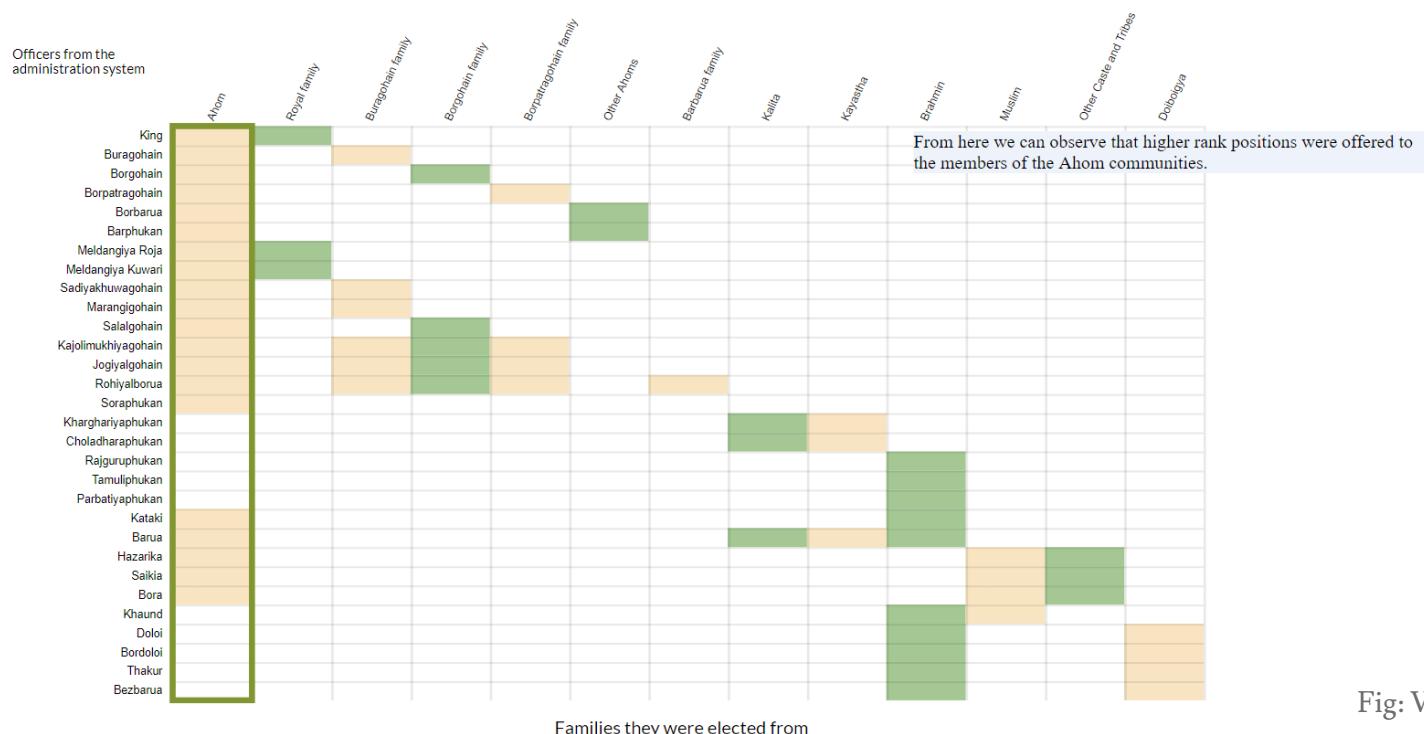


Fig: Viz 4

Viz 6: Duration od Reign of kings and their possible reasons of demise

With the timeline in y-axis, this chart depicts the duration of reign of different kings, in the x-axis.

Interactivity:

With every scroll event, the visualization changes to show the next detailed level.

