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HG2052: Assignment 1

Morse Code and its legacy

1. Introduction

The human need to communicate across space and time has driven language development for centuries, catalysing related technological development such as the Morse Code. This medium rose with the telegraph in 1838, improving connectivity in the 18th and 19th centuries. Overtime, alternate versions sprouted as it spread globally. Today, we have the Japanese Wabun Code, the SKATS Korean code, the International Morse Code that is applicable to languages using Latin, and more (Omniglot). Morse Code has inspired research into nature-mimicking communication, new technological inventions in the medical field and even language itself, bringing impacts ranging from the socio-cultural, economic, military and to medical rehabilitation.

2. Origins: The Morse Code and its story

Samuel Finley Breese Morse (1791 - 1872), was originally an American painter. To tell the story of his invention requires recognising crucial others. In 1825 his wife, Lucretia, passed on upon delivering their 3rd son and his parents left him in the following 4 years. Heartbroken, Morse travelled to Europe, meeting the inventor Charles Jackson upon return. They discussed the possibility of electronic impulses being transmitted across wire, inspiring Morse to build a functional prototype in 1836. 2 years later, he partnered with Alfred Vail to develop the system of ‘dits’ and ‘dahs’ - the American Morse Code. In 1842, they received funding from Maine Congressman Francis Ormand Jonathan Smith to test early electromagnetic designs, the demonstration of which won further funding for a 38-mile telegraph line between Washington, D.C. and Baltimore, Maryland. On May 24, 1844, Morse tapped the first telegram, “What hath God wrought!” (Biography.com., 2019).

The morse code comprised sequences of dots and dashes for each letter in the English alphabet and numbers 0 through 9. Sentences could hence be encoded in binary signals. Dits (dots) and dahs (dashes) were relayed by single taps and 3 taps on the receiver respectively. Spaces between letters were represented by pauses of a dot’s duration while inter-word spaces required 7-dot pauses. Morse originally encoded only numbers, but Vail added letters (Cryptomuseum.com).

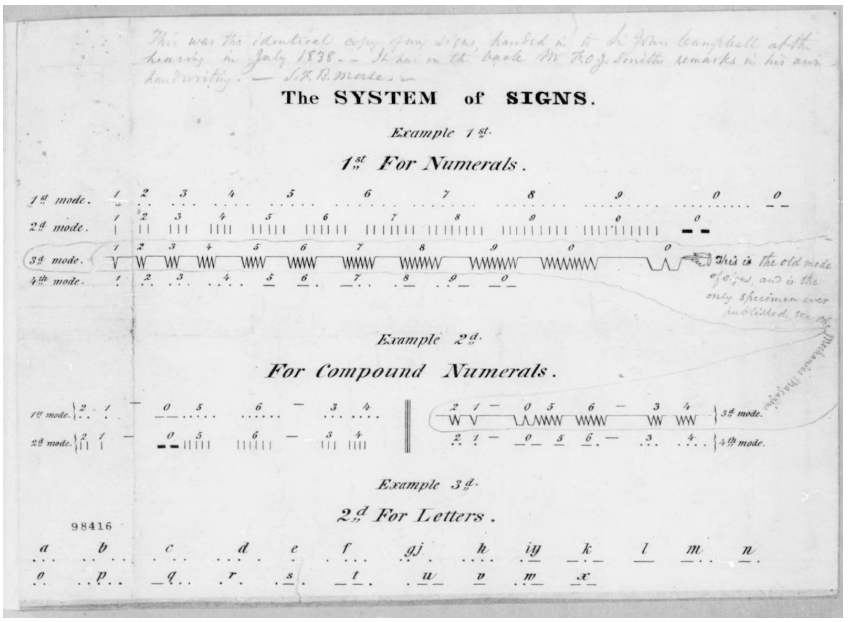

Fig. 1: Chart of the Morse Code by Samuel F.B. Morse, 1837. Source collection: Samuel Finley Breese Morse papers, 1793-1944. Library of Congress

The frequency of letter use shaped the morse code's design: more frequently-used letters had simpler patterns than less frequently-used ones. For example, 'e' was assigned a single dit while 'q' was assigned 3 dahs (9 dits). This ingenuity worked as operators gradually interpreted messages while listening to the receiver's clicking. Resultantly, the paper for imprinting was replaced by a receiver producing clearer 'beeps' representing 'dits' (History.com).

