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ÚSTAV JAZYKŮ

THE TECHNOLOGY OF SUBTITLES IN FILMS AND OTHER MEDIA

TECHNOLOGIE TITULKŮ VE FILMECH A DALŠÍCH MEDIÍCH

BACHELOR'S THESIS

BAKALÁŘSKÁ PRÁCE

AUTHOR

AUTOR PRÁCE

Eliška Tobiášová

SUPERVISOR

VEDOUCÍ PRÁCE

M. A. Kenneth Froehling

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Student: Eliška Tobiášová

ID: 211288

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The theme of the Bachelor project is to examine the different ways subtitles are used in present day films and television programs, and to assess their accuracy, usefulness and importance in understanding the film or program. When assessing the understanding of the film, one should not only looking at people trying to understand foreign language films, but also at people who are hearing impaired who need to understand not only the words, but the emotions too.

RECOMMENDED LITERATURE:

Jorge Diaz-Cintas, "The Technology turn in Subtitling", in Translation and Meaning by Marcel Thelen, Barbara Lewandowska-Tomaszczyk (eds.), Zuyd University of Applied Sciences, part 9 , pp.119-132, January 2013.

https://www.researchgate.net/publication/314262159_The_technology_turn_in_subtitling

J. Ohene-Djan and R. Shipsey, E- Subtitles: Emotional Subtitles as a Technology to Assist the Deaf and Hearing-Impaired when Learning from Television and Film. Sixth IEEE International Conference on Advanced Learning Technologies (ICALT'06), 24 July 2006, ISBN: 0-7695-2632-2.

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doc. PhDr. Milena Krhutová, Ph.D.
Subject Council chairman

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Bakalářská práce

bakalářský studijní obor **Angličtina v elektrotechnice a informatice**

Ústav jazyků

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ID: 211288

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NÁZEV TÉMATU:

Technologie titulků ve filmech a dalších médiích

POKYNY PRO VYPRACOVÁNÍ:

Tématem bakalářské práce je prozkoumat různé způsoby použití titulků v současných filmech a televizních programech a posoudit jejich přesnost, užitečnost a důležitost pro porozumění filmu nebo programu. Při hodnocení porozumění filmu by se nemělo dívat pouze na lidi, kteří se snaží porozumět cizojazyčným filmům, ale také na sluchově postižené lidi, kteří potřebují rozumět nejen slovům, ale i emocím.

DOPORUČENÁ LITERATURA:

Jorge Diaz-Cintas, "The Technology turn in Subtitling", in Translation and Meaning by Marcel Thelen, Barbara Lewandowska-Tomaszczyk (eds.), Zuyd University of Applied Sciences, part 9 , pp.119-132, January 2013.

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doc. PhDr. Milena Krhutová, Ph.D.
předseda oborové rady

UPOZORNĚNÍ:

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Abstract

The purpose of the bachelor's thesis is to explore subtitling technology. This is analysed from a historical, present, and future perspective. The research also mentions specific ways of using subtitles for certain types of media and it also includes an analysis of the target groups for which the subtitles are intended. In addition to theoretical research of subtitling technology, an experiment is conducted to assess the accuracy of subtitling between machine-generated subtitles, professional work, and amateur work. This is achieved by comparing subtitles from the same film scenes side by side in tables. The result of the research, which is derived from the criteria mentioned in the work, shows that professional subtitles are the most reliable way.

Key words

Subtitles, media, hearing-impaired, technology, emotions, transcription, films, television, translation

Abstrakt

Účelem bakalářské práce je prozkoumat technologii titulkování. Ta je rozebrána historického, současného a budoucího hlediska. V práci jsou zmíněny i specifické způsoby využití titulků pro určité typy médií a součástí je i rozbor cílových skupin, pro které jsou titulky určeny. Kromě teoretického rozboru technologie titulkování je na závěr proveden experiment, jehož účelem je porovnat přesnost titulkování mezi strojově generovanými titulky, profesionální prací a amatérskou prací. Toho je dosaženo porovnáváním titulků ze stejných filmových scén vedle sebe v tabulkách. Výsledek výzkumu, který je odvozen na základě kritérií, zmíněných v práci, ukazuje, že profesionální titulky jsou nejspolehlivější cestou.

Klíčová slova

Titulky, média, sluchově postižení, technologie, emoce, přepis, filmy, televize, překlad

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Prohlášení

Prohlašuji, že bakalářskou práci na téma *Technologie titulků ve filmech a dalších médiích* jsem vypracovala samostatně pod vedením vedoucího bakalářské práce a s použitím odborné literatury a dalších informačních zdrojů, které jsou všechny citovány v práci a uvedeny v seznamu literatury na konci práce.

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V Brně dne 31.5.2021

.....

Eliška Tobiášová

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1 Introduction

The lives of each of us are somehow influenced by television, films, and their environment or by any other media in the form of, for example, streaming platforms on the internet or social networks focused on video production. An essential part of this media is not only its visual side, but also its sound. Sound's purpose is to complete all important information people need to know, so they can be able to fully understand the plot in the visual part. Information is acquired with the help of music that adds the right atmosphere to the situation and prepares the audience for what they can expect, or with monologues and dialogues of participants in broadcasted media. In these days it would be hardly imaginable to watch films or TV news without any sound. However, there used to be times when films without sound were standard. Film technology was not that advanced, and the audience could only perceive pictures on a screen. This means it was necessary to find a way of passing on information about the plot so that the film could be fully understood by the audience. Therefore, the so-called "intertitles" were created. We can consider them as the beginning of today's subtitles. The text in films became common practice until the audio technology was implemented.

