A project report on

EPIGRAPHY USING DEEP LEARNING CONCEPTS

Submitted in partial fulfilment for the award of the degree of

Bachelor of Technology in Computer Science

by

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DECLARATION

I here by declare that the thesis entitled **"Epigraphy using Deep Learning Concepts"** submitted by me, for the award of the degree of **B. Tech Computer Science and Engineering** is a record of bona-fide work carried out by me under the supervision of **Prof. Ilakiyaselvan**.

I further declare that the work reported in this thesis has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Place: Chennai

Date: Signature of the Candidate

School of Computer Science and Engineering

CERTIFICATE

This is to certify that the report entitled **"Epigraphy using Deep Learning Concepts"** is prepared and submitted by **Arjun Baburaj** (**16BCE1069**) to VIT Chennai, in partial fulfullment of the requirement for the award of the degree of **B.Tech. CSE** programme is a bonafide record carried out under my guidance. The project fulfills the requirements as per the regulations of this University and in my opinion meets the necessary standards for submission. The contents of this report have not been submitted and will not be submitted either in part or in full, for the award of any other degree or diploma and the same is certified.

Signature of the Guide:

Name: Dr./Prof.

Date:

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Name: Name:

Date: Date:

Approved by the Head of Department, **B. Tech CSE**

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(Seal of SCOPE)

ABSTRACT

Epigraphy is the study of inscriptions, or epigraphs, as writing; it is the science of identifying graphemes, clarifying their meanings, classifying their uses according to dates and cultural contexts, and drawing conclusions about the writing and the writers. Epigraphs are very significant because they can shed a light on various historical events as well as give us mew literary works. These are just some of the important features of studying epigraphs.

I found an application that actually is used for Greek epigraphy. It's name is Pythia. Here I saw that they had actually made a database that had all the possible type of Greek characters fed into it. The image of the inscription is taken and it can actually translate it into something we can understand. From this I was able to notice that we could also make such an application for our native language. I was trying to find whether I can also make a database for our native languages. So I was thinking of doing it for Malayalam and if possible for Tamil. Of course a deep understanding of the language is needed.
If we are able to proceed with this, we can actually find relationships with other inscriptions through the usage of computer. This decreases the manual workload by a lot.

ACKNOWLEDGEMENT

Place: Chennai

Date: Name of the student

CONTENTS

CHAPTER 1

INTRODUCTION

CHAPTER 2

PYTHIA

CHAPTER 3

EPIGRAPHIC DATABASE HEIDELBERG

CHAPTER 4

WORK PLAN

CHAPTER 5

CONCLUSIONS AND FUTURE WORKS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

ARIE   Annual Report of Indian Epigraphy

EDH   Epigraphic Database Heidelberg

API   Application Program Interface

BC   Before Christ

AD   Anno Domini

Chapter 1

Introduction

1.1 EPIGRAPHY

It is the study of inscriptions or epigraphs. It is the science of finding graphemes, clarifying their meanings, classifying their uses according to dates and cultural contexts, and drawing conclusions about the writing and the writers.

Epigraphy is derived from two words, epi and graphie. There are a lot of different types of inscriptions like royal declarations, records of donation, land deeds, literary works, and many more. They can be found in many types of languages and scripts. They could be written on anything like coins, stone, plates and many more.

Epigraphic documents have always been considered highly accurate, among the various written archaeological findings, since unlike textual sources, these have not been tampered with or changed.

Generally, any historical information is acknowledged as true record when it is substantiated by an epigraphical record. This is similarly the case in the study of the history of literature and language.

1.1.1 INSCRIPTION

Epigraphy may be defined as any descriptive and analytical study of the epigraphs. The word 'Inscription' is also most commonly used as synonymous with epigraph. This word has been derived from a Latin word Inscribere which also gives the meaning 'to write upon.' Dr. D.C.Sircar has stated that "Inscription literally means only writing engraved on some object.".

The Encyclopedia Britanica states that "Inscriptions are the documents, incised on some hard permanent material in the form of letters or other conventional signs, for the purpose of conveying some information or preserving the data. They are, therefore, to be

distinguished on the one hand from manuscripts or documents written on papyrus, parchment, paper or smoother surfaces by means of a brush reed or pen and some coloured flint."

During the old times, people usually etched inscriptions on plates, tablets, pillars, pots and rocks and other objects. Some times writings such as the legends found on coins and seals, most of which are produced out of moulds or dies and also records pointed on cave walls or written in ink on wooden tablets are also regarded as inscriptions, although these writings are not actually etched on them. Inscriptions may greatly vary in point of length, sometimes on epigraphs contain only a mark or one single word or expression indicating the name of an individual.