Without accumulated innovation, morse code and the telegraph would not have come to be. In 1800, Italian physicist Alessandro Volta (1745 - 1827) invented the battery, and in 1820, Danish physicist Hans Oersted (1777 - 1851) founded electromagnetism, demonstrating movement in needles along electric currents. Sir William Cooke (1806 -79) and Sir Charles Wheatstone (1802 - 75) developed the British Telegraph in the same century when Morse and Vail worked together, likely inspiring them (The Telegraph, 2016).

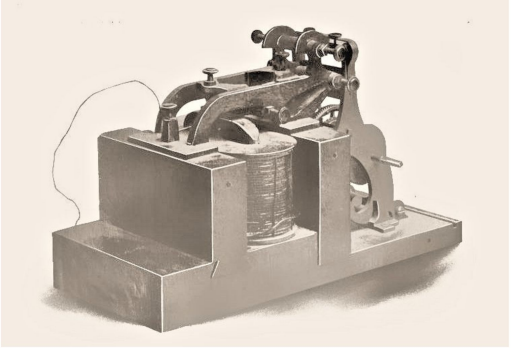

Fig. 2: Early photograph of the Morse-Vail receiver used in the 1844 demonstration of telegraph

3. Applications of Morse Code and its socio-cultural impacts:

3.1. Past

Together, the telegraph and morse revolutionised socio-economic culture. In 1851, the Western Union Telegraph Company laid out the first transcontinental telegraph line, and by 1940, a total of 40 telegraph lines traversed the Atlantic and Europe. The almost instantaneous transmission and reception of messages allowed quicker correspondence, increasing the awareness people had of events and the speed at which they acquired it. Journalism thus grew as an industry, and profits were raised. Even money could be 'wired' across telegraph lines, boosting consumerism rates both locally and transnationally (New Atlas, 2013). Sadly, jobs were lost when the Pony Express closed 2 days after the telegraph reached the West Coast (Skrabec, 2012, pg. 58). The issue of job market change with technological waves was inevitable and recurred with new modes of communication such as the telephone. Yet, the telegraph and morse code had a colossal impact while they lasted, catalysing the birth of wireless technology.

Signals were easily lost underwater when physical cables became damaged. Such limitations fueled improvements, and in 1901 Guglielmo Marconi invented the first radio-telegraph equipment (King, 2019). Military communications became faster both at land and sea. By 1910, the U.S. law regularised wireless sets in all passenger ships for emergency communications. However, subsidence was inevitable in 1876 when Graham Alexander Bell invented the telephone. In 1912, the Telephone Company flourished and telephone lines were eventually nationalised in the U.S. Wired telegraph systems and morse gradually faded in use, as the decades saw wired systems shutting down in many countries. In 2013, the last wired telegram was sent from Ashwani Mishra, reporting for DD News TV channel in India, to Rahul Ghandi, then Vice President of the Indian National Congress, to congratulate him on his election (New Atlas, 2013). However, the traditional telegram still holds nostalgic value to parts of the world, living on with radio enthusiasts. Morse Code is also still used in maritime and oil industries, albeit more so in its wireless version (The Telegraph, 2016).

3.2. Linguistic impact throughout history

As language principles in speech were applied to the structure of morse, short informational complexes were increasingly developed. The infamous signal, 'S.O.S', was conceived in 1905 by the German government for radio regulations (Collister, 2015), capitalizing the easy patterns of 'S' and

‘O’ for urgent emergencies. This bleeding over of language principles into morse let it influence language in turn as many of its special signals leaked into mainstream media. Diachronically, ‘S.O.S’ has evolved to mean ‘Save our souls’, ‘Save our ship’, ‘Save on socks’, and even the title of a song released by ABBA in 1975 (Specktor, 2020). Thus, morse not only diversified existing communication mediums, it contributed to language growth - both online and offline as we shall see below. A simple telegraphic signal led to an ambigram-palindrome with homonymous meanings quite deviant from its origins.