Of course, sound occurs in every visual media nowadays, but still, it is possible to encounter cases, where people are not able to receive information despite the presence of sound. Certainly, the subtitles are still a significant part of visual media. However, their processing/compiling is not an easy matter, since they have to be accurately timed and excellently translated (if the media is in a different language than what the audience speaks), so the viewer could have a good grasp of not only the speech of performer, but also of their emotions.

The aim of this bachelor's thesis is to explore and compare various technologies and processes by which subtitles are created. It also points out different types of media and provides the explanations of how and why they implement and share subtitles. Target groups for which the subtitles are intended are of interest as well. In this context it is necessary to focus on possible subtitle adaptations that would refine the quality of the information obtained from them.

The thesis is divided into chapters and subchapters, each one is focused on a specific topic:

The second chapter is a theoretical part containing the definition of subtitles, a history of their creation, a description of older and newer subtitling technologies. Different types of media

are also pointed out and this paper provides explanations of how and why they use them. This chapter also mentions targeted groups and explicates the ways of how subtitles help them in everyday life.

The third chapter is the practical part that assesses the accuracy of subtitling between automatic captions, professional subtitles, and amateur subtitles. The subtitles are transcribed next to each other in six tables. This form is used to allow the reader to immediately compare and see the differences between the three researched subjects.

The fourth chapter is a conclusion that reports and summarises all findings and results of this thesis into one statement.

2 Theoretical part

2.1. The definition of subtitles

As was mentioned in the introduction, the purpose of the subtitles is to enable understanding of the “story” or a message of the projected visual media to the people who are somehow disabled to perceive either the language of the media or the sound. Basically, we can say that subtitles are a transcription of spoken words appearing in the media. The transcription may be in the same language as the language of the media or in a completely different one.

2.1.1. Division of transcripts of spoken words

According to Myers (2019) we can divide this spoken word transcription into two types:

Captions are for deaf people or hard of hearing. The transcription usually displays at the bottom of the screen. The text may have many forms, creators usually use white or yellow colour of the text, in some cases the colour of the text differs depending on the speaker. Due to poor visibility of the text against the background the creators use black bar behind the text. The transcription is word-for-word of the spoken dialogue. However, it may sometimes diverge in the accuracy and the pacing, but the meaning of the message should be as similar as possible. Captions may also contain background sounds, noises and other sound descriptions that help better understanding of the situation. They are more adaptable to live broadcast. Captions of the video can be open, so they are not removable or closed - these can be turned on or off.

Subtitles have visual side same as the captions except the black bar that does not appear; however, they do not necessarily contain background sound descriptions. Subtitles, as Myers (2019) says, primarily work as a help for people who speak different language than the one that appears in the projected media or for who do not have such high language skills to catch the speech without any difficulty. When we use standard subtitles, we assume that the audience hears the sound. Of course, there exist so-called **Subtitles for Deaf or Hard-of-Hearing (SDH)** that are meant for the group of people mentioned in its name and contain, similarly to captions, important non-dialogue information, such as who speaks, the way how he speaks, what sound effects are in the background and more.

The following table should provide clear comparison and summary of closed captions, subtitles and SDH subtitles parameters:

	SUBTITLES	SDH	CLOSED CAPTIONS
Synced with video	✓	✓	✓
Can be turned on/off	✓	✓	✓
In source language		✓	✓
Speaker identification		✓	✓
Sound effects		✓	✓
Text appearance	Varies	Varies	Usually white text on the black background
Onscreen placement	Centred lower bottom third	Centred lower bottom third	Varies
Encoding	Supported through HDMI	Supported through HDMI	Not supported through HDMI

Table 1. Comparison of Subtitles, SDH subtitles and Closed Captions. Reprinted from Eldberg (2020)

The difference between these two may be clearly defined, but people usually consider captions and subtitles as the same. It should be added that although the subtitles and their purpose are defined mainly as mentioned above, their use can be these days also considered as saving or earning money to film companies. Using subtitles is much more affordable than dubbing and enables video projects to spread around the world and increase its popularity thanks to higher accessibility for people from foreign countries and for disabled.

2.2. A brief history of subtitles

The history of subtitles goes much further than it seems. Historically, they are an invention that began with music. The next sub-chapters will briefly record important historical milestones concerning their transformations and purposes.

2.2.1. Surtitles, supertitles

People often match subtitles only with the film era. However, the first subtitles were not a matter of a film technology. Mara (2019) mentions on her webpage a term called *surtitle* or *supertitle*. Surtitles were used during opera as a translation from Italian, which was the most preferred language to operatic composers. Even though it was not required, use of Italian was considered as a tradition by many. The issue was that except the Italians the rest of the world could not comprehend the story of opera and because of its high popularity the translation needs rose. Therefore, the text of opera was displayed on a separate screen above the stage and for its position the text was called “surtitle” or “supertitle”. This tradition still continues in many theatres and film festivals.