1.1.2   NATURE OF EPIGRAPHY

An epigraphical study is primarily a study related with the letters and words. The content of the epigraph is more direct and mostly tells about the situations observed during the time it was written.

Epigraphy has three major stages of study. The first stage is taking the copy of the inscription and this is generally called as taking estampages. The second stage is identifying the letters in the inscription one by one meticulously and reading the literary text. We can call this stage as deciphering. The third stage is applying the literary data for writing of history and this stage is called as analysis and interpretation. After deciphering an inscription applying it to write the history in various respects.

1.1.3   SCOPE OF EPIGRAPHY

In India, there is a lot of scope for epigraphy or study of inscriptions strewn over the whole of the country and extended over the centuries. We know that the earliest writing in India belongs to the Sindhu valley civilization, the greatest civilization that existed in this part of the continent. But it has still not been successfully deciphered. The final conclusions about this have yet to be found out. We began to get a complete and understandable script from the ruling time of the Mauryan emperor Asoka.

The scope of epigraphy is limited to the ancient and medieval period in history. It starts from the third century B.C. This was when inscriptions first appeared in India and

at most it can be extended up to the end of seventeenth century A.D. In the context of India, the fortunes in history have changed after the European intervention.

1.2   IMPORTANCE OF EPIGRAPHY

Inscriptions are considered important political documents, and also are deemed to have great cultural significance. You could say that there is no part of life, which has not been written upon in inscriptions. The edicts of Asoka Maurya, played a very important role in the making of Indian history. Dhamma which refers to a code of morals which he believed to be the teachings of Buddha. Asoka's teachings relate to practical code of morals but not to metaphysical or theological in nature. In his edicts, he referred the virtuous qualities like compassion, liberality, truthfulness, politeness, self control, purity in thoughts, speech and deeds, respect for elders and parents, rules regarding accumulation and expenditure of wealth, absence of violence, vanity, anger and ruthlessness, prevention from slaughter or injuring other living beings. These noble values of humanity which are pretty acceptable to all in everywhere in all times, constructed the Asoka's concept of Dharma.

Prayaga Inscription of Samudragupta has thrown light on the political conditions prevailing at that time. This inscription gives us an account of political career of Samudragupta and his conquests. Inscriptions also give us glimpses regarding the social conditions of the ages to which they belong.

Inscriptions also throw light on social customs. For example, the Brahmadeyam inscription refers to the sati committed by the queen of Rajendra Cola I. The Uttramerur inscription of a Cola king Parantaka I give a picture of the structure and systems of a local governing body at Caturvedimangalam. Some of the inscriptions speak of the measures taken by the ruler to deal with situations where there was panic among the people.

Many inscriptions have information related to education and learning during their time period. For instance, Salotagi inscription of Rastrakuta Krishna III (10th century A.D.) records the construction of a Sala (School) by his minister Narayana. The school attracted students from everywhere to pursue their studies.

There are some inscriptions which showcase the importance of the tradition of dance and music. Perhaps, the earliest reference to dance is found in an inscription from Jogimara cave (Second century B.C.) It mentions a Sutanuka, a temple dancer and her

lover Devadatta, a sculptor from Varanasi. Kudumiyanmalai inscription from Tamil Nadu is one of the earliest inscriptions referring to music.

Long time ago, Indians created many cultural and trade contacts with south east Asian countries like Java, Sumatra, Cambodia and Borneo. Most of the inscriptions found in these place are very similar to Indian epigraphs in respect to their language. The scripts reflect the expansion of Indian culture in these countries.

Inscriptions are very useful in deciphering the economic life of the people of old. Agriculture was the main occupation during those times as depicted in the records. The Junagadh inscription of Saka Rudradaman states that the Sudarsana Lake was constructed during the rule of Chandragupta Maurya and its conduits were set up during the time of Asoka. Later on it was repaired, first during the reign of Rudradaman and subsequently in the Gupta period, during the reign of Chandragupta II as known from their edicts.

For understanding the history and culture of the Indian people from the time of Asoka (3rd Century BC) to the late medieval period, we are entirely dependent upon the study of the inscriptions. The study of a large number of connected inscriptions enabled the historians to reconstruct the important facts and events of a particular period or reign or region.

1.3   KINDS OF INSCRIPTIONS

1.3.1   ADMINISTRATIVE

The first set of inscriptions belonging to this type is found among the Edicts of Asoka. They were written with an intention to broadcast the orders issued by the king among the citizen.

1.3.2   EULOGISTIC

Inscriptions dealing with the eulogy (Prasasti) form the most important type from the political point of view. Broadly, they are distinguished into eulogy and mixed with other types.

