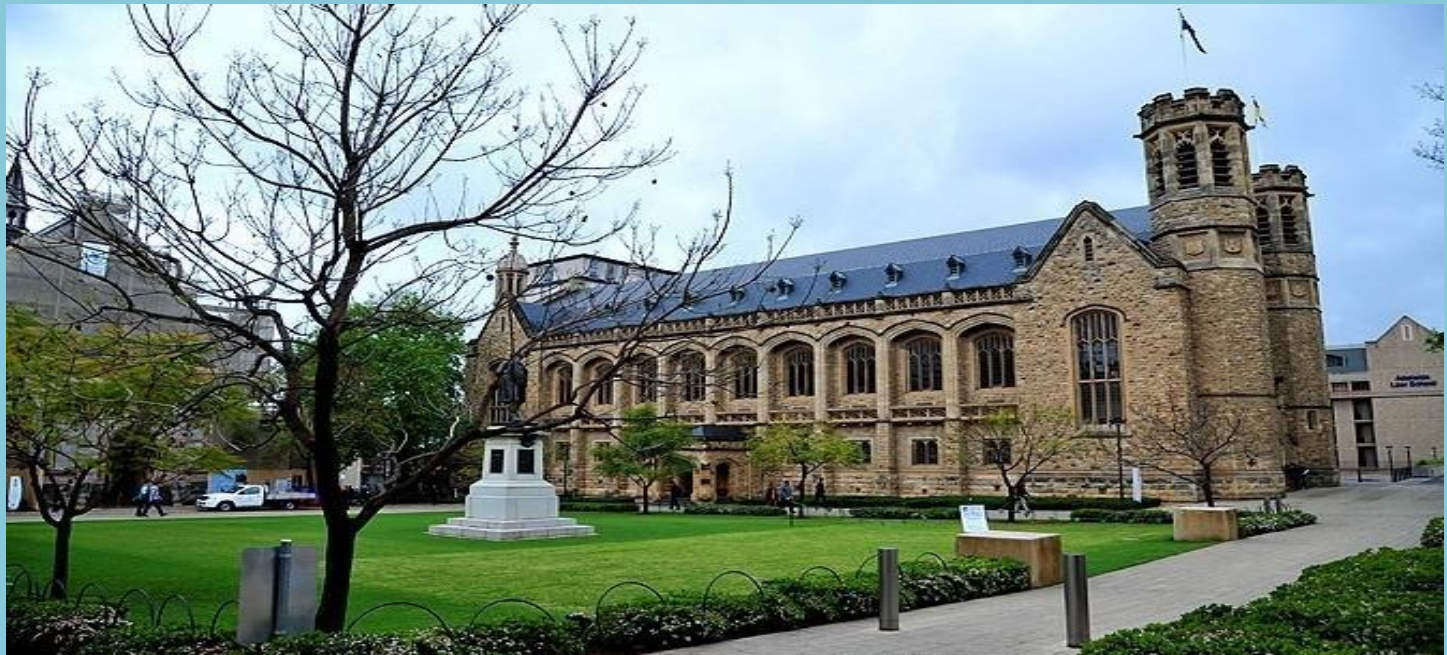




THE UNIVERSITY
of ADELAIDE



2016 Masters project 141

Cracking the Voynich manuscript code

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Outline

- ✓ The Voynich manuscript (background and history)
- ✓ Literature review
- ✓ The project 141
- ✓ Phase 1: Text investigation
- ✓ Phase 2: Illustrations research
- ✓ Phase 3: Marginal symbols investigation
- ✓ Conclusions
- ✓ Applications

The Voynich manuscript (background and history)



Wilfrid Voynich (1865-1930)

- Born in Telsze in Polish.
- In 1912, the Voynich manuscript was found.
- In 1914, he brought the manuscript to New York.

https://en.wikipedia.org/wiki/Voynich_manuscript#/media/File:Micha%C5%82_Wojnicz_c._1885.png

The Voynich manuscript



- ✓ About 240 pages remaining.
- ✓ folios, numbered from f1 to f116.
- ✓ Each folio have two pages, r and v.