2.2.2. Intertitles

Introduction briefly presented the existence of “intertitles”. As was mentioned before, with the invention of the film, film creators were thinking about a way how to convey the story of the film to the audience without any audio present in the film. The audio technology was not that advanced, and it was not possible to bring dialogues and monologues to life through hearing. Then the breakthrough came in 1903. UKEssays says (as cited in article The history of subtitles in media, 2017):

“It was started with what we now call intertitles which texts are drawn or printed on paper then filmed and placed between the sequences of the film. In 1903, they were first seen as epic and descriptive titles in Edwin S. Porter’s movie, “Uncle Tom’s Cabin”.”

As the quoted, intertitles had a form of text-only clips appearing between scenes and worked as an explanation of important plots in a silent movie. It must be said that intertitles are not a term of the past. Film studios and video creators use intertitles as an expression of a certain style of their work. Mara (2019) mentions especially Star Wars series (George Lucas, 1977-2019) that are widely known for their use of intertitles at the beginning of the film. Mara also mentions popular animated TV show Spongebob Squarepants (Sherm Cohen, 1999-2020). It could be said that these days it is nothing unusual to see intertitles in many animated films and TV series.

2.2.3. Problems with the arrival of sound

Many would think that after the advent of sound technology the problem was solved. According to Language Reach (2016) more problems occurred as the dialogues and monologues were tied to one language and therefore the film export became difficult. Because 90% of the film industry was based in USA and therefore the most films were in English, overseas countries struggled with understanding and enjoying the content. Dubbing was one of possible solutions. The introduction of a new audio recording in the required language implemented in films met not only the requirement of understanding, but also the requirement of easy watching. But dubbing was very financially demanding. It also required acting skills to properly imitate the emotions of the original voice and precise synchronisation. Therefore, film industry recycled the use of subtitles, but not in the same way as intertitles. The position of the text has changed. Instead of text-only clips appearing as a single scene explaining the plot, the text was positioned at the bottom of the screen so as not to interrupt the picture.

2.2.4. Modern subtitles

Subtitles have become common practice in film and television industry. To offer to the deaf and hard-of-hearing people the best experience and enough information, many TV programmes started to provide captions. Some countries even put into their legislative an obligation to subtitle certain media. For example, Martinek (2020) in his news article says that in the Czech Republic all state institutions must accommodate to hearing impaired needs and describe all audio-visual content on their websites from 23rd of September 2020. With the arrival of a digital era subtitling has become uncomplicated and quicker. Invention of computers and the internet helped to create subtitling software accessible to everyone who has an internet connection. Subtitling is not a matter of professionals anymore. Many amateur translations and transcriptions can be found as a result of fan work or as a result of a hobby. The future is focused on machine transcription, which is not fully developed yet, but possibly could solve time demands and provide quick and accurate translations without any human presence.

2.3. The technology of subtitles

Since the aim of this thesis is to explore subtitling technologies, this sub-chapter will provide a look at technologies not only from the present era, but also at technologies used in the history and those that could work in the future.

2.3.1. Early technologies

As the first subtitling technique we can consider the invention by M. N. Topp. Ivarsson (2009) states in his article that in 1909 Topp patented “a device for rapid showing of titles for moving pictures other than those on the film strip.” (p.4). The technique worked as follows: Subtitles were shown by a person who was using a special kind of slide projector and they were projected on a screen that was positioned below. However, this technique has not really caught on, although there are some cases of its today’s use.

The invention of sound in the film placed subtitling in the background and sound became more prominent. Moreover, there was no highly advanced technology that would made subtitling profitable. But of course, the language barrier forced filmmakers and scientists to come with something new. Predominantly Nordic countries have shown interest in exploring this field. Because dubbing was demanding, film producers wanted to implement subtitling instead. Soon, the **optical method** was improved and applied in this field. Optical method upgraded older one that had already existed and made it automatic. Ivarsson (2009) describes the technology as follows: “Exposed “blank” frames were inserted between the title frames and the titles were fed forward by means of a counter to ensure that the subtitles were of the right length and came in the right place.” (p.4.)

Despite the fact that this technology has brought greater simplicity and better readability of the text, the development of subtitling was not that simple in its early days. The main issue was that copies of films and their negatives were stored mostly in their country of origin. Transporting negatives over long distances or even to other continents was not usual and therefore translators and subtitlers did not have access to most of them. Since negatives were a necessity, this led to complex processes of their obtaining.

Descendant of optical method was **mechanical process**. Its origin comes from the workshop of Leif Eriksen in 1930. Ivarsson’s research explains that Eriksen patented the technique of imprinting text into the film using moistening.

UKEssays (2018) mentions **thermal processes** as another and more important method. This process saw the light of day in 1935 and its inventor was Hungarian O. Turchányi. Ivarsson

(2009) described the process in much more detail: the technique was based on heating the plates until the film emulsion started melting and could have been removed. There was no need for moisturising in comparison to the mechanical process. However, both methods had the same shortcomings in the resulting font and text quality and the overall appearance of the film could have been damaged by these processes.