1.3.3 DONATIVE

The largest number of inscription belongs to this type. This had been a very popular practice in ancient and medieval times to record any grant or donations made by the king or any authority or a person by engraving an inscription in which the details of the grant are also made. Some of the donations recorded are the donations of caves, stupas, images, lands, villages, worshipping articles to the deity at a temple and monetary donations.

1.3.4 COMMERCIAL

The periods of Indian history subsequent to the Indus valley civilization have not yielded so far specimens of commercial seals or any extensive records of commercial nature. The Nigamas and Srenis has the power of making their coins and seals and use of writing for their transactional purposes. Though these transactional records made on perishable materials could not survive for a long time.

1.3.5 MAGICAL

The Indus Valley furnishes the earliest specimens of these types. Many seals were containing magical formula. The inscriptions very likely contain the names of invocations to the deities' represented by the animals peculiar to their sects on the seals. Magical formula continued to be written on metals as well as on brick-bark and other perishable materials.

1.3.6 RELIGIOUS OR DIDACTIC

The type includes all those inscriptions, which deal with the statements, the positions and the preaching of religion or morality.

1.3.7 VOTIVE OR DEDICATIVE

The first deciphered example of this type is found in the short Piprahva Buddhist vase inscription which records the donations of the relic casket of Lord Buddha.

1.3.8 COMMEMORATIVE

The inscriptions of this type record the events such as birth, any spectacular achievements of martyrdom from a saint's or a hero's life and also the death of a king or a hero or a warrior.

1.3.9 LITERARY

There are a few inscriptions having literary in nature. Some inscriptions of ancient India record pieces of poetic compositions and dramatic works and their purpose is purely literary.

1.4   EXAMPLES

(Fig1)

(Fig 2)

(Fig 3)

(Fig 4)

1.5 CHALLENGES FACED BY EPIGRAPHISTS

One of the main challenges that epigraphists face is that the inscriptions are sometimes very faint, so it is very hard to understand what was inscribed. Most of the times, inscriptions that are found will be in damaged condition, especially the older ones, and some may even have missing characters. There are also linguistic problems regarding the semantics of words and differences in grammar on different stages of development of languages during which those texts were created.

Most of the time the inscriptions discovered are in parts, so some times understanding it becomes difficult because the lack of context. They are also required to judge whether the facts presented in the inscriptions are true or exaggerations of an event.

1.6 ANNUAL REPORT ON INDIAN EPIGRAPHY

The Annual Report on Indian Epigraphy (ARIE) is the name given— retrospectively for the earlier volumes—to a series of annual reports started in 1887 by the Public Department, Government of Madras, initially recording the progress report of the Government Epigraphist.
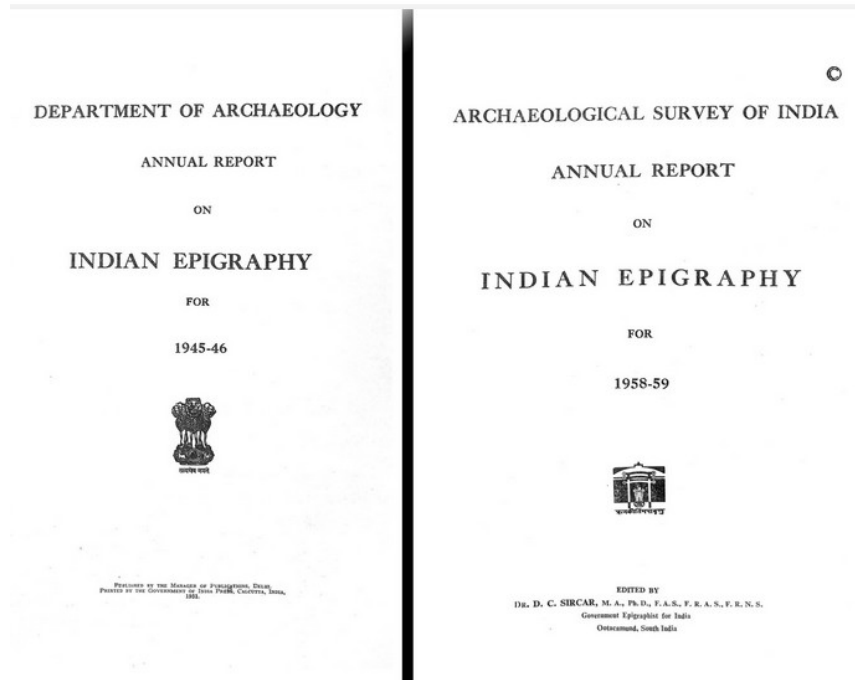
(Fig 5)

1.7 PROJECT STATEMENT

My aim is to create an application that can use deep learning to connect all the details found by the archaeologists and as such find relations between the various findings. My major focus will be to create one for my native language (Malayalam).