[https://en.wikipedia.org/wiki/Voynich_manuscript#/media/File:Voynich_Manuscript_\(170\).jpg](https://en.wikipedia.org/wiki/Voynich_manuscript#/media/File:Voynich_Manuscript_(170).jpg)

Six sections

Herbal section



http://www.voynich.nu/q02/f016v_crd.jpg

Astronomical section



http://www.voynich.nu/q09/f067r1_crd.jpg

Cosmological section



http://www.voynich.nu/q10/f069v_crd.jpg

Biological section



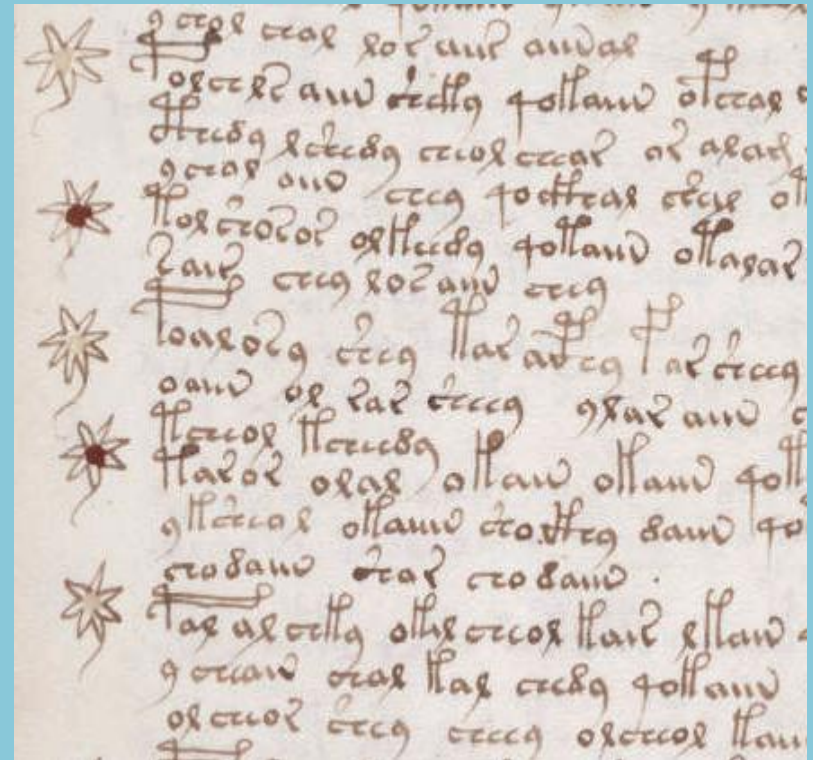
http://old.world-mysteries.com/sar_13.htm

Pharmaceutical section



http://www.voynich.nu/q15/f089r2_crd.jpg

Recipes section (marginal stars)



<https://cogitz.wordpress.com/2009/09/14/the-mysterious-voynich-manuscript/>

Literature review

Researcher	Conclusion
John Tiltman Friedman ^[1]	Artificial language.
Feely ^[2]	1943, Latin.
The first study group (FSG) ^[3]	1946, transcription alphabet.
Takahashi ^[4]	Transcription