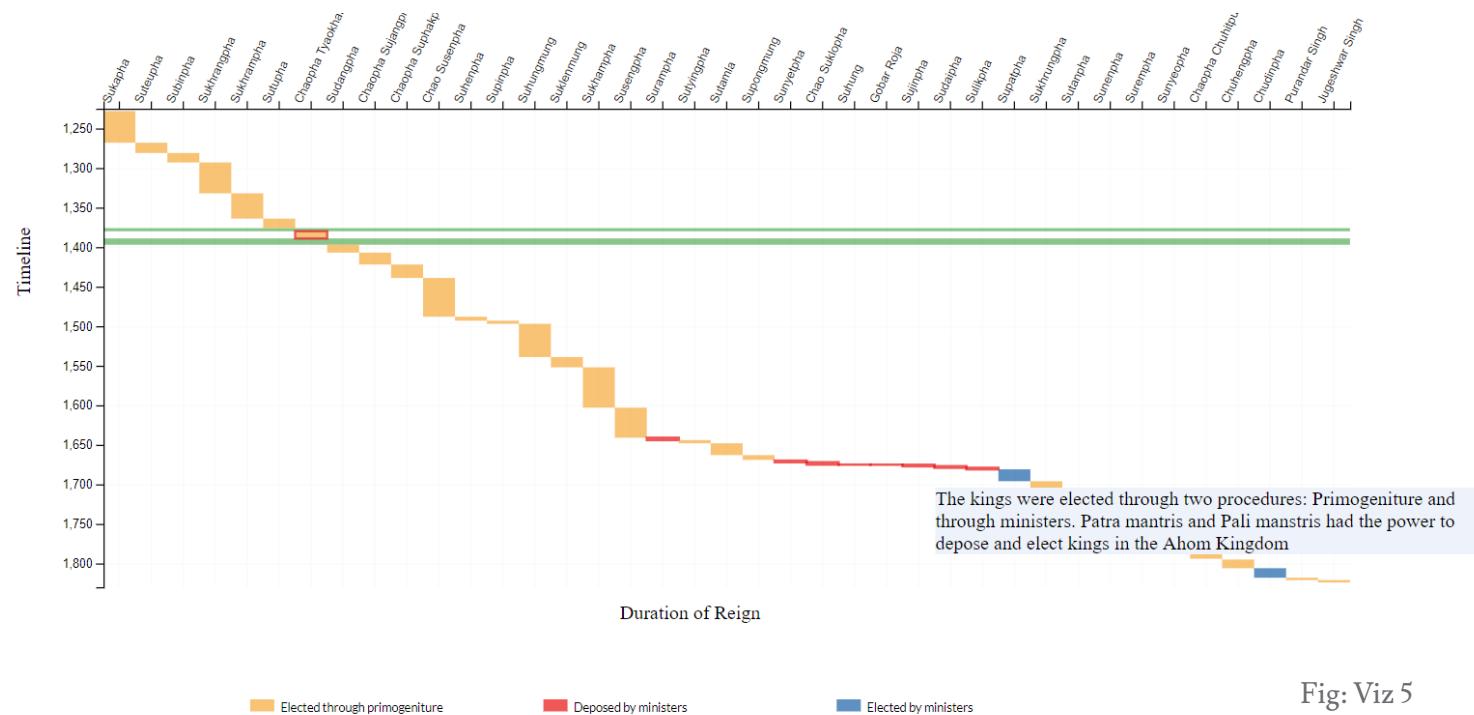
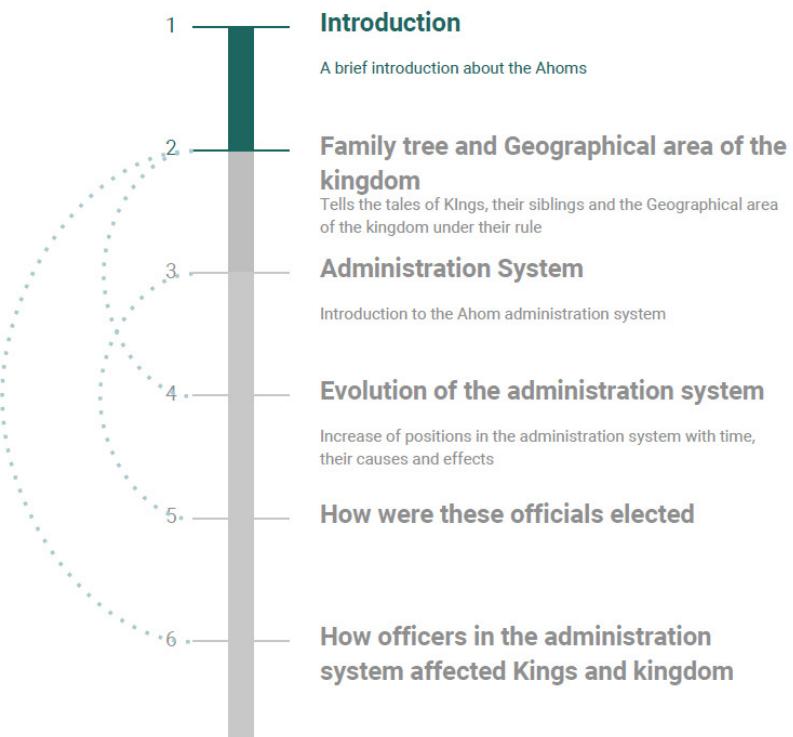


Fig: Viz 5

Final prototype

The final prototype is an interactive website for desktop. It contains visualizations weaved together into a story structure. To support these visualizations are brief narrations. The story structure is explained as follows.

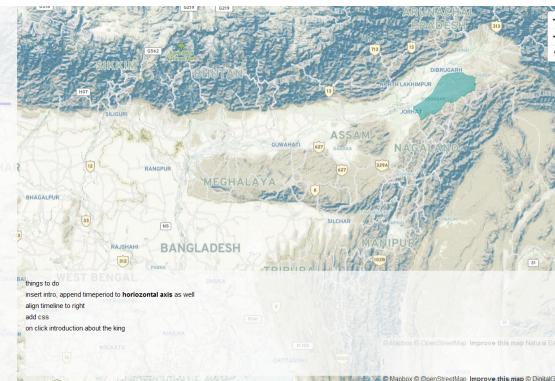
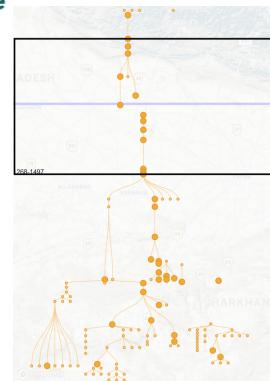


1 Introduction

A brief introduction about the Ahoms

2 Family tree and Geographical area of the kingdom

Tells the tales of Kings, their siblings and the Geographical area of the kingdom under their rule