1.8 OBJECTIVES

- To study various other applications for other languages, which can convert the given inscription text to understandable format.

- To study databases related to epigraphy and their structure.

- To extract Malayalam text from given inscription.

- To connect to database and get related information, like similar kinds of inscriptions, inscriptions from same place, etc from the search term which will be the inscription text extracted in the earlier objective using Deep Learning concepts.

1.9 SCOPE OF THE PROJECT

Archaeologists and Epigraphists have to do a lot of manual labour to find and connect all the similar kinds of inscriptions they find. The main issue is that most of them are found in partially damaged conditions or are parts of a whole. Now these parts of a whole may be found in different places in different time periods. This makes it a necessity for them to manually go through all the records available. This process can take a very long time, like up to 2 – 3 years. This impedes their work and makes progress slower.

If I am able to realize the project, it will be a great leap for the epigraphists who study Malayalam inscriptions as well as make their work a lot easier because they can find all the information on the collective database that has been built.

Chapter 2

Pythia

2.1 INTRODUCTION

Pythia is an ancient text restoration model that recovers missing characters from a damaged text input using deep neural networks. It was created by Yannis Assael, Thea Sommerschield, and Jonathan Prag, researchers from Google DeepMind and the University of Oxford.

Ancient history relies on subjects such as Epigraphy, to study the history of ancient civilizations and the society of that time. Many of the inscriptions have survived to our day, but are often severely damaged over the time. Illegible parts of the text must then be restored by specialists, called epigraphists, in order to extract meaningful information from the text and use it to expand our knowledge of the context in which the text was written. Pythia takes as input the damaged text, and is trained to return hypothesised restorations of ancient Greek inscriptions, working as an assistive aid for ancient historians. Its neural network architecture works at both the character- and word-level, thereby effectively handling long-term context information, and dealing efficiently with incomplete word representations(Fig 5). Pythia is applicable to any discipline dealing with ancient texts and can work in any language (ancient or modern).
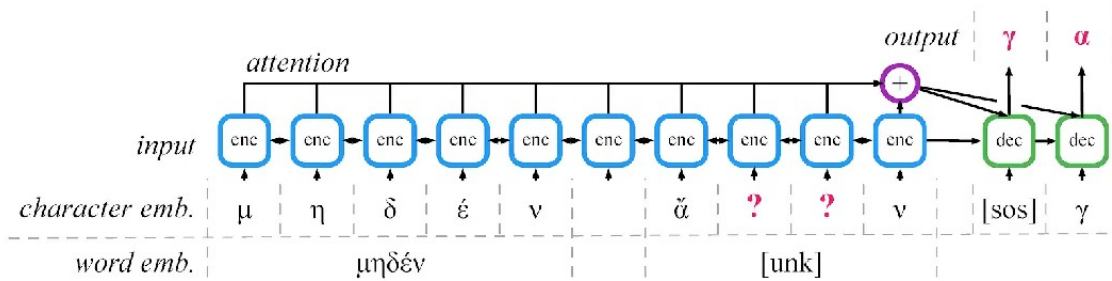
(Fig 6)

2.2   EXPERIMENTAL EVALUATION

To train Pythia, they wrote a non-trivial pipeline to convert the largest digital corpus of ancient Greek inscriptions (PHI Greek Inscriptions) to machine actionable text.

| Method	CER	Top-20
Ancient Historian	57.3%	−
LM Epigraphy	52.7%	47.0%
PYTHIA-UNI	42.2%	60.6%
PYTHIA-BI	32.5%	71.1%
PYTHIA-BI-WORD	**30.1%**	**73.5%**

(Table 1)

2.3   OBSERVATIONS

This application is the first of its kind, which can actually restore the missing characters found in the inscriptions. They have done this for the ancient Greek language. They have used the concept of Deep Neural Networks.

