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HG2052 Assignment 1

Semaphore

Introduction

The term "semaphore" was derived from greek words "sêma" and "phorós" which meant sign and bearer respectively. The use of semaphore systems dated back to the early centuries, where different forms were used. For example , hydraulic telegraphs were used in ancient Greece. Smoke signals and torches were also used. However , it did not extend to large scale usage. (Optical telegraph, n.d.) In this essay we will take a look at optical telegraph and the modern derivative flag semaphore in order to understand semaphore systems in detail. This essay will look into the origins of semaphore , mainly the optical telegraph. By using the seven features of speech and text introduced by Crystal (2006), a comparison will be made. This is followed by the effect of semaphore on language, how it affects society in the past and present and the conclusion.

Origin of semaphore

The Chappe system , also known as Optical telegraph was invented in the early 1790s by Claude Chappe and his brothers. Chappe was an engineer. He experimented on different designs for a long distance signalling system before settling with using semaphore rigs and operators equipped with telescopes to decipher the visual signals given by the optical telegraph infront or behind. (Selin, n.d.) Semaphore rigs were a structure found on the top of the tower which has movable arms for the operator to relay messages. The optical telegraph involved a line of relay towers with a semaphore rig that was built around 5-20 miles (8–32 km) apart from each other, so that they remain within each other's line of sight. (ibid) A more detailed explanation on how the system worked will be elaborated in the next paragraph. A demonstration of the optical telegraph was conducted in March 1791 by sending a message between Brûlon and Parcé which was around 16km away. (Optical telegraph, n.d.). The message read "Si vous réussissez vous serez bientôt couvert de gloire" which translates to "If you succeed , you will soon bask in glory. (Chan, 2018)This method of communication was more efficient compared to pigeon post and horse riding messenger in conveying the message over a distance. It was also more cost effective in the long run. (Optical telegraph, n.d.) Optical telegram was thus widely used as an alternative to other methods of communication used. However, this system is no longer in use after relaying one of its final messages which was the news of the fall of Sebastopol in 1855. (Chan, 2018) Following this , the semaphore system was adopted in other countries as a mode of communication for national service and military purposes.