3 Administration System

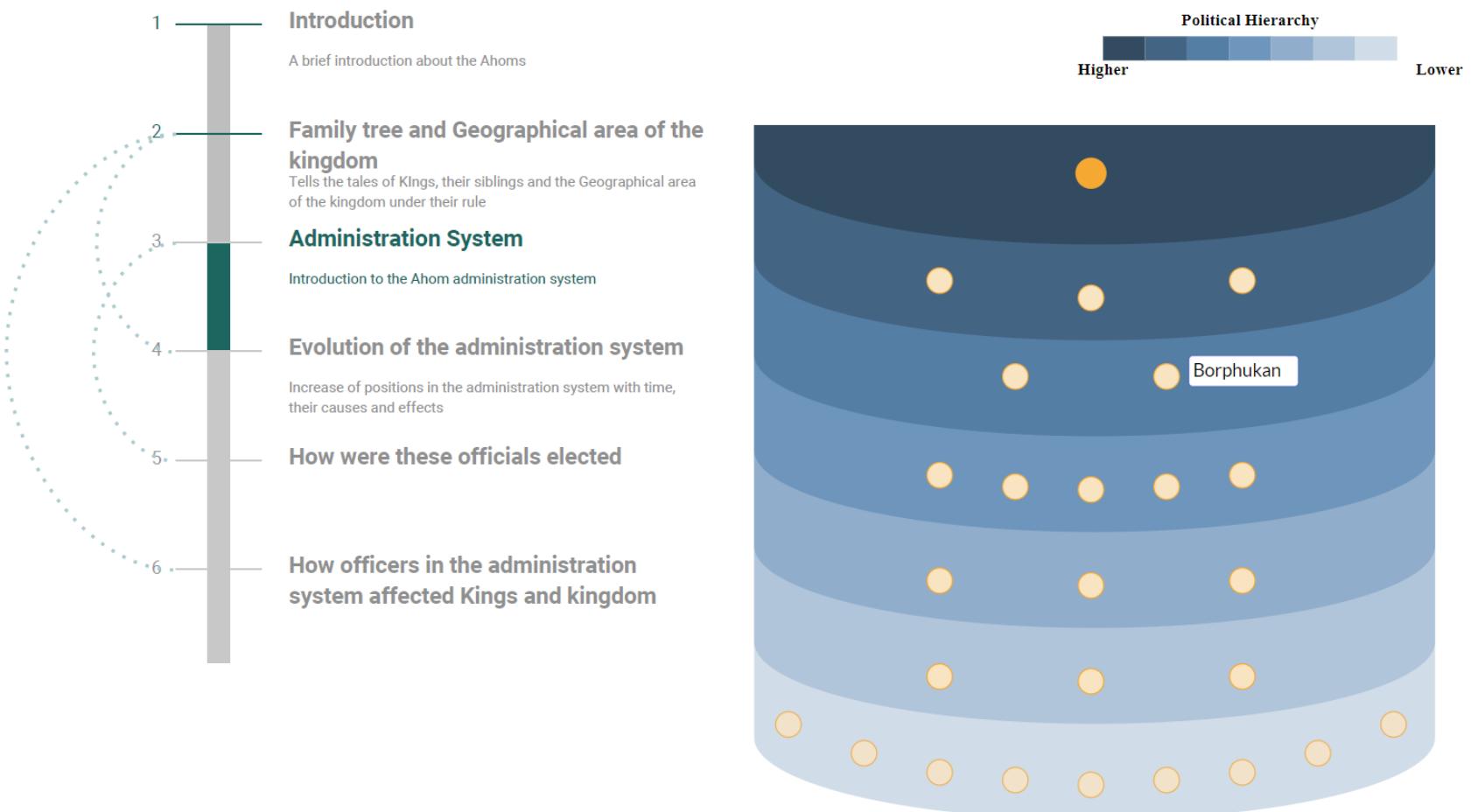
Introduction to the Ahom administration system

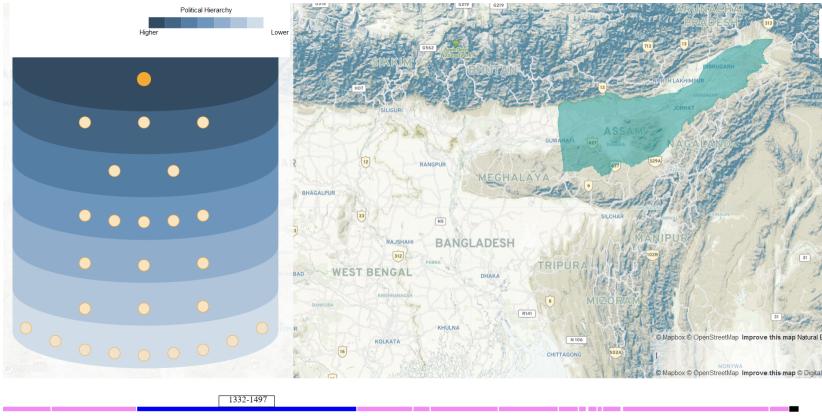
4 Evolution of the administration system

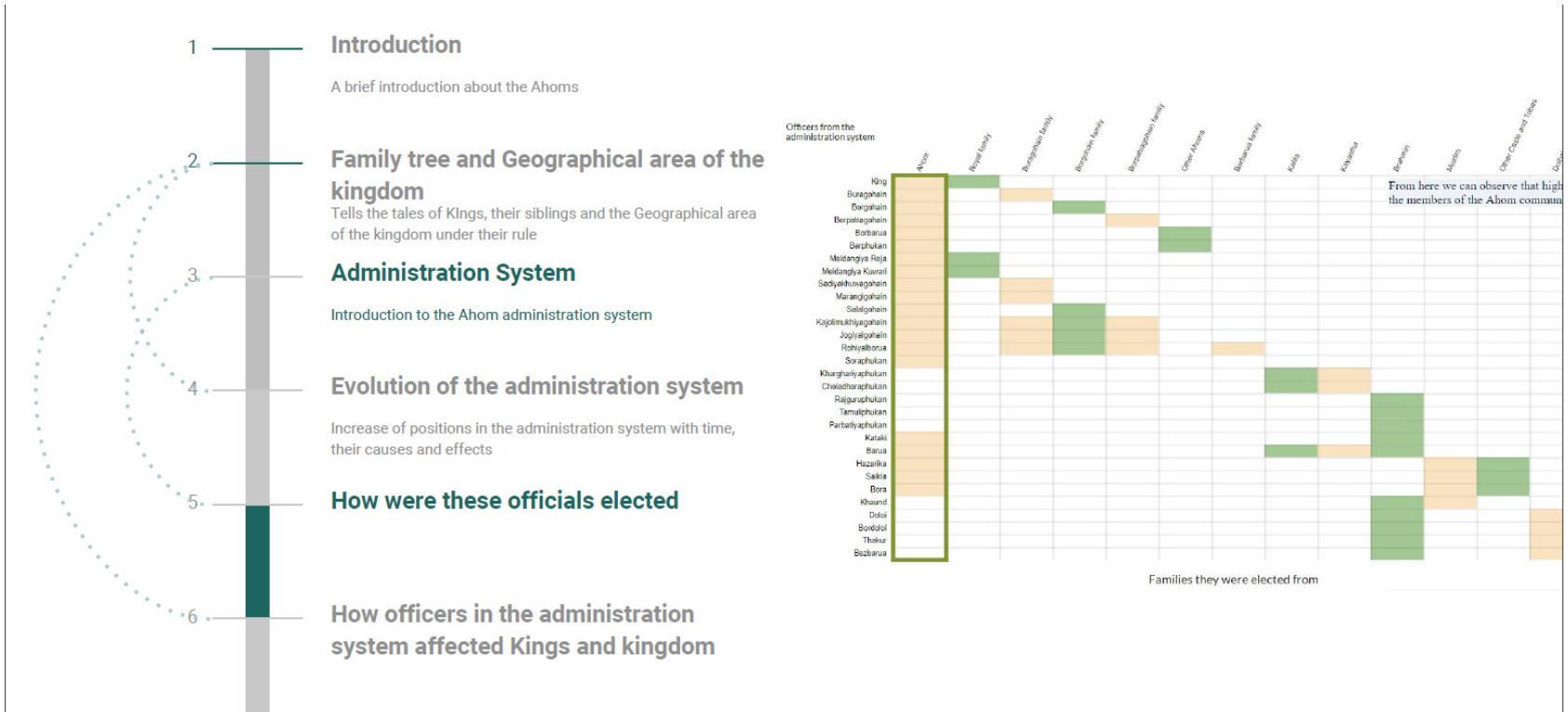
Increase of positions in the administration system with time, their causes and effects