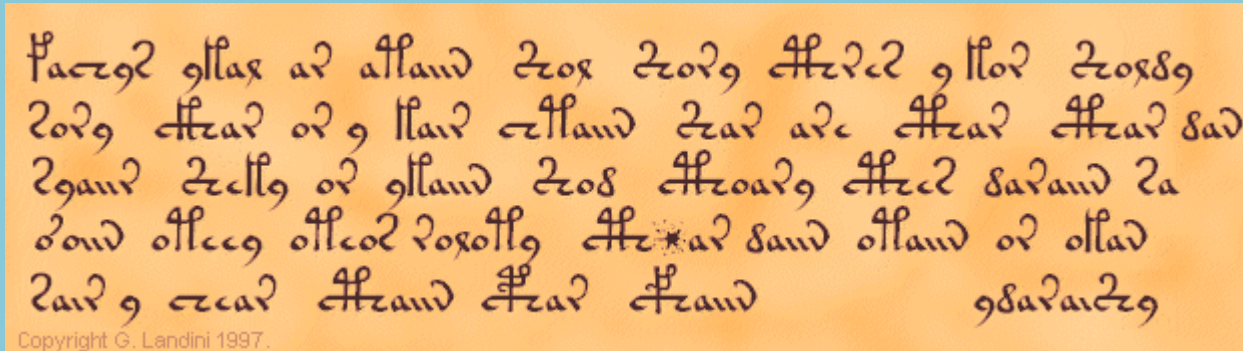
The Project 141

- ✓ **Perspective:** possible written numbers.
- ✓ **3 phases:** text investigation, illustrations research, marginal symbols research.

* Because of the massive number of words and illustrations in the Voynich manuscript, the aim of this project is not solve the whole Voynich manuscript.

Phase 1: Text investigation

The Voynich manuscript



<http://www.voynich.nu/analysis.html>

Takahashi Version

fachys ykal ar atain Shol Shory cThres y kor Sholdy
sory cThar or y kair chtain Shar are cThar cThar dan
syair Sheky or ykain Shod cThoary cThes darain sa
o'oiin oteey oteor roloty cTh*ar daiin otain or okan
sair y chear cThain cPhar cFhain ydaraiShy

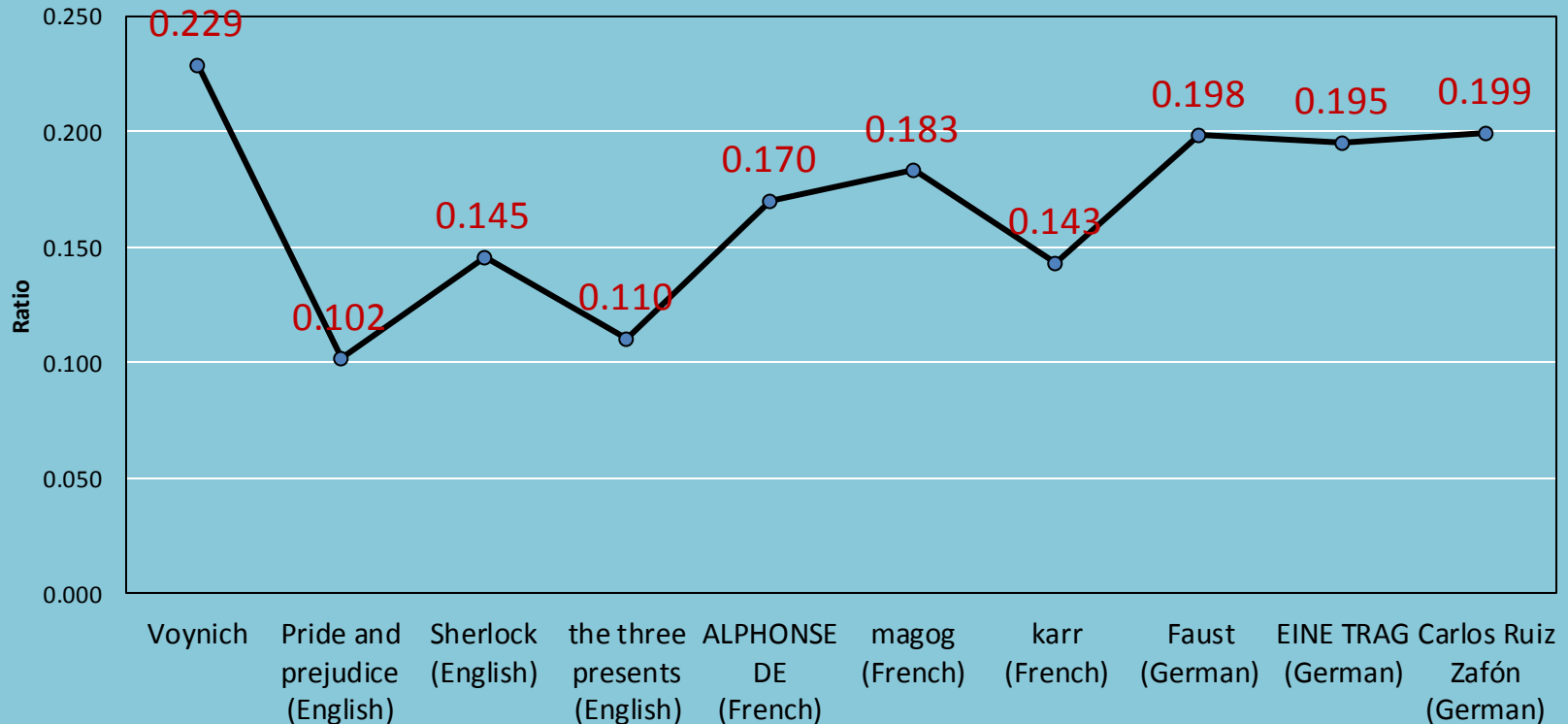
Text investigation:

Use the **MATLAB** to deal with the features of the text.

- ✓ The number of **words**.
- ✓ The people's **writing habits**: the length of words, the occurrence frequencies of unique words.
- ✓ **Compare** the Voynich manuscript with other known languages.

Text investigation: analysis

Unique words/total words



Difference

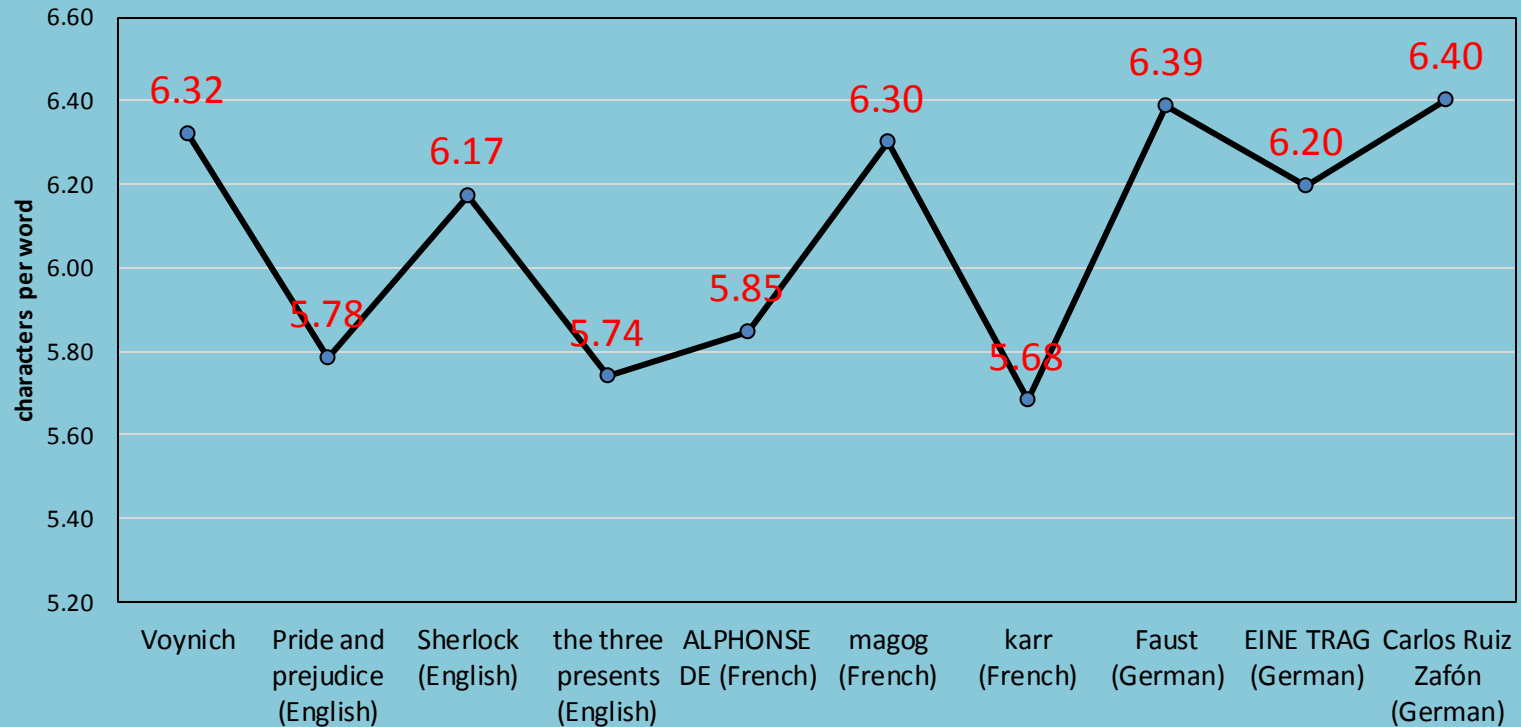
Voynich VS English: **47.9%**

Voynich VS French: **27.7%**

Voynich VS German: **13.6%**

Text investigation

word length