Figure 1 : Design of Optical telegraph

How Optical telegraph worked

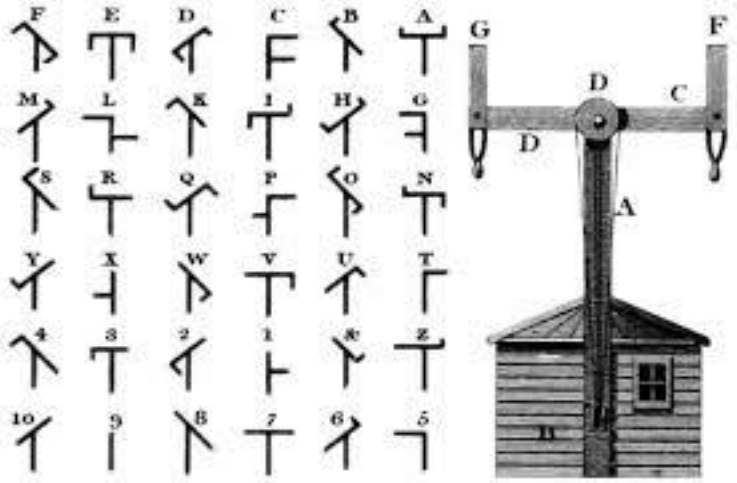

Figure 2 : Alphabet and Numbers in Optical telegraph

The line of relay towers consist of divisional stations (10th to 15th stations) , end stations and in between stations. The tower was equipped with two telescopes , one pointing in the direction of the nearest station up the line and the other towards the other direction down the line. The semaphore rig on top of the tower consists of two movable wooden arms (paddles) or blades which are connected by a long , movable cross-bar. The movable arms are called the indicator while the movable cross-bar is called a regulator. (Selin, n.d.) Iron weights were placed on the arms for counterweights. According to the figure , the regulator can be positioned vertically or horizontally. When the regulator is in an oblique or diagonal position , it is inactive and not transmitting a signal (Selin, n.d.)The indicator could be angled at seven different positions , each 45 degrees apart. This results in a total of 98 possible positions where six of them were reserved for control signals, excluding its resting position. The remaining positions were used to code alphabets , numbers and frequently used syllables.(ibid) Each station is operated by two operators. using pulleys and ropes while the operator in the next tower had to decipher the message and replicate it for the next tower to receive. Operators at the in-between stations had no knowledge of the code being conveyed and were only in charge of relaying the message to the next station. End stations and divisional stations were in charge of coding and decoding the message that was transmitted to their tower. Each tower operator had a role of verifying the signal being relayed so as to reduce transmission errors. The semaphore system was highly dependent on the weather condition. Certain weather conditions can render the transmission of the message to be cancelled or misinterpreted. In the event where the line of sight is blocked, the message can be diverted to another tower where the message will be re-transmitted from there. This system was much more efficient that other medium of communication in that time. An extensive network of the relay towers were built across France.

Comparison with speech and text

Speech		Text	
Time-bound	Yes	Space bound	No
Spontaneous	No	Contrived	Yes
Face to face	No	Visually decontextualized	No
Loosely structured	Varying degree	Elaborately structured	Varying degree
Socially interactive	No	Factually communicative	Yes
Immediately revisable	Varying degree	Repeatedly revisable	Varying degree
Prosodically rich	No	Graphically rich	Yes

Figure 3 : Comparison with speech and text with the seven features by Crystals (2006)

Using the seven features introduced by Crystals (2006) , the use of a semaphore system as a medium of communication resembles text. The semaphore system is time-bound due to the nature of the information which requires quick relay of it. The optical telegraph has varying degrees with respect to its structure being loose or elaborate. For example , in conveying messages through the optical telegraph , punctuations are not encoded as a visual signal but can be represented by a pause within the message. The structure is elaborate as it follows the conventional structure of the French language. Additionally , the revisability of the message can be immediate or repeated. It is immediate if the message is still at the divisional or end station where coding and decoding occurs. However, it is repeatedly revisable when the messages are being transmitted through the in-between stations and the verification of the messages occurs.

Effect on language

Encoding of information

Sensitive and confidential information such as military information needs to be encrypted and encoded. The optical telegraph allows for this due to the arbitrariness of visuals signs in relation to the alphabet or number that it is coding. Additionally, 196 characters can be produced by the optical telegraph and these characters can combine to form different phrases and sentences. This is estimated to 9,999 possible codes being generated. (History Behind Semaphore Flags, n.d.) A closed system was further ensured by the coding and decoding which only occurred at the divisional stations and end stations. This reduces the number of operators who had knowledge of the codes and ensured that the information would not be leaked out. The use of a coded message and abbreviations was prevalent in the past , pigeon post was one of the first mediums of communication to do so. Similar to pigeon post which requires the use of a code book to decipher its written content , the optical telegraph made use of coded messages to report on their enemies' movements and updates on the situations in other parts of their country.

Language structure

The semaphore system led to standardisation of communication within the military. Standardisation is a process whereby the society conforms to a particular usage of language or in this case the semaphore system. The semaphore system became the primary medium of communication for war and military in the past. Additionally , the use of the semaphore system became more universal where other countries started to re-standardise the semaphore system to fit the requirements of their language. The next country to use the optical telegraph was Sweden. In Figure 3 , the semaphore system closely resembled a text-like communication. However, Sweden expanded on the semaphore system which allowed it to be socially interactive. The first demonstration of Sweden's optical telegraph happened in November which was the king Gustav IV Adolf's 14th birthday. Edelcrantz dedicated a poem to him through the optical telegraph. (Optical telegraph, n.d.)The intention of its users determines the direction and nature of its usage. The demonstration steered the usage of the semaphore system away from its usual convention which was to send formal reports and observation.