5 How were these officials elected

6 How officers in the administration system affected Kings and kingdom







1 Introduction

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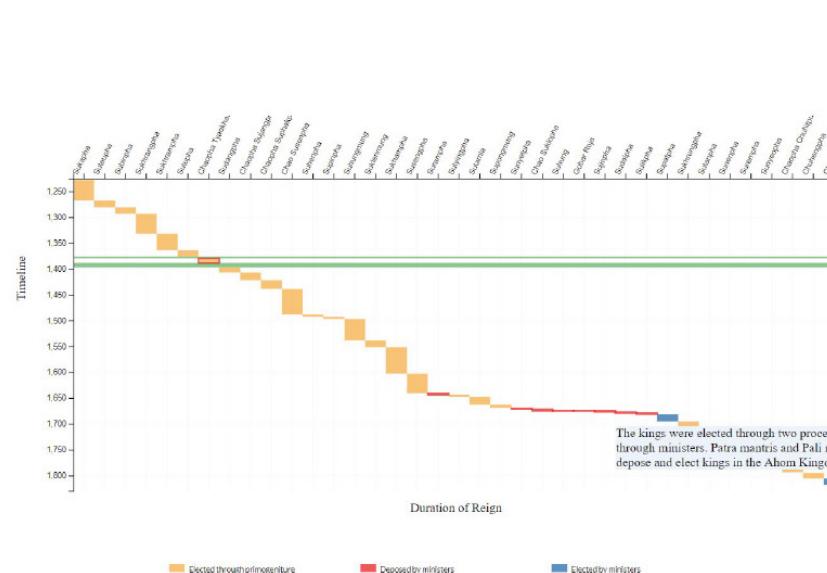
Introduction to the Ahom administration system

4 Evolution of the administration system

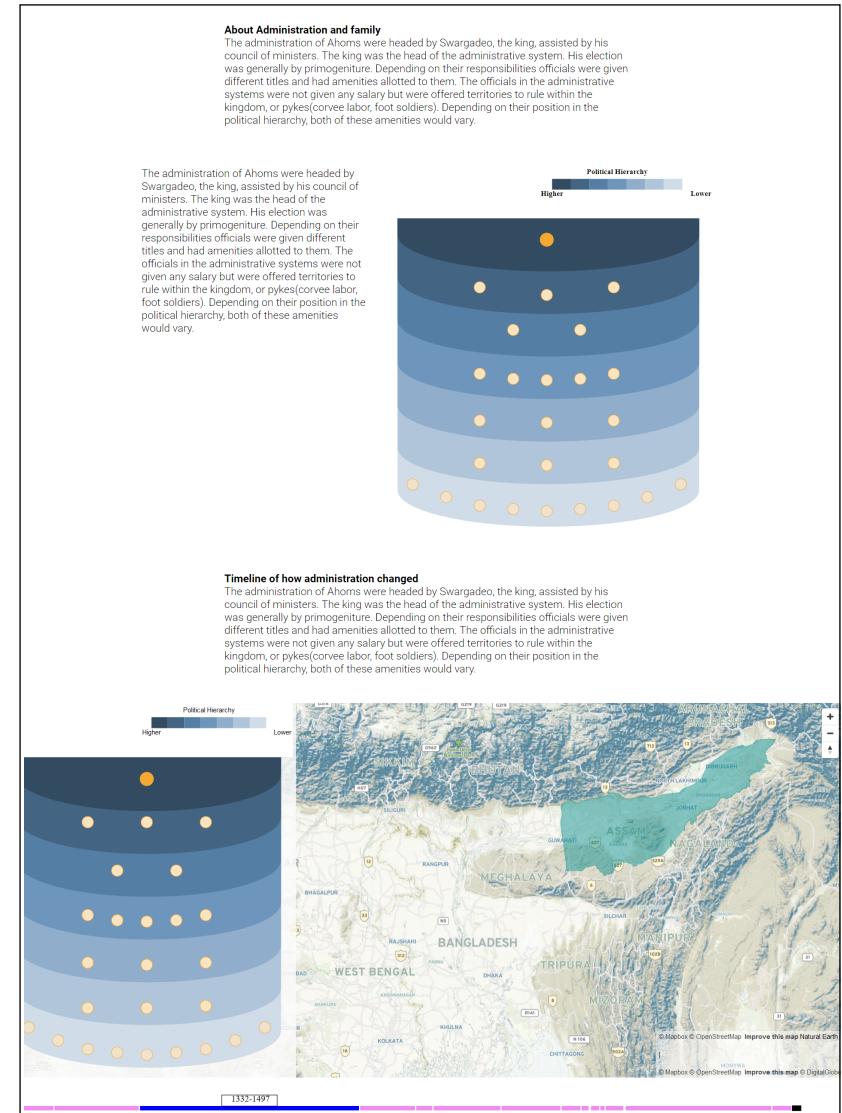
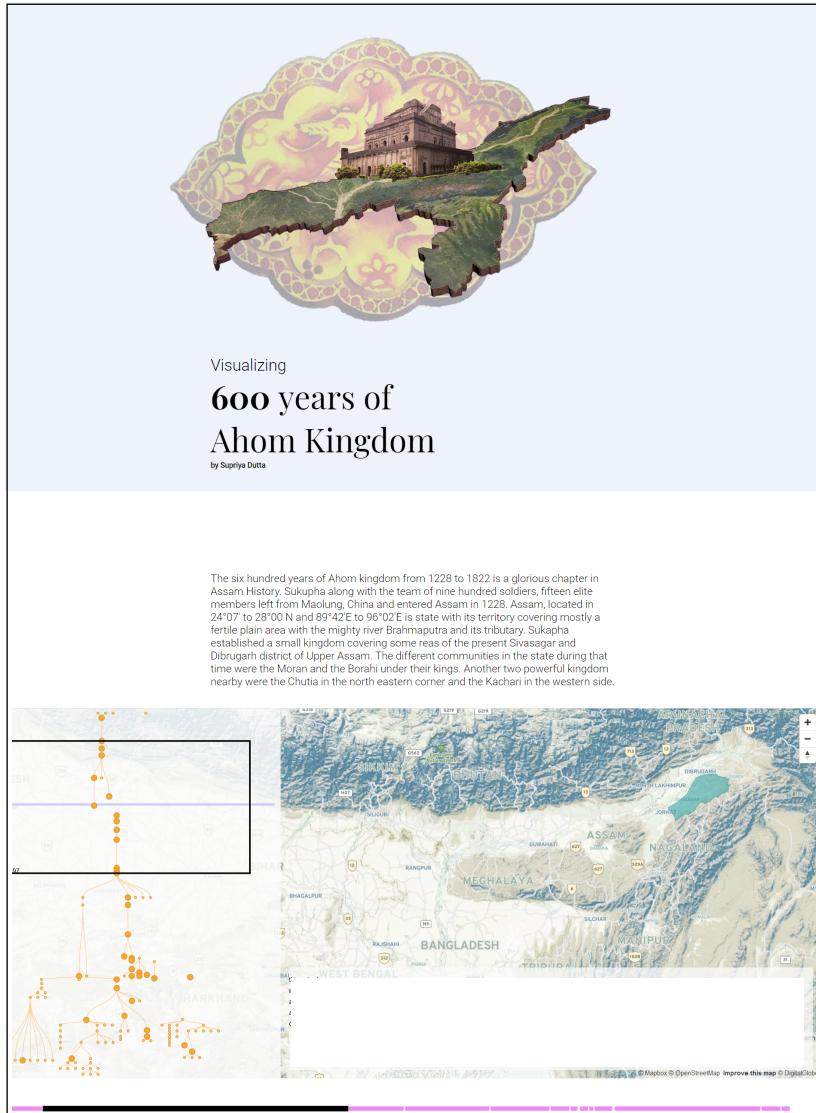
Increase of positions in the administration system with time, their causes and effects