With the spread of wireless telegraphy, morse evolved further as its social uses increased. The American Radio Relay League (ARRL) was founded in 1914 (Maxwell, 2000) and amateur radio hobbyists formed the ‘first social network’. Users brought new lingo to the table such as ‘HI HI’ that mimicked chuckling - the morse predecessor to ‘LOL’ for ‘Laugh a lot’ now widely used in text or speech (Collister, 2015). Evidently, the culture of expressional short-cuts first bled into morse from language before ‘re-bleeding’ into linguistic culture.

Original word	Morse Code abbreviation
American Radio Relay League	ARRL
About	ABT
Broadcast Interference	BCI
Before	B4
Yes, correct	C
Please	‘PSE’

Table 1: Examples of morse abbreviations that emerged throughout history

Above are some examples of morse abbreviations that are clippings, acronyms, and devowelled forms of common words (LittleCamels.com). Some, such as ‘B4’ have become frequent in texting. In fact, elements of abbreviation in SMS can be traced to morse messages (Snowden, 2006). The loop of influence continued as morse morphed for different languages, undergoing revision in 1848 when German writer Friedrich Clemens Clarke included latin diacritics e.g. “ü” and “ö”, producing the basis for the International Morse Code. Chinese speakers adopted the original codes for numbers but reinvented 4 digit codes for each character (Devlin, 2019).

3.3. Diversified uses in the modern day

Morse code has been applied to fields beyond original parameters such as helping patients with speech difficulties in medical care. In 1987, Steve Shipley, a hospital administrator at Petaluma Rehabilitation Hospital, built an electronic device with his father to convert eye blinks to electronic tones using infrared light sensors. This helped Dennis Dugger, a patient with locked-in syndrome, to communicate his pain, unhappiness, and thoughts to doctors and his family during his rehabilitation (Ricks, 1987). This was crucial to his experience of social support and emotional relief - all of which played a part in his recovery. Another instance of the code's life-saving use was when Jeremiah Denton, a U.S. navy pilot, blinked 'torture' in Morse behind enemy lines when forced by North Vietnamese forces to tell U.S. headquarters that he was well treated on television in 1966 (Mancini, 2020).

Morse code is also still applied in current military communications, such as Covert Underwater Acoustic Communication (CUAC) in the American navy. In 2019, research has progressed for the mimicry of natural marine sounds such as those of humpback whales to 'mask' morse signals of marinecraft. Development is ongoing for standard mimicry codes bearing similarity to morse (Bilal, M. et al., 2019). Hence, morse provides foundational reference for the development of new communicative mediums inspired by nature.

There have even been developments to bridge the deaf-blind and the non-deaf-blind through morse. Good Vibes, an app by Cheil WW India, an advertising agency, is on Google Play with over 500,000 downloads. Users simply need to learn morse to converse: non-deaf-blind users may use short taps and long presses on the phone screen to represent dits and dahs respectively to record morse signals that are then transmitted to the deaf-blind user via the app in the form of vibrations on the deaf-blind user's phone (Mitter, 2019). Though the application has limitations resulting in its general rating of 3.5 on Google Play Store, it broadens the application of morse for the greater good.