2.3.1   DEEP NEURAL NETWORKS

A deep neural network (DNN) is an artificial neural network (ANN) with multiple layers between the input and output layers. This is a type of neural network but like all the others it contain the same parts: neurons, synapses, weights, biases, and functions. These parts function similar to the human brain and can be trained like any ML algorithm.
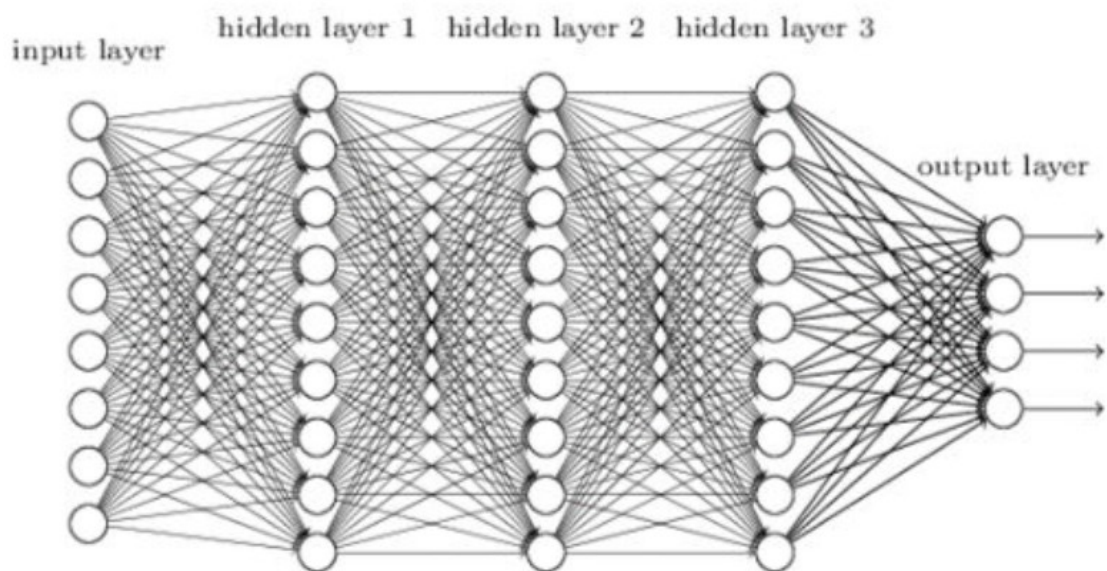
(Fig 7)

Chapter 3

# Epigraphic Database Heidelberg

3.1   INTRODUCTION

The task of the Epigraphic Database Heidelberg (EDH) is the systematic entry of ancient Latin and bilingual (usually Latin and Greek) inscriptions into a complex database. As a result of its outstanding approach, conception and method of work, EDH is counted as one of the leading international database projects that collects and provides reliable historical analysis of epigraphic monuments.

Here you can find a lot of information regarding the epigraphs like where it was found, which country it is from, who was the one who found it, what type of inscription it is, what was written on it.

The Epigraphic Database Heidelberg (EDH) is a resource that is searchable and provides texts, bibliographic verses, descriptive data and images for Latin and Greek inscriptions of the Roman Empire. EDH forms an essential component of the Electronics Archive of Greek and Latin Epigraphy, functioning as the primary repository for inscriptions from the Roman Empire. It is directed by Christian Witschel, who took over in 2007 from the project's founder, Géza Alföldy. Witschel is assisted by a research team at Heidelberg, and a growing number of external collaborators worldwide. It was first developed in 1986, and put its first data online in 1997.

As of 2019, EDH contained texts for over 80,000 inscriptions from 30,000 spots, together with full records for over 16,000 bibliographic items and over 38,000 images.

We can see from Fig 7, that the EDH database is constantly getting updated. There are also places were the EDH data has been completely updated.
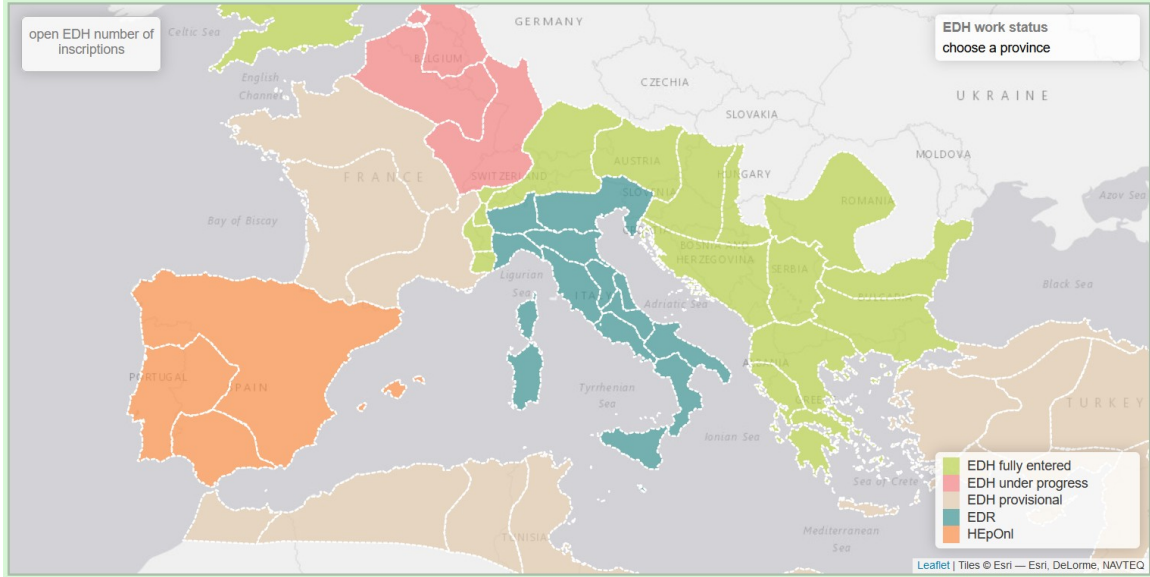
(Fig 8)