R. Hruska and Oscar I. Ertnæs were involved in the development of **chemical subtitling technology**. In the beginning of the process, wax or paraffin was used directly on the film material.

According to Ivarsson (2009) then the technique worked as follows:

The printing plates were placed in a kind of printing press, into which each plate was fed and heated to a temperature of nearly 100°C and one by one pressed against the paraffin coating at the bottom of the frame that corresponded to the beginning of the dialogue line. The paraffin under the letters melted and was displaced, exposing the emulsion. (p.6.)

This process was applied on all film frames where the subtitles should have been. After all the work was done, the film was exposed to a bleaching bath that removed all what was unwanted. Result was quite satisfying, much preferable than previous techniques. The proof of this statement is that the chemical processes are still used in modern times, but of course with enhanced and faster technology, so the result is even more precise.

In 1988 a revolutionary technology was developed – **laser subtitling**. Denis Auboyer co-operated with Titra-Film and they created a laser beam process controlled by computer, that leaves no damage on the film frames. Technology is quick as the beam stays at one frame less than one second. Frames where there is no speech are automatically skipped. This provides great letter resolution with slight errors that hardly destroy the overall appearance of the film. The only disadvantage is expensive equipment.

Bennett (n.d.) on her web article about older subtitling technologies mentions the first appearance of two **word processors** in 1970s. Ivarsson considers in his article the technique as a modern one. However, it has been several years since his study was published and the situation has changed greatly in recent years, therefore the technology is included among the older ones, although the technique can still be applied now. Ivarsson describes the first word processor as **teletext-based** one. The teletext creation is achieved by using a computer that decodes the image signal, characters can be captioned, generated, and placed directly into the TV broadcast. The second word-processing technique involves **character generator in the transmitter**.

Ivarsson (2009) says: “When the subtitler cues in a new subtitle, the characters are generated by electronic means and mixed into the transmitted image” (p.10.)

Diaz-Cintas (2013) describes subtitling in years 1970’s and more as a process in which subtitler had to have a computer, a special software, a VHS¹ with the given film or a television with the given programme. Since the computer programmes were not fully perfected, sometimes manual stopwatches were used in so-called *spotting*.²

2.3.2. Modern technology

Computers and the launch of the internet have revolutionised subtitling. First, with the advent of **DVDs**³, the first fan amateur translations created with the help of a computer began to appear, especially for films that might not be attractive enough for film companies to try to dub or transcript. Here, however, they were mainly illegal copies of the film.

But the need for subtitling also applied to official copies, since the concept of the DVD was to provide as many dubbings as possible, better availability for hearing-impaired, as well as more translations on one portable medium. The reason was simple - one version of the DVD was then released in hundreds of thousands to millions, meeting all the requirements for most of the world's population, and the cost was reduced immeasurably. Not to mention the fact that it was possible to buy a DVD in a foreign country and the buyers still had access to their language on that medium. Diaz-Cintas (2013) reports in his research that the DVD took advantage of its high popularity for commerce and placed a number of commercials and especially trailers for newly released films usually before the beginning of the film. These trailers were not dubbed, subtitles were used instead. The DVDs also included bonus tracks for the film, exclusively available to those who bought them, and these tracks were also mainly subtitled. DVDs are still sold today and practice the same policy; however, their popularity has gone a bit into the background due to the Internet.

The Internet gradually began to provide all kinds of media in one place (news, viral videos, communications, databases, books, movies...), which of course appealed to many people. Nowadays, the Internet has managed to attract billions of users and is a 'second life' for many. Indeed, the film and software companies realized this.⁴ An important aspect of why the Internet

¹ VHS – abbreviation for Video Home System, it is analogue recording on tape cassettes.

² The term "spotting" is explained in more detail in the subchapter "Subtitling rules".

³ DVD – abbreviation for Digital Versatile Disc, it is an form of optical digital data carrier

⁴ Sub-chapter 2.4.3 also discusses the Internet and how film creators use subtitles on it.

is mentioned here is that it has started development of various **subtitle editors and software**. Díaz-Cintas (2013) mentions for example programme EZTitles, but it is also worth mentioning Subtitle Workshop and, of course, the various video editors, such as Adobe Premiere Pro, which includes a subtitling feature. They are accessible easily and thanks to them subtitling can be performed on one device with only one screen. They differ only in that some of them are intended for professional use and are paid for, while some are free and can be used by laymen. Software is constantly updated and upgraded to make work more comfortable. Recently, there has been a great deal of automation, where programs are able to recognize shots and frames themselves, distinguish sound waves and their height and display them on a timeline so that the subtitler can approximately recognize where the speech is and does not have to manually search for it.

“Autotiming, i.e. assigning the time in and time out to subtitles, can also be done automatically according to some developers.” (Díaz-Cintas 2013, p.126.) However, he also admits, that the company that presents this kind of technology based on speech recognition also claims that it needs pure sound without any background sounds, which is perhaps not standard in films and other media, therefore the technology will have to be improved.