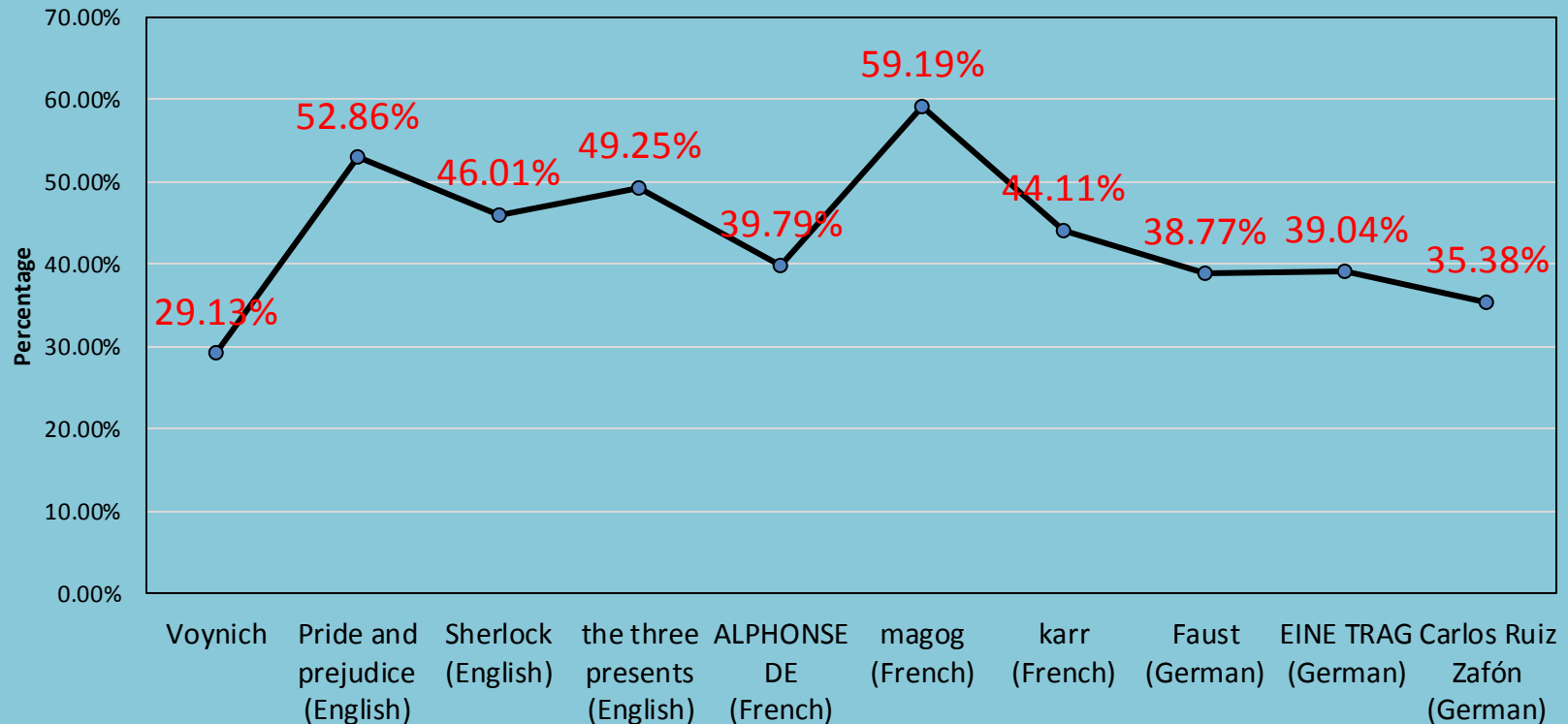


Difference

Voynich VS English: **6.7%** Voynich VS French: **6.0%** Voynich VS German: **0.1%**

Text investigation

words appear > 1/total unique words



Difference

Voynich VS English: **41.0%** Voynich VS French: **38.9%** Voynich VS German: **22.8%**

Text investigation: conclusion

The most possible language which the author of the Voynich manuscript used is German.

Phase 2: Illustrations research

- ✓ Numbers in pictures
- ✓ Potential digits



http://old.world-mysteries.com/sar_13.htm