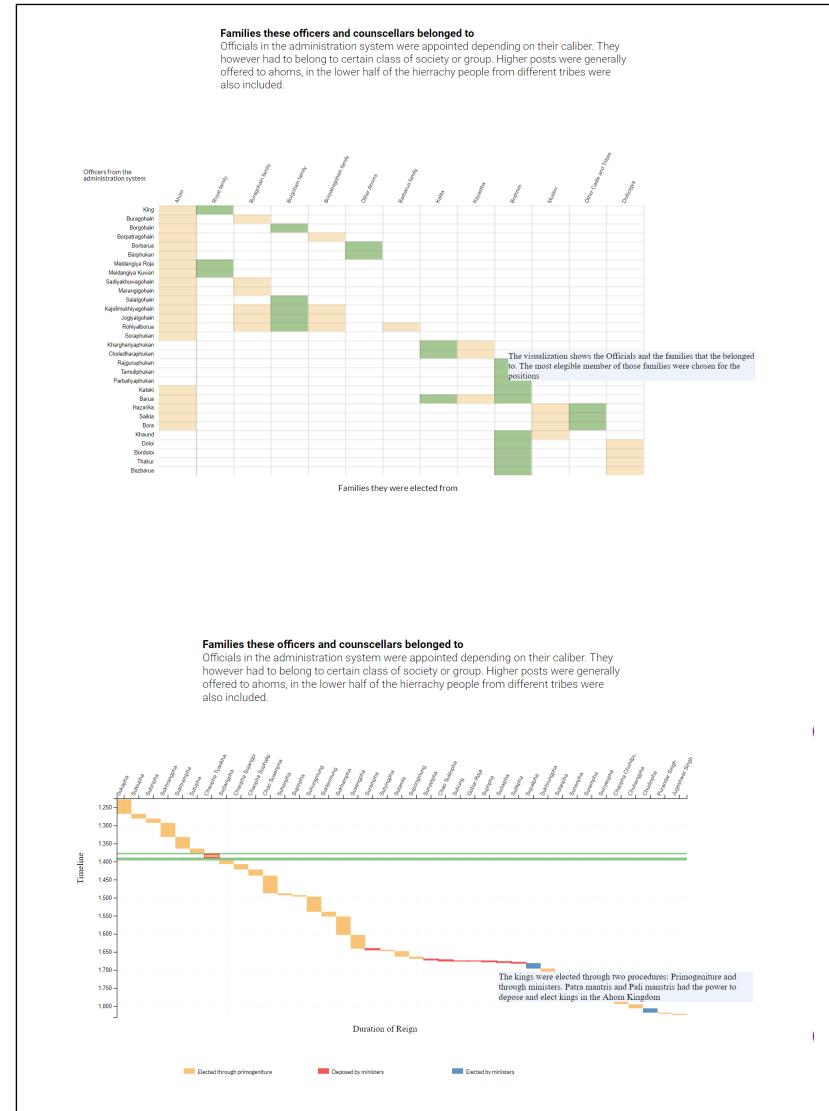
5 How were these officials elected

6 How officers in the administration system affected Kings and kingdom



Final prototype: website





Evaluation plan

The evaluation plan was carried out in two stages. Each visualization was individually evaluated in the first stage. In the second stage, the story narrative along with the visualizations was evaluated.