3.2   OBSERVATIONS

We can use this database as a reference for creating a database for my native language Malayalam. The database that will be created will only be a trial database, since collecting all the information will take a long time.

Work Plan

4.1 WORK PLAN

- I first plan on studying both Pythia and the Epigraphic Database Heidelberg

- Then I plan on manipulating the EDH database through Jupyter Notebook and gain maximum understanding of how the database works

- Then I plan to create database similar to the EDH, for my native language Malayalam.

- Then I plan to create a user interface, where epigraphists can either upload their findings to the newly created database or search the already existing items in the database.

- Then I plan on employing the deep learning concept, deep neural networks to make my UI be able to function similar to Pythia, i.e. be able to guess what the missing part of a given inscription might be.

Chapter 5

Conclusion and Future Work

5.1   CONCLUSION

I have a basic idea of how to implement a deep neural network. It works in a similar way as to check all possibilities and pick the most probable outcome. This is like a filter and is done for as many times as there are hidden layers. This will allow us to get the answer more accurately.

Now only after making a basic database and implementing the UI can I fully utilize these concepts. So I worked with the EDH Database. It was not given in a .csv format. It usually gives the output in a json file. So for that we have to extract the various information and append it and make it one big dataset. For that I have used Jupyter Lab, and I had some success.
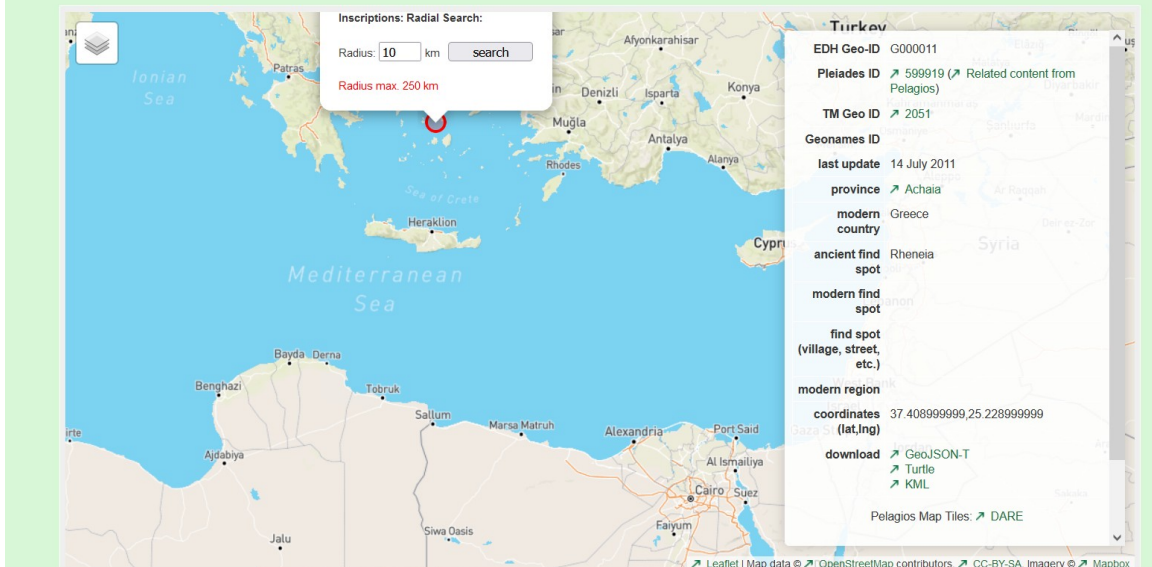
The main problem was that the dataset I worked on was stored in a shared folder in the science dk cloud. I only go a trial version of it so I was unable to proceed with extracting the database. I then opted to store the worked upon data to the IBM Cloud instance. There we have a service called db2 which is used for storing information in the form of a database.