Effect on society : present and past

Military Communication

The semaphore system is used in military communication both in the present and in the past. This is due to the nature of the system being able to encrypt and encode their message. Optical telegraph was used as a medium of communication in the past to transmit messages and reports of the situation in the country. Flag semaphore is a modern derivative of the semaphore system which is used in marine or Navy communication.

i. Flag semaphores

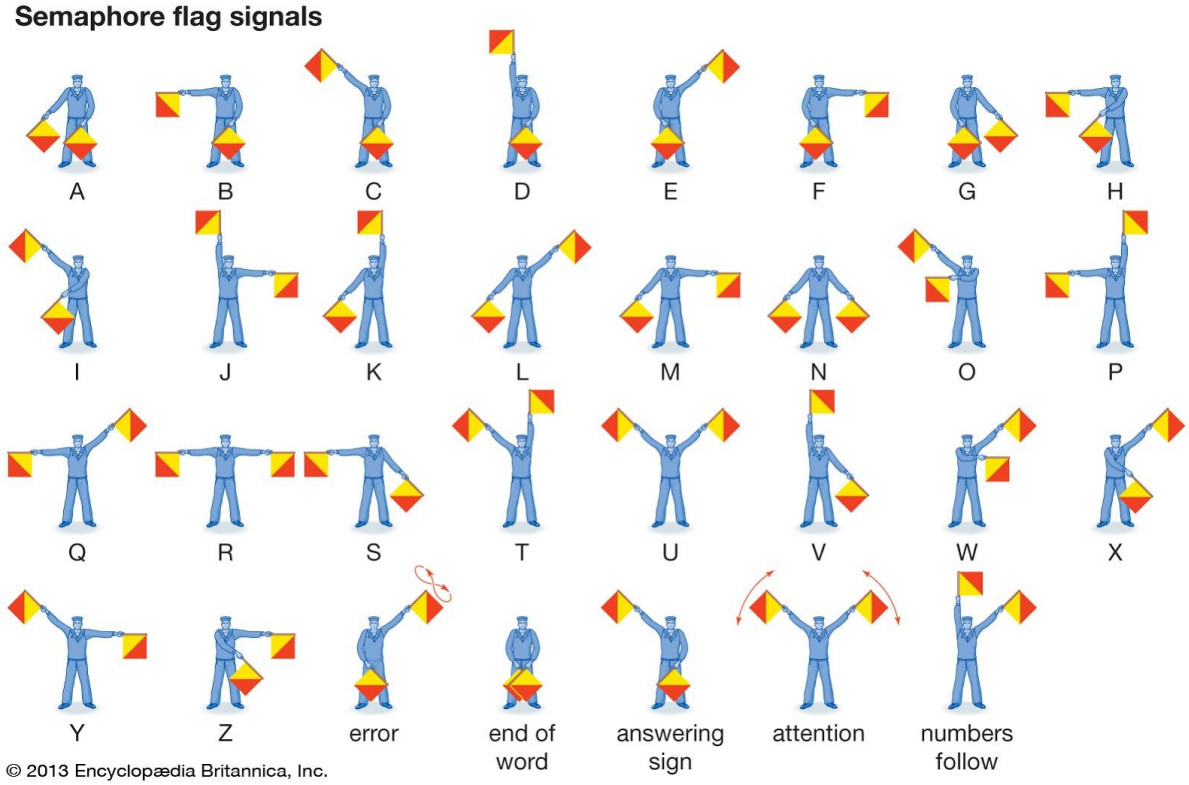

Figure 4 : Semaphore flag signals

The semaphore flag system is used to convey information to and from a distance through the use of flags as a visual signal. The flag semaphore was introduced in the 19th century which employed the use of dual coloured flags. There are two variations of the flag based on its

usage on land or at sea. The flag used for ship to ship communication is called the Oscar flag and is red and yellow. Whereas the flag used for shore-to-ship communication is called Papa flag and is blue and white. People in charge of the signals held a flag in each hand. The flag can be extended into 8 possible directions and it can only overlap if it is in resting position. The flags replace the movable arms in the optical telegraph and perform the same function of coding an alphabet , numbers or frequently used phrase. The figure 4 shows the different signals used. This system is still in use during underway replenishment at sea.