Illustrations investigation: Analysis

letter	number	frequency
o	1	24
	2	20
	3	16
	4	14
	5	12
ol	10	14
	13	12
	12	11
	11	9
or	10	19
	12	13
	13	12

os	19	11
	12	4
	13	4
r	1	48
	2	26
	3	21
	5	19
	4	14
	2	54
s	1	46
	3	41
	5	32
	2	36
y	1	30
	3	29
	5	20
	2	36

Illustrations investigation: Conclusion

The most possible relationship

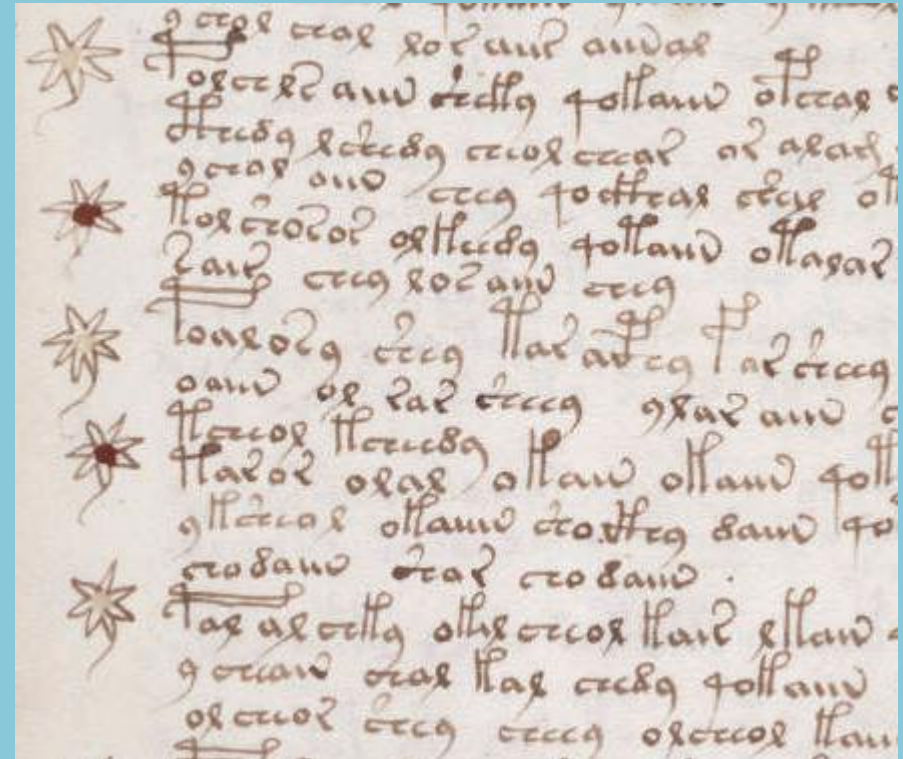
- **'o' and '1'**
- **'ol' and '13'**
- **'or' and '13'**
- **'r' and '1'**
- **'y' and '2'**
- **'s' and '2'**
- **'os' and '19'**