Moreover, because digital copies of films are freely available in various corners of the Internet, a new system has been introduced. The users either download the film directly with subtitles or, if the subtitles are not available directly in the digital copy, search for various websites aimed at a distribution of subtitles as it is shown in the Figure 1. Here they select the desired format and timing so that the subtitles fit exactly and then combine them in the video player with the digital copy of the film. It should be added that subtitles from such sites tend to be more or less amateur work. This is just a further proof that subtitling technologies are now very simple and accessible. Surely, this does not indicate the quality of the resulting work. The quality can be ensured mainly by professionals in the field.

At one time, 3D films were a big attraction for the audience. Film companies wanted to bring this experience to deaf. And, of course, special **3D subtitles** were developed over time for these types of films as well. Díaz-Cintas (2013) presents from this perspective as a revolutionary film *A Christmas Carol* (Robert Zemeckis, 2009), that was very first one to be included in the list of 3D films for hearing-impaired population. In the research he also mentions the difficulty of creating 3D subtitles. They must be well positioned to not interfere with the 3D effect and to not cause migraines or other discomfort to the viewer's eyes.

Na co se nyní čeká. 🟢 schváleno - objeví se při příštím přenosu 🔴 zatím neschváleno		
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🟢 Zheng tu	🟢 Love Affairs in the Afternoon	🔴 El Cuaderno de Tomy
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🔴 Truth Seekers S01E07	🔴 Flirt	🔴 30 Monedas S01E01
🔴 Double World	🔴 B Positive S01E01	🔴 Spotless S01E09
🔴 Khun Phan	🔴 Back to God's Country	🔴 Beach Red
🔴 The Right Stuff S01E08	🔴 The Right Stuff S01E07	🔴 The Right Stuff S01E06
🔴 The Right Stuff S01E05	🔴 The Right Stuff S01E04	🔴 The Right Stuff S01E03
🔴 The Right Stuff S01E02	🔴 The Right Stuff S01E01	🔴 Portals to Hell S02E07
🔴 Serpico	🔴 Star Trek: Discovery S03E07	🔴 Huang jia du chuan
🔴 The Good Girl	🔴 Tenet	🔴 La Haine
🔴 La Haine	🔴 The Sentinel	🔴 Family Guy S19E07
🔴 Portrait of a Lady on Fire	🔴 The Cursed E03 CZ S01E03	🔴 The Cursed E02 CZ S01E02
🔴 The Cursed E01 CZ	🔴 Vida S02E04	🔴 Vida S02E03
🔴 Vida S02E02	🔴 Vida S02E01	🔴 The Mandalorian S02E05
🔴 Star Trek: Discovery S03E06	🔴 Star Trek: Discovery S03E07	🔴 Doctor Who S04E11 (2008)

Figure 1. Amateur subtitle database. Reprinted from server titulky.com (2020)

Auto-captioning and machine translation other technologies that have now taken hold. Although they are not absolutely perfect, several projects have already been developed to explore new improvements and implementation of this technology. Díaz-Cintas mentions especially projects MUSA and project SUMAT, that was co-funded by European Commission. Nowadays, however, perhaps the most famous automatic-caption system is the one developed by Google, which is currently widely used on the Youtube social network. It was introduced in 2009 and Google combined its voice-recognition and speech-to-text technology to create machine generated captions for many different videos. The user uploads any video to Youtube and sends request for automatic subtitles. After a while subtitles are machine generated for the video and the user can either edit them or leave them as they are. The function now offers automatic translation into many languages, but this function is lagging far behind and, for example, translation into the Czech language does not make sense in many instances. Figure 2. shows Youtube captions appearance.

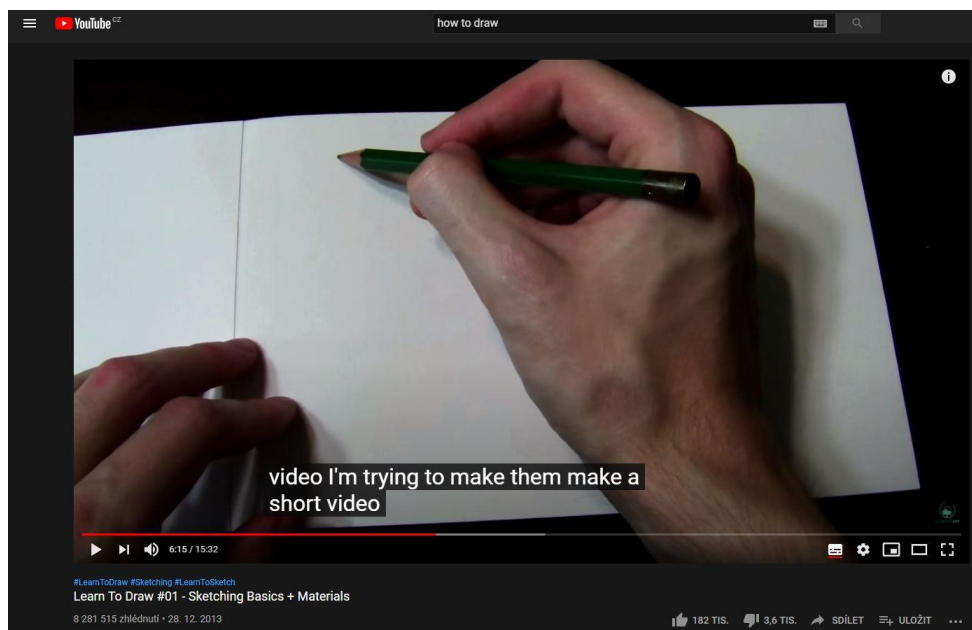


Figure 2. Automatic captions on Youtube. Reprinted from Youtube (2020)