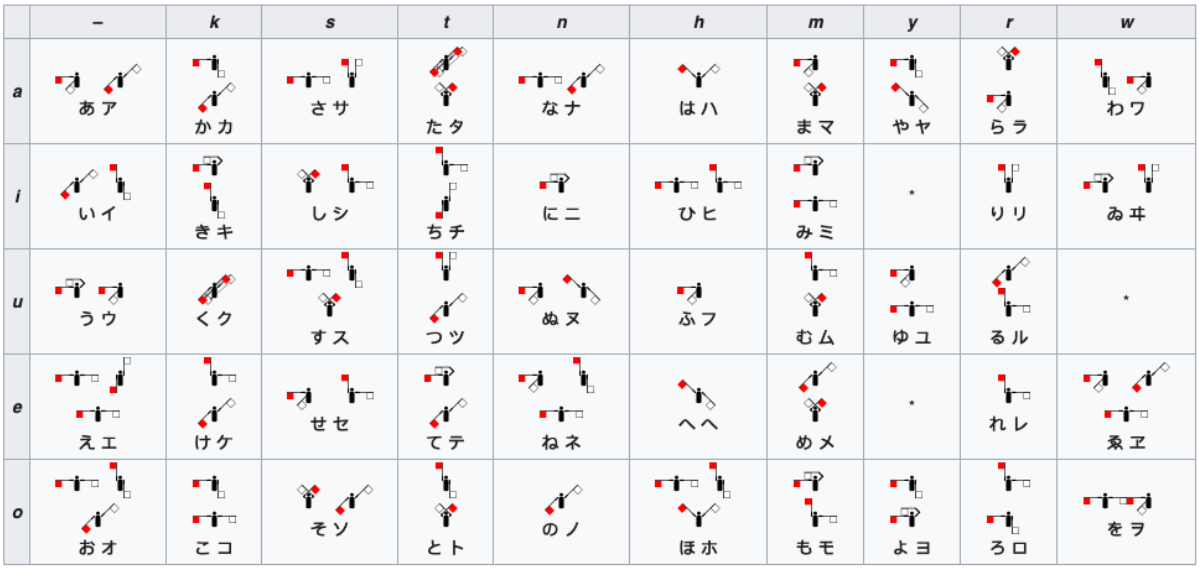

Figure 5 :Japanese Flag Signals with the associated kana

The semaphore flag system was also adopted by other countries such as Japan which re-standardised the colour and to accommodate more alphabets found in their language. The 26 alphabets in the original flag semaphore was not sufficient for conveying a message in Japanese. In figure 5 , the signals consist of one or more signs to convey kana in Japanese. Additionally , the flag was no longer dual coloured. One of the flags is red while the other is white. These examples show that the semaphore flag system played a huge role in information transmission at sea in the past.

ii. Signal flags

Signal flags are another medium of communication at sea which was influenced by the use of flag semaphores. Instead of alphabets and numbers to spell out a message, signal flags are mainly used to communicate a particular situation.