Possible relationship

- **'r' and '2'**
- **'ol' and '10'**
- **'ol' and '12'**
- **'or' and '10'**
- **'or' and '12'**
- **'s' and '1'**
- **'s' and '3'**
- **'y' and '1'**
- **'y' and '3'**

Phase 3: Marginal symbols investigation

- ✓ Count the number of symbols for each page.
- ✓ Search potential digits from the text.



<https://cogitz.wordpress.com/2009/09/14/the-mysterious-voynich-manuscript/>

Marginal symbols investigation: Analysis

letter	Pages	Digit	Occurrence pages	frequency								
y	18	5	3	16.67%	s	10	6	4	40%			
		6	7	38.89%			7	3	30%			
		7	10	55.56%	o	8	6	4	50%			
		8	5	27.78%			8	2	25%			
l	13	7	7	53.85%	9	2	25%	ar	22	10	4	18.18%
		8	4	30.77%	10	3	13.64%					
		9	2	15.38%	13	6	27.27%					
or	17	10	3	17.65%	15	3	13.64%			al	21	10
		13	5	29.41%	13	6	28.57%					
ol	21	12	3	14.29%	14	2	9.52%	15	4			19.05%
		13	5	23.81%								
		15	4	19.05%								

Marginal symbols investigation: Conclusion

The most possible relationship

- **'y' and '7'**
- **'or' and '13'**
- **'ol' and '13'**
- **'o' and '1'**
- **'a' and '1'**
- **'s' and '6'**
- **'l' and '7'**

Possible relationship

- **'ar' and '13'**
- **'ar' and '10'**
- **'al' and '15'**
- **'al' and '13'**
- **'al' and '10'**
- **'ol' and '15'**
- **'y' and '6'**
- **'y' and '8'**
- **'l' and '8'**
- **'o' and '6'**

Conclusions

Text investigation:

The language which is used in the Voynich manuscript may be a branch of German.

Illustrations and marginal symbols investigation:

The possible relationship	
Characters	Digits
s	2 and 6
y	2 and 7
a	1
r	1
os	19
l	7
The most possible relationship	
o	1
ol	13
or	13

Applications

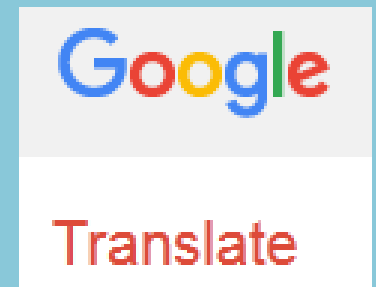
✓ Data analysis.



✓ Statistics.



✓ Information Theory.



References

- [1] Tiltman, John, “The Voynich Manuscript, The Most Mysterious Manuscript in the World”. NSA Technical Journal 12 (July 1967), pp.41-85.
- [2] Feely, Joseph M, *Roger Bacon's Cipher: The Right Key Found*, Rochester, 1943.
- [3] First Study Group (FSG)
<http://www.voynich.nu/transcr.html>
- [4] René Zandbergen, transcription of the text, 2004 – 2016.
<http://www.voynich.nu/transcr.html>