Total number of participants: 6

Time taken: 10 mins per visualization

In the first stage, participants were asked to interact with the visualizations, find problems, criticize and give feedback to the same. These data was recorded as a part of the qualitative feedback and were used to improve the visualizations.[13]

Total number of participants: 10

In the second stage, the story narrative was evaluated. The story narrative consisted of a textual narrative along with the visualizations. Participants were asked to interact with the website. Think aloud was implemented. Interactions made by the user with the prototype was recorded.

Participants were asked to discuss, criticize and give feedback on the same.

Semi structured interviews were conducted to understand the user experience. Data collected from the interviews will be plotted in the visualization wheel to understand the type of data narrative created[14]

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Appendix

Datasets used in the project are as follows:

1. About King

Name (Tai language)	Name (Hindu)	Timeperiod	Capital	Cause of Death
Sukapha		1228-1268	Charaideo	natural death
Suteupha		1268-1281	Charaideo	natural death
Subinpha		1281-1293	Charaideo	natural death
Sukhangpha		1293-1332	Charaideo	natural death
Sukhrampha		1332-1364	Charaideo	natural death
Sutupha		1364-1376	Charaideo	Sukhramphaa was assassinated by the king of the Chutiya kingdom on a barge ride on Suffry river (Gogoi 1968:273)
Chaopha Tyaokhamte		1389-1397	Charaideo	Sukhangphaa and his chief queen were deposed and executed by the ministers for their autocratic rule (Gogoi 1968:274).
Chaopha Sudangpha		1397-1407	charagua	natural death
Chaopha Sujangpha		1407-1422		natural death
Chaopha Suphakpha		1422-1439		natural death
Chao Susenpha		1439-1488		natural death

Name (Tai language)	Name (Hindu)	Timeperiod	Capital	Cause of Death
Suhenpha		1488-1493		Suhenphaa was speared to death in his palace by a Tai-Turung chief in revenge for being accused of theft (Gogoi 1968:282).
Supinpha		1493-1497		natural death
Suhungmung		1497-1539	Bakata	Suhungmung was assassinated by a palace staff in a plot engineered by his son, Suklenmung (Gogoi 1968:309).
Suklenmung		1539-1552	Garhgaon	natural death
Sukhampha		1552-1603 or 1611	Garhgaon	natural death
Susengpha	Pratap Singh	1603 or 1611-1641 or 1649	Garhgaon	natural death
Surampha	Bhaga Vijayaditya Singh	1641-1644	Garhgaon	Suramphaa was deposed by the ministers when he insisted on burying alive a son of each minister in the tomb of his dead step-son (Gogoi 1968:386). He was later murdered on the instructions of his nephew, the son of his brother and succeeding Swargadeo
Sutyingpha		1644 or 1652 or 1646 -1648 or 1654 or 1650	Garhgaon	Sutingphaa was a sickly king (Noriaya Raja), who participated in an intrigue by his chief queen to install a prince unpopular with the ministers. He was deposed and later murdered on the instructions of his son and successor king Sutamla (Gogoi 1968:391-392)
Sutamla	Jaydhvaj Singh	1648 or 1659 or 1650-1663 or 1663 or 1669	Garhgaon/bakata	natural death

Name (Tai language)	Name (Hindu)	Time period	Capital	Cause of Death
Supongmung	Chakradhwaj Singh	1663 or 1663 or 1664-1669 or 1670 or 1670	Garhgaon/bakata	natural death
Sunyetpha	Udayaditya	1669 or 1670 or 1670-1673 or 1672 or 1673		Udayaaditya Sinha's palace was stormed by his brother (and successor king) with a thousand-strong contingent of men led by Lasham Debera, and the king was executed the next day. Udayaaditya's religious fanaticism under the influence of a godman had made him unpopular, and the three great gohains implicitly supported this group (Gogoi 1968:479–482). This event started a very unstable nine-year period of weak kings, dominated by Debera Borbarua, Atan Burhagohain and Laluk-sola Borphukan in succession. This period ended with the accession of Gadadhar Singha
Chao Suklopha	Ramdhwaj	1672 or 1673-1675 or 1674		Ramadhawaj Sinha was poisoned on the instructions of Debera Borbarua when he tried to assert his authority (Gogoi 1968:484).
Suhung		1674 or 1675-1674 or 1675		The Samaguria raja was deposed by Debera Borbarua, the de facto ruler, and later executed, along with his queen and her brother (Gogoi 1968:486)
Gobar Raja	Gobar Raja	1674-1674		Gobar Raja was deposed and executed by the Saraighatias (the commanders of Saraighat/Guwahati), led by Atan Burhagohain (Gogoi 1968:486–488). Their target was the de facto ruler, Debera Borbarua, who was also executed.

Name (Tai language)	Name (Hindu)	Timeperiod	Capital	Cause of Death
Sujinpha	Arjun konwar	1675-1677		Sujinphaa Arjun Konwar tried to assert control by moving against the de facto ruler, Atan Burhagohain, but was routed in a skirmish. Sujinphaa was blinded and held captive when he committed suicide by striking his head against a stone (Gogoi 1968:489)
Sudaipha		1677-1679		Sudoiphaa was deposed by Laluk-sola Borphukan, who styled himself as the Buraphukan, and later executed. Atan Burhagohain, the powerful minister, had been executed earlier (Gogoi 1968:492–493).
Sulikpha	Lora Raja	1679-1681		Sulikphaa Lora Roja was deposed and then executed by Gadadhar Singha (Gogoi 1968:496–497)
Supatpha	Godadhar Singh	1681-1696 or 1695	Borkola	
Sukhrungpha	Rudra Singh	1696 or 1695-1714	Rangpur	
Sutanpha	Sib Singh	1714-1744		
Sunenpha	Pramata Singh	1744-1751 1752		
Surempha	Rajesvar Singh	1751 or 1753-1769 or 1770		
Sunyeopha	Lakshmi Singh	1768 or 1769-1780 or 1779		
Chaopha Chuhitpung Gommung	Gauri Nath Singh	1780 or 1779-1798 or 1792	Jorhat	
Chuhengpha	Majiu Aideu Kamaleshwar Singh	1795 or 1792-1801 or 1806	Jorhat	