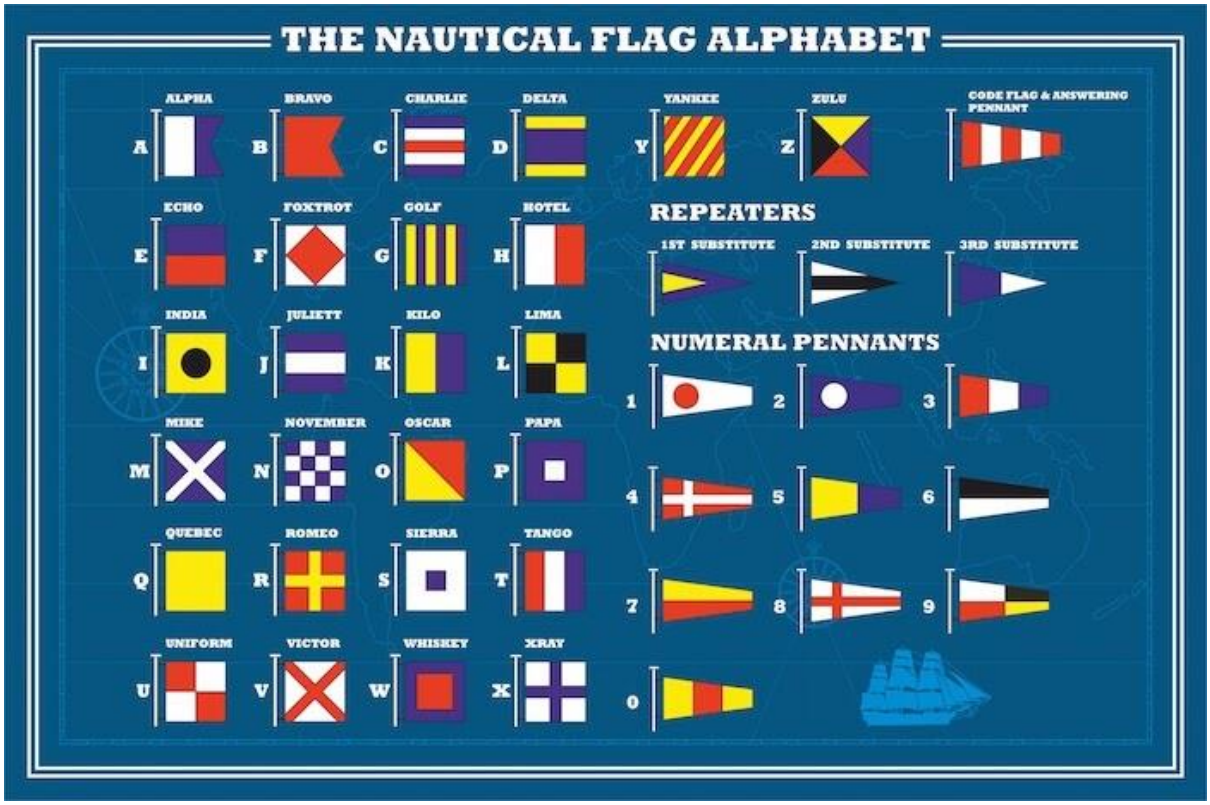

Figure 6 : The nautical flag alphabets

The signals flags are used to convey information at sea through visual signals. As shown in figure 6 , there are 26 square flags , 3 repeaters and 10 numeral pennants. The 26 square flag represents an alphabet which corresponds to International code words such as Alpha and Bravo. These alphabets represent a common situation that has occurred. For example , when the Alpha flag is flown , it means “I have a diver down; keep well clear at slow speed.” Additionally, each flag (except the R flag) takes other meanings in certain combinations. The use of signal flags are still prevalent in the 21st century.

Programming language

Semaphore extended to being used in programming language as a low-level synchronisation mechanism. There are two common types of semaphore which are counting semaphore and binary semaphore. Counting semaphores are semaphores which allows an arbitrary resource count. Binary semaphores are semaphores which are restricted to the values of 0 and 1. (Semaphore (Programming), n.d.)This semaphore concept was invented by Dutch computer scientist Edsger Dijkstra in the 1960s. (Semaphore (Programming), n.d.) The counting semaphore involves two operations , wait (P) and signal (V). These operations are involved in the execution of tasks. Semaphore in programming language is a variable used mainly for process synchronisation.

Conclusion

The semaphore system has evolved over the years. The semaphore system expands to different domains of usage such as for military communications and in programming language. The semaphore system has impact and influences language and the society in the past and present. Semaphore as a medium of communication paved the way for other inventions and some of its applications are still being used in society.

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