In Fig 9, we can see that a search based on geographic location has been used. Now for geographic location search from the EDH database, we get output as such. We have used the url (https://edh-www.adw.uni-heidelberg.de/edh/geographie/11) to get the geography location search.

As shown in Fig 10, when we extract all the features of geography we get a JSON file. From the raw data we have to extract all the features and then append to a new database. The url used is:
(https://edh-www.adw.uni-heidelberg.de/download/edhGeographicData.json)

(Fig 9)

(Fig 10)

5.1.1 ACCESSING EDH THROUGH API

The basis form of a request is as follows:
(https://edh-www.adw.uni-heidelberg.de/data/api/inscriptions/search?)

With this, to create query based on inscription number, you have to specify the paramenter hd_nr, like here:

(https://edh-www.adw.uni-heidelberg.de/data/api/inscriptions/search?hd_nr=1)

Here we use the function requests.get() to make our requests from python.

```python
%%time
inscription_number = 100
URL_form = "https://edh-www.adw.uni-heidelberg.de/data/api/inscriptions/search?"

response = requests.get(URL_form + "hd_nr=" + str(inscription_number))
response
json_data = response.json()
print(json_data)
```

```
{'total': 1, 'items': [{'province_label': 'Hispania citerior', 'modern_region': 'Soria', 'findspot_ancient': 'Uxama', 'transcription': 'D[---] / AN
ELI[---] / BERVE[---] / P[---]IT[------]', 'commentary': ' Text in vier Zeilen, nahezu unlesbar.', 'id': 'HD000100', 'literature': 'AE 1983, 0597.;
C. García Merino, in: Homenaje al Prof. Martin Almagro Basch 3 (Madrid 1983) 355, Nr. 2; lám. 1, 2. - AE 1983.', 'uri': 'https://edh-www.adw.uni-he
idelberg.de/edh/inschrift/HD000100', 'language': 'Latin', 'findspot_modern': 'El Burgo de Osma', 'work_status': 'provisional', 'edh_geography_uri':
'https://edh-www.adw.uni-heidelberg.de/edh/geographie/9371', 'last_update': '2015-05-21', 'diplomatic_text': 'D[ ] / ANELI[ ] / BERVE[ ] / P[ ]IT
[', 'trismegistos_uri': 'https://www.trismegistos.org/text/226731', 'country': 'Spain', 'responsible_individual': 'Gräf', 'type_of_monument': 'stel
e'}], 'limit': '20'}
CPU times: user 15.5 ms, sys: 95 µs, total: 15.6 ms
Wall time: 854 ms
```

(Fig 11)

From Fig 11 we can see that we get the records from the EDH database where the inscription number is 100.

After appending the geographies the first five records from the database looked like in fig 12. In Fig 13, the Fig 12 table has been magnified..

	responsible_individual	type_of_inscription	letter_size	not_after	literature	work_status	height	diplomatic_text	people	depth	...	not_before	findspot	year_of_find	present_location	external_image_uris	religion	fotos	geography	social_economic_legal_history	military
0	Feraudi	epitaph	3.2-2 cm	0130	AE 1983, 0192.; M. Annecchino, Puteoli 4/5, 19...	provisional	33 cm	D M / NONIAE P F OPTATAE / ET C IVLIO ARTEMONI...	[['name': 'Noniae P.f. Optatae', 'cognomen': '...	2.7 cm	...	0071	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1	Feraudi	epitaph	4 cm	0200	AE 1983, 0080. (A); A. Ferrua, RAL 36, 1981, 1...	no image	28 cm	C SEXTIVS PARIS / QVI VIXIT / ANNIS LXX	[['nomen': 'Sextius', 'praenomen': 'C.', 'pers...	NaN	...	0051	Via Nomentana, S. Alessandro, Kirche	1937	NaN	NaN	NaN	NaN	NaN		NaN	NaN
2	Feraudi	honorific inscription	4.5-3 cm	0170	AE 1983, 0518. (B); J. González, ZPE 52, 1983,...	provisional	(37) cm	[ ]VMMIO [ ] / [ ]ISENNA[ ] / [ ] XV[ ] / [ ] / [	[['nomen': 'Mummius+', 'gender': 'male', 'prae...	(12) cm	...	0131	NaN	before 1975	Sevilla, Privatbesitz	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	Gräf	votive inscription	2.5 cm	0200	AE 1983, 0533. (B); A.U. Stylow, Gerión 1, 198...	checked with photo	(39) cm	[ ]AVS[ ]LLA / M PORCI NIGRI SER / DOMINAE VEN...	[['name': '[---?]AV[?]S[?][---]L(?)L(?)A M. Po...	18 cm	...	0151	Carcabuey, Grupo Escolar	before 1979	[http://cil-old.bbaw.de /test06/bilder /datenban...	names of pagan deities	NaN	NaN		NaN	NaN
4	Feraudi	epitaph	NaN	0200	AE 1983, 0078. (B); A. Ferrua, RAL 36, 1981, 1...	no image	NaN	[ ] L SVCCESSVS / [ ] L L IRENAEVS / [ ] C L T...	[['person_id': '1', 'name': '[---]L Successus...	NaN	...	0001	Via Cupa (ehem. Vigna Nardi)	NaN	NaN	NaN	NaN	NaN	NaN		NaN	NaN