Name (Tai language)	Name (Hindu)	Time period	Capital	Cause of Death
Chudinpha	Chandra Kanta Singh	1806 or 1810-1818	Jorhat	Chandrakanta Singha was deposed by Ruchinath Burhagohain, mutilated and confined as a prisoner near Jorhat (Baruah 1992:221). The Burhagohain choose Brajanath, a descendant of Suremphaa Pramatta Singha, as the king and coins were struck in the new king's name, but it was discovered that he had mutilations on his person and his son, Purandar Singha, was instated instead (Gait 1906:223).
Chudinpha	Chandra Kanta Singh	1819-1821	Jorhat	
	Purandar Singh	1818-1900	Jorhat	Purandar Singha's forces under Jaganath Dhekial Phukan defeated the forces led by the Burmese general Kee-Woomingee (Kiamangi or Alumingi Borgohain) on February 15, 1819, but due to a strategic mistake Jorhat fell into Burmese hands. Kiamangi brought back Chandrakanta Singha and installed him the king (Baruah 1992:221-222)
	Jugeshwar Singh	1821-1828		Jogeshwar Singha was removed from all pretense of power and Mingimaha Tilwa was declared the "Raja of Assam" toward the end of June, 1822 (Baruah 1992:225)

2. About the administration system(1)

Designations	Council	Political Hierarchy	From families	Role in court
King		1	Prince; royal family member; Has to have no wounds;	Head of Council of ministers; for every important matter he has to meet Patra Mantis, Meldangia Raja, Borphukan, Borborua, Soraphukan, Princes, Datiyaliya Gohain ad kartaliya Raja. Take aproval from Patra mantris
Bura Gohain	Mantri Sabha	2	bura Gohain family member	king's Advisors; Rulers of their own areas;
Bor Gohain	Mantri Sabha	2	Bor Gohain family member	king's Advisors; Rulers of their own areas;
Borpatra Gohain	Mantri Sabha	2	Borpatra Gohain	king's Advisors; Rulers of their own areas;
Borbarua	Mantri Sabha	3		Rulers of their own are; Judge; Army General; King's Advisor
Borphukan	Mantri Sabha	3		Rulers of their own are; Judge; Army General; King's Advisor; it was him who could decide/ advice the king on making or voting out of kings of Panbari Borduwar Soygaon Panton Boku Bongaon Jogai Bhulagaon Dwar Moirapur

Designations	Council	Political Hierarchy	From families	Role in court
Tipomiya Raja		4	royal family member; Future kings: 2	Could give advice to the king; Weren't given any sectors/area to work on, on the ground that they might unite with other people against the king
Namrupiya Raja		4	royal family member; Future kings: 3	Could give advice to the king
Chariyinya Raja		4	royal family member; Future kings: 1	Could give advice to the king
Majumeliya Raja		4		Could give advice to the king
Sarumeliya Raja		4		Could give advice to the king
Sadiyakhuwa Gohain	Datiyaliya Gohain	5	Buragohain	king's Advisors; Rulers of their own areas; Judge; Army general
Marangi Gohain	Datiyaliya Gohain	5	Buragohain	king's Advisors; Rulers of their own areas; Judge; Army general
Salal Gohain	Datiyaliya Gohain	5	Bor Gohain family member	king's Advisors; Rulers of their own areas; Judge; Army general
Kajolimukhiya Gohain	Chakiyal Bisoya	6	borpatra gohain family	
Kajolimukhiya Gohain	Chakiyal Bisoya	6		
Jogiyal Gohain	Chakiyal Bisoya	6	Barbarua family	
Rohiyal borua	Kuwori Mell	7		
Borkuvari	Kuwori Mell	7		
Parbatiya kuwari	Kuwori Mell	7		

Designations	Council	Political Hierarchy	From families	Role in court
Tamuli Kuwari	Kuwori Mell	7		
Samuwa Kuwari	Kuwori Mell	7		
King's Mother	Kuwori Mell	7		
King's stepmother	Kuwori Mell	7		
King's grandmother	Kuwori Mell	7		
King's caregiver- mother?	Kuwori Mell	7		
King's daughter	Kuwori Mell	7		

2. About the administration system(2)

Designation	Number of pykes	Offivers under them	Post created	Reason for post creation
King				
Bura Gohain	10000 pykes		always there	
Bor Gohain	10000 pykes		always there	
Borpatra Gohain	10000 pykes		Suhungmung (1497-1539)	
Borbarua	14000 pykes(gait); 12000 pykes(assam Buranji)	BarBorua Sabha; 12 Rajkhowas; 2 Chetiyapatra Barua, 2 Gharphaliya Barua, 4 Changcharung Barua	Susenpha (1603-41; 1611- 1649)	with the expansion of the kingdom, people were needed for efficient management of resources, and hence thiese posts were made
Borphukan	12000 pykes	BarPhukan Sabha	Susenpha (1603-41; 1611- 1649)	with the expansion of the kingdom, people were needed for efficient management of resources, and hence thiese posts were made
Tipomiya Raja		Phukan, Hazarika, Barua, Saikia,Bora	Suhungmung (1497-1539)	
Namrupiya Raja		Phukan, Hazarika, Barua, Saikia,Bora	Suhungmung (1497-1539)	
Chariyinya Raja		Phukan, Hazarika, Barua, Saikia,Bora	Sukhrangpha (1332-1364)	

Designation	Number of pykes	Offivers under them	Post created	Reason for post creation
Majumeliya Raja		Phukan, Hazarika, Barua, Saikia, Bora		
Sarumeliya Raja		Phukan, Hazarika, Barua, Saikia, Bora		
Sadiyakhwa Gohain			Suhungmung(1497-1539)	with the expansion of the kingdom, people were needed for efficient management of resources, and hence datiyoliya gohain were made
Marangi Gohain			Suhungmung(1497-1539)	with the expansion of the kingdom, people were needed for efficient management of resources, and hence datiyoliya gohain were made
Salal Gohain			Khura Raja(1552- 1603)	with the expansion of the kingdom, people were needed for efficient management of resources, and hence datiyoliya gohain were made
Kajolimukhiya Gohain			Pratap Singh(1603-1641)	to keep the king informed about his new acquired territories
Jogiyal Gohain			Pratap Singh(1603-1641)	to keep the king informed about his new acquired territories
Rohiyal borua			Pratap Singh(1603-1641)	to keep the king informed about his new acquired territories
Borkuvari		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	