2.3.3. How subtitling programmes work

Not only subtitling programmes but also video editors are now available on the market. Most operate on a similar basis. However, some include enhanced features compared to the others, and there is also a noticeable difference between paid software and freeware. For most of them, it is common to have a built-in video player that allows the user to play the video alongside the texts. This feature allows user to use only one monitor. However, some programmes still lack this feature, although it is crucial for many translators and subtitlers. For example, for EZTitles, after selecting a given subtitle format and setting parameters such as the number of characters per caption and the length of its displaying time, the subtitler can upload the desired video to the programme interface. EZTitles automatically generates a voice timeline and marks the editing points. Then it is possible to skip video frame by frame and estimate accurate moment where the speech starts and hence the subtitle starts as it is shown in the Figure 3.

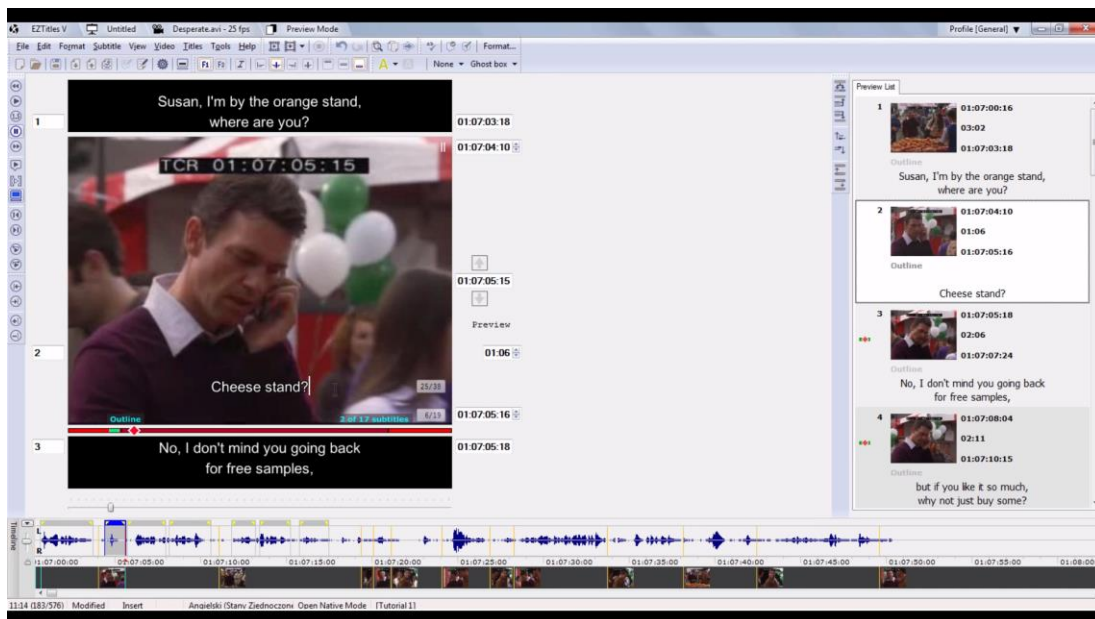


Figure 3. EZTitles interface. Reprinted from Youtube (2020)

Bitton (2020) in the web article talks about subtitle editors and mentions Jubler, for example, that offers a text translation and text correction mode. The Subtitle Workshop also contains a feature of spellchecking and error detection in titles. EZTitles is advanced in that it monitors overlaps of limits and draws attention to texts that remain too long on the screen or take up too much space in the picture. Most programmes have different font types and font colours on the menu. Some allow users to write subtitles directly in the program itself, while others require them to upload a pre-created text file, this applies to DivXLand Media Subtitler.

2.3.4. Subtitle formats

Several formats are currently available in which subtitles can be saved and applied. They can also be sorted into groups by purpose. Suhrwardy (2019) divided these formats into the following groups:

Web Caption or Subtitle File Formats – SubRip, Sonic Scenarist Closed Caption, WebVTT and more.

TV Caption file formats - Sonic Scenarist Closed Caption, Avid Captions Only AFF, Cheetah Caption

Subtitles File Formats – EBU STL, BluRay XML/PNG, SubRip, CVC DVD

Following table should introduce and briefly describe the most important and the most widely used formats:

Format name and abbreviation	Description	Example
SubRip Video Subtitle Script (*.srt)	Most common, highly basic, and easy to use. Usually supported by most of the media players.	1. 00:00:00,00 --> 00:00:02,550 This is first caption! 2. 00:00:02,550 --> 00:00:05,720 This is second one!
Sonic Scenarist Closed Caption (*.SCC)	One of the most popular, open to modifications, can be seen at streaming services, widely used for broadcasts, DVD and BluRay	00:01:14:20 9425 9425 94ad 94ad 9470 9470 d94f d552 20d0 4cc1 4345 2054 4f20 4c45 c152 ce20 c1ce c420 54c1 4ccb
WebVTT (*.vtt)	Compatible for HTML5 websites, similar to .srt format. Allows colour and font editing.	00:00:00,00 --> 00:00:02,550 align: end size: 50% <v Peter>This is first caption!
Flash XML in Timed Text Authoring Format DFXP (*.xml) or (*.dfxp)	Used for Flash players and Netflix, text can include position and formatting information	<p begin="00:02:30.050" end="00:02:31.180 "> This is XML subtitle format.<p
STL (*.stl)	Developed by Spruce Technologies in 1991, it has become a standard in broadcast and online streaming industry. It can contain information in a form of comment, that does not appear during film.	00:02:35:08, 00:02:37:18 STL captions example.00:02:37:18, 00:02:38:20 are here.
Cheetah Caption (*.cap)	Developed by Cheetah International, used in broadcast media	

YouTube SBV (*.sbv)	Format used by Youtube for their video captions	0:00:10.000, 0:00:21.000 Hello, this is an example of subtitles used by Youtube.
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Table 2. List of the most common subtitle formats and their descriptions. Adapted from Limecraft Support (2020), Capital Captions Typing Services (n.d.), Suhrwardy, (2019)

2.3.5. Future

The future may bring many unknowns, but indications of the direction it is likely to take can be already seen. Díaz-Cintas, for example, mentions in his research the so-called Resembling Glasses, developed in 2009. It occurred to the developers that they could make a live translator out of glasses originally intended as a business tool, using a special projection on the retina display embedded in the glasses to show subtitles that would translate conversation between people who do not understand each other. The microphone, attached to the device, would record words and the translation itself would be performed by speech-to-text technology. Díaz-Cintas also points out that Sony has developed subtitling glasses specifically designed for hearing impaired who visit the cinema. This technology was supposed to be used in 2012 in Britain, but so far it looks like it has not taken hold on a global scale. The development and improvement of such glasses can be expected. The idea that it would be possible to understand anyone and at any time, without knowledge of languages, only with the aid of subtitling glasses, would make life simpler for many (especially for those who do not possess a gift for language learning). Of course, captioning glasses would be an incredible advantage for deaf-mutes who have trouble communicating in offices and other places where people are not familiar with sign language. This goes hand in hand with the upgrade of machine translations and automatic captioning. Some even believe that the craft of translators and subtitlers will disappear with the advent of near-perfect translating and captioning machines. If this prediction is true, only time can tell.

2.4. Subtitles in the media

The media have different forms of subtitles and practice them in many ways. The following sub-chapters will therefore name different types of media and their subtitling approach.

2.4.1. Television

Díaz-Cintas (2013) says in his text that television used to provide subtitles through teletext. But the analogue time is over. Smart TVs with internet connections are now in the lead role. He says: “TV remote controls have now a subtitle button that allows viewers to access subtitles in a much easier and more straightforward manner.” (Díaz-Cintas 2013, p.121)

It is clear that there are predefined subtitles that television broadcasts to the device. The question is, how do live shows and broadcasts work if they cannot be overwritten in advance?

BBC (2011) says in their reportage that there exist live subtitles that are obtained by a technique called re-speaking. This technique may have some delays in comparison to actual speech and may contain some mistakes.

Barett (2011) in the reportage explains his work as a subtitler:

I listen to what the person on the television is saying and then all I do, really, is repeat what they're saying into the microphone. And then the software converts that into a text which gets thrown up onto the television screen as subtitles. It sounds a lot simpler than it is. I can't just talk into the microphone as I'm talking now in a natural way. The software's not sophisticated enough to recognize what I'm saying. We have to make sure each word is very, very clear and defined. (t. 3:17)

It must be said that such talking sounds very robotic, and the BBC reports that they must train people specifically for the job in order to learn how to speak the correct way for the software. In the reportage, Barett (2011) expresses uncertainty about the imperfections of the software, especially when he has to pronounce foreign names, which, of course, the programme does not have in the vocabulary and so various errors arise.

2.4.2. Cinemas

Cinemas do offer films in all variants, both with subtitles and with dubbing. However, they are faced with a problem related to hearing impaired people. They do not provide SDH subtitles in most cases. In this thesis have been already mentioned glasses with a built-in display, which should be newly introduced in cinemas and could provide benefits for deaf people, but their implementation is lagging behind.

2.4.3. Internet

The Internet is revolutionary in the area of subtitling. Many film producers have reoriented their productions to streaming platforms such as Netflix or HBO GO. These platforms are highly popular among the public and perhaps play a more important role for younger people than television. They yield many variations of dubbing and subtitling. It could be stated that they offer everything that DVD provides, but at a lower price, higher accessibility and portability. The user only needs to open the link through a browser or have the application. This gives him a selection from a database of thousands of films and shows. Unfortunately, with more and more films being released for these platforms, the time demands for subtitling and translation speeds are also increasing, which is clearly reflected in the final quality. Netflix is infamous for its frequent wrong translations and misspellings in the Czech variants.

The social network Youtube, which is home to and business for many audio media creators, has already been mentioned. Subtitles are an indispensable part here too, as dubbing is not available on this network. If someone wants to become worldwide famous persona, they must either speak English or at least provide a translation of their videos in the form of either automatic captions or manually created ones.