5 rows × 36 columns

(Fig 12)

	responsible_individual	type_of_inscription	letter_size	not_after	literature	work_status	height	diplomatic_text	
0	Feraudi	epitaph	3.2-2 cm	0130	AE 1983, 0192.; M. Annecchino, Puteoli 4/5, 19...	provisional	33 cm	D M / NONIAE P F OPTATAE / ET C IVLIO ARTEMONI...	'No C 'cogno
1	Feraudi	epitaph	4 cm	0200	AE 1983, 0080. (A); A. Ferrua, RAL 36, 1981, 1...	no image	28 cm	C SEXTIVS PARIS / QVI VIXIT / ANNIS LXX	[{ 'prae 'C
2	Feraudi	honorific inscription	4.5-3 cm	0170	AE 1983, 0518. (B); J. González, ZPE 52, 1983,...	provisional	(37) cm	[ ]VMMIO [ ] / [ ]ISENNA[ ] / [ ] XV[ ] / [ ] / [	[{ 'Mur 'male
3	Gräf	votive inscription	2.5 cm	0200	AE 1983, 0533. (B); A.U. Stylow, Gerión 1, 198...	checked with photo	(39) cm	[ ]AVS[ ]LLA / M PORCI NIGRI SER / DOMINAE VEN...	'[---?]A [---]L
4	Feraudi	epitaph	NaN	0200	AE 1983, 0078. (B); A. Ferrua, RAL 36, 1981, 1...	no image	NaN	[ ] L SVCCESSVS / [ ] L L IRENAEVS / [ ] C L T...	[{'pe '1' Suc

5 rows × 36 columns

(Fig 13)

20

	responsible_individual	type_of_inscription	letter_size	not_after	literature	work_status	height	diplomatic_text
0	Feraudi	epitaph	3.2-2 cm	0130	AE 1983, 0192.; M. Annecchino, Puteoli 4/5, 19...	provisional	33 cm	D M / NONIAE P F OPTATAE / ET C IVLIO ARTEMONI...
1	Feraudi	epitaph	4 cm	0200	AE 1983, 0080. (A); A. Ferrua, RAL 36, 1981, 1...	no image	28 cm	C SEXTIVS PARIS / QVI VIXIT / ANNIS LXX
2	Feraudi	honorific inscription	4.5-3 cm	0170	AE 1983, 0518. (B); J. González, ZPE 52, 1983,...	provisional	(37) cm	[ ]VMMIO [ ] / [ ]ISENNA [ ] / [ ] XV[ ] / [ ] / [
3	Gräf	votive inscription	2.5 cm	0200	AE 1983, 0533. (B); A.U. Stylow, Gerión 1, 198...	checked with photo	(39) cm	[ ]AVS[ ]LLA / M PORCI NIGRI SER / DOMINAE VEN...
4	Feraudi	epitaph	{}	0200	AE 1983, 0078. (B); A. Ferrua, RAL 36, 1981, 1...	no image	{}	[ ] L SVCCESSVS / [ ] L L IRENAEVS / [ ] C L T...

5 rows × 71 columns

(Fig 14)

After all the inscriptions and geography data are merged and cleaned we get the dataset shown in Fig 14. This was very tough to obtain because it gave errors so many times that almost all the time for the project was taken into debugging this. Also this was slightly difficult for me because I am new to this concept.

The inscription in Malayalam, that could we considered the oldest, came from a cave in Edakal. It is dated at the 4th century C.E.

5.2   FUTURE WORK

Now what I have to do is to create a database similar to the EDH database for Malayalam inscriptions. Of course it won't be as big as the EDH database, but after designing and implementing the UI, which will be a Web API, I think the database can grow on its own if more people get to know about it. This will definitely make working easier for all the archaeologists and epigraphists.

The UI work is also pending. If given time I will be able to complete both the database and the UI and also figure out a way to spread the usage of this application.

21

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