Designation	Number of pykes	Offivers under them	Post created	Reason for post creation
Parbatiya kuwari		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	
Tamuli Kuwari		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	
Samuwa Kuwari		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	
King's Mother		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	
King's stepmother		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	
King's grandmother		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	

Designation	Number of pykes	Offivers under them	Post created	Reason for post creation
King's caregiver-mother		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	
King's daughter		Phukan; Barua; Hazarika; Saikia; Bora; etc; meldagiya baruah	always there	

3. Family

Name	Successor	Son 1	Son 2	Son 3	Son 4	Son 5
Chao Sukapha	Suteupha	Suteupha				
Suteupha	Subunpha	Subinpha				
Subinpha	Sukhangpha	Sukhangpha				
Sukhangpha	Sukhanpha	Sukhanpha	Chao Sulai:Tya Pulai:Charing Roja	Sutupha		
Sukhrampha	Sutupha	Tyaokhamte				
sutupha	tyaokhamte					
Sudangpha	Sujangpha	Sujangpha				
Sujangpha	Suphakpha	Supkhakpha				
Suphakpha	Sudenpha	Susenpha				
Sudenpha	Suhenpha	Suhenpha				
Suhenpha	Supinpha	Supinpha				
Supinpha	Suhungmung	Senglung	Suhungmung			
Suhungmung	Suklengmung	Suklengmung	Sureng Phisao:	Sukhring:Suleng Tipam Roja	Suteng, Namrupia Roja	Supheng
Suklengmung	Sukhampha	Sukhampha				
Sukhampha	Susengpha	Susengpha	Sutyinpha			

Name	Successor	Son 1	Son 2	Son 3	Son 4	Son 5
Susengpha	Sutyinpha					
Sutyinpha	Sutamla	Sutamla				
Sutampa	Supangmung, Chakradhvaj Singh					
Deu Roja's grandchild						
Supangmung, Chakradhvaj Singh	Udayaditya	Subyanpha, Saru Saringiya Ramdhvwaj Singh	Samguria Suhungpha, Suhung	Sujinpha		
Chao Suteng						
Sudaiphia	Sulikpaha, Lora Roja					
Sulikpaha, Lora Roja	Gobar					
Suteng, Namrupia Roja						
Chao Aabong		Gobar	Nisaong Gohain			
Gobar	Supatpha, Godadhar Singh	Supatpha, Godadhar Singh	Jombar Gohain			
Supatpha, Godadhar Singh	Sukhrungpha, Rudra Singh	Sukhrungpha, Rudra Singh	Lesai Namrupia Raja			

Name	Successor	Son 1	Son 2	Son 3	Son 4	Son 5
Sukhrungpha, Rudra Singh	Sutanpha: Siv Singh	Sutanpha: Siv Singh	Chao Sunenpha: Pramata Singh	Muhanmala	Surampha: Rajesvar Singh	Sunetupha, Lakhimi Singh
Sutanpha, Siv Singh	Pramata Singh: Sunenpha					
Pramata Singh: Sunenpha	Surampha: Rajesvar Singh	Malou Gohain: Tipam Roja	Madhav Saring Raja			
Madhav Saring Raja		Bona Gohain				
Bona Gohain		Bolo Gohain				
Sunetupha, Lakhimi Singh	Suhitpongpha: Chaopha Chuhitpung Gommung	Suhitpongpha: Chaopha Chuhitpung Gommung				
Suhitpongpha: Chaopha Chuhitpung Gommung	Chuhengpha	Gorbhe Singh	Jayanti Aideu			
Boliya		Bhator				
Bhator		Phaguna				
Bayur Sut		Basanta				
Basanta		Kinaram				
Kinaram		Kerkan				
Kerkan		Kelkeli				
Kelkeli		Krishnaram				

Name	Successor	Son 1	Son 2	Son 3	Son 4	Son 5
Krishnaram		Heramba				
Heramba		Tamradhwaj				
Aayu Sut Gohain		Kadam Dighali Charingiya Raja	Khura Gohain	Kaliya	Dhupal	Sarujana Sakhi Gohain
Kadam Dighali Charingiya Raja		Chuhengpha	Chudinpha			
Chuhengpha	Chudinpha					
Chudinpha	Purandar Singh	Ghanakanta Yuvaraj	Hemkanta	Devjani		
Ghanakanta Jubaraj		Kesabakanta Yuvaraj				
Kesabakanta Yuvaraj		Aideu Louhitya Kumari	Aideu Govinda Kumari			
Surampha: Rajesvar Singh	Sunetupha, Lakhimi Singh	Kandura	Saru Singh Charing Raja	Ratneshwar Tipam Raja	Pat Konwar	
Saru Singh Charing Raja		Cherel Gohain				
Cherel Gohain		Giridhar				
Giridhar		Lombodar				
Ratneshwar Tipam Raja		Vijay Borkumar				
Vijay Borkumar		Brajanath Chari Raja	Bhubaneshwar Tipam Raja	Indranath Sarumelia Raja	Aapa Gohain	

Name	Successor	Son 1	Son 2	Son 3	Son 4	Son 5
Brajanath Chari Raja		Purandar Singh	Radha Nath			
Purandar Singh	Jugeshwar Singh	Kandapeshwar Singh	Saru Gohain			
Kandapeshwar Singh		Nareshwar	Kumudeshwar	Ailokeshwari Aideu		
Radha Nath		Nor Narayan: Majumeliya Raja				
Nor Narayan		Chandra Narayan: Jorhat s Town Mahalor Moujadar	Gun Narayan: Moujadar	Padmanarayan		
Gun Narayan: Moujadar		Shree Dandeswar: Moujadar	Shree Nagendra Narayan: Moujadar	suren		
Bhubaneshwar Tipam Raja		Nareshwar				
Nareshwar		Manjur	Durga	Aokora	Kumudini	