4. Comparison of the Morse Code to Speech and Writing

Comparative feature	Speech	Writing	Morse Code
1. Boundedness	Time-bound	Space-bound	Time-bound
2. Spontaneity	Most spontaneous	Quite spontaneous	Moderately spontaneous
3. Physicality	Face-to-face	Visually decontextualized with exceptions of attached media.	Visually decontextualized.
4. Structure	Loose	Elaborate	Strictly structured, less elaborate
5. Social interactivity	Very	Quite	Moderate
6. Revisability speed	Immediately revisable	Repeatedly revisable though depends on medium used - email, written letter or etc.	Immediately revisable
7. Prosody	Rich	Indirectly rich; through graphic features	Moderately rich

Table 2: Comparison of morse and speech and writing based on David Crystal's 7 features

4.1. Spontaneity:

Morse code, if mastered, may produce messages with fluidity and spontaneity close to that of the spoken and written word. With each letter converted into a pattern, a new system of discrete symbolic units is produced, operating akin to the written system albeit in the form of dots and dashes. Evidently, experienced users could develop a mental map of the code, translating letters into patterns quite quickly while listening to the taps of the telegraph device, seeing the blinks of a light, or hearing streams of beeps, the speed of which suggests near automaticity of code interpretation akin to processing and expressing a new language.

However, constraints on creative possibilities in spontaneous expressions still make morse less creative than speech and writing, since more processing time is required for the patterns of letters than that of language units, the knowledge for which is more immediately accessible due to longer exposure, experience, and considerable innateness of language processing. This inevitably constrains the extent of novel, jargonic expressions that can be produced in morse spontaneously as compared to in speech or writing.

The extent of spontaneity in morse also varies with the complexity of different versions. The Chinese version is so complex and tedious to use, the buffer time for translational processing from characters to code and vice versa is longer than what an English morse speaker would experience, further limiting expressional spontaneity.

4.2. Quality of revisability:

Similar to speech, messages sent in morse cannot be revised immediately because of the instantaneous nature of its signals. Once the signal is sent, it transmits to the other party, in the form of electronic signals or light flashes. Signals cannot be recalled back like text, and the only way to correct previous errors is to send another message clarifying the previous error, similar to speech. Thus, morse and speech are both more immediately revisable than written messages, which may be repeatedly revised as 'drafts' to be sent over time.

4.3. Face-to-face exchange:

Morse is rarely used face-to-face, with exception to special cases such as the case for Dennis Dugger's rehabilitation. Speech originates for face-to-face communication before the telephone, and the closer participants are the easier it actually is to communicate because spoken meanings are accompanied by non-verbal cues such as eye expressions, facial expressions and hand gestures for added clarity. Contrastingly, morse is designed for decontextualized long-distance communication as it operates on monotonous tones or signal units. Writing is also facially decontextualized if we refer to snail mail.

4.4. Boundedness to time:

Morse is less time-bound than speech since transmitted signals can sometimes be recorded and replayed like telephone calls. However, if signals were sent via light between vessels and lighthouses it is time-bound like speech. We can't replay a spontaneous utterance unless we have it recorded, and most of the time, we don't - given the naturalness of speech in daily life. Writing contrasts the most from both morse and speech because of its space-boundedness; it could be rewritten in the same physical space. However, in the context of snail mail revising sent drafts is impossible, and one would have to resend a draft to correct mistakes, a process that is time-bounded like speech, albeit slower.

4.5. Social interactivity:

Speech is definitely more social than morse. Morse may involve social interactivity given the fluidity in expression it permits an experienced user to have, but speech may involve more conversing participants. It would be more confusing to have multiple morse signallers at each exchange - the overlapping streams of signals would be hard to interpret individually and collectively. The social interactivity of speech allows us to congregate in conversational groups of threes to the dozens at social events like functions and parties. Writing is the least social of the 3 mediums as conversation is a slower unilinear track between person A to person B (as in snail mail).

4.6. Structure:

Speech is definitely more loosely-structured than morse due to the varying sounds that can be made in a moment. However, morse is still considerably loosely-structured like speech given its basis on letter or character units that can be strung together into words.

4.7. Prosody

Unlike morse, speech has prosodic features such as tone of voice, pitch and cultural accent. The expanded morse systems in today may involve punctuation marks for attitudinal quality but are still limited in bearing equivalents to qualities of speech prosody apart from volume. Writing involves more graphemic richness in symbols, font, multimedia (photos, drawings, etc) and it is through such that it communicates unspoken prosody.

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