On the Internet films can be downloaded legally and illegally to various devices. This has already been discussed in the sub-chapter 2.3.2. Modern technologies. The sub-chapter points out databases with subtitles that provide files with translations of many films and videos. Professional work is sometimes available, but they are mainly amateurish and occasionally poorly synchronized or inaccurately translated.

2.4.4. Computer games

The interface of computer games is all itself subtitles and captions. Games contain descriptions and labels of items, places, menus and much more. Also, many games contain scenes, often interactive, that are subtitled. Especially if the game is only available in a few languages. Sometimes important game titles go through so-called localization, i.e. translation of the game from the original language into the language of the target country.

Schubert (2013) in his article states, that localization of games is much more draining work than a translation of a book or a film. The main specifics of games are the considerable amount of text, nonlinearity, time constraints of the project and translation is often done blindly, as it is frequently started before the product is completed.

Schubert says (as cited in the article *TÉMA: Jak se překládají hry do češtiny*, 20th October 2013):

An ordinary book or film is 100% linear, with a predetermined story and dialogues that the viewer or reader cannot influence in any way. Only passively consumes. The game requires human interaction, which is not predetermined, each is playing differently. Thus, texts (as opposed to a book or film) may appear at random, once, not at all, several times or in a predetermined place.

It is also important that the translator is familiar with the genre in order to avoid misunderstanding of concepts. Translations of random generated texts must therefore be put into context and translators must consider all possibilities that may arise in the story of the game. This means that, for example in the case of Czech language, a distinction must be made between first-name terms and using polite form of address and the inflection must fit according to gender.

As has already been mentioned for the films on the Internet, there also exist an amateur translations and subtitles that can be accessed and installed to the game through various modes.

2.5. Target groups

Subtitles have been created in particular for the groups mentioned below. Each one uses subtitles for different purposes. The following text will attempt to explain how and why these target groups use a transcription of words. It will also provide insight into some of the problems related to this topic that some researchers have come up with.

2.5.1. Hearing impaired

Subtitles work as a help to deaf and hard-of-hearing. However, they cannot fully replace the sound function. The reason is that the sound gives the films an atmosphere and the intonation of the actors' voice formulates the feelings. Simply text cannot substitute this feature. This can lead to a partial or complete misunderstanding of the scene. Ohene-Djan and Shipsey (2006) engaged in a research of so-called “E-subtitles”, abbreviation for Emotional Subtitles. Ohene-Djan and Shipsey say:

“Our research has been directed towards the adaptation of subtitle to indicate these subtle but significant features of speech. We believe such adaptive features could potentially yield significant benefits for Deaf and hearing-impaired students.” (Ohene-Djan and Shipsey 2006, p.1)

They recommend that colours and different variations of fonts should be included in the subtitles, using a special format. For example, colours could indicate which person is speaking at the moment, making it easier to distinguish it especially in children's programmes, where we often encounter different coloured characters. Fonts would determine the type of emotion. Playful rounded fonts could mean joy and sharp distinctive fonts could convey feelings such as consternation or enthusiastic call outs.

However, the question arises as to how to deal with the problem, which in this case are small children who cannot read yet. Ohene-Djan and Shipsey suggest that deaf young children should learn to discern at least the colours and shapes of fonts by which they would recognize emotion and would probably use the image to complete the rest of the plot. But, so far it seems that the best solution for this situation is a sign language speaker. They appear on screens in many programmes for the deaf-mutes and pass on the information using a sign language at the edge of the screen. Thanks to facial expressions they are able to imitate how something has been said and thus assist to determine feelings.

2.5.2. People who do not understand the origin language

Subtitles are also intended especially for people who speak a language other than the one spoken in the audio-visual medium. For some, dubbing in their language is hard to hear and they prefer original voices. Many foreign-language films, which have not gained enough popularity, are only subtitled. Even so, they have a chance of succeeding abroad, as most of the world's population is able to read the transcription of words in their own language. However, this is not sufficient for the population of countries with low literacy. While it could be said that in such countries many of them do not have access to electricity or television, they cannot be neglected. Because of this subtitles and captions cannot serve them, therefore dubbing is a necessity.

2.5.3. Other groups

Ohene-Djan and Shipsey (2006) say that their emotional subtitles could be helpful for children with **Asperger's syndrome** diagnosis. Website Autism Speaks states that this syndrome is a disorder on autistic spectrum. People with this diagnosis have difficulty with social interactions and emotional recognition. Emotional subtitles could help them distinguish what emotions the character expresses on the show, then store these pieces of knowledge in the memory. If the situation requires, they can apply the gained experience in everyday life.

Someone likes to watch videos with subtitles because they favour visual memory over auditory memory and store information from the video through texts. Some aim to **enrich their vocabulary**. Nowadays, it is quite common for young people to learn a large part of their vocabulary from a foreign language arbitrarily by subtitled films and games.

3 Practical part

3.1. Subtitling “rules”

Even though official subtitling process rules do not exist, there are unwritten proceedings that should be listened to. According to O’Donovan (2018) in her article we can divide process of subtitling into following phases:

Spotting - in doing so, the exact times at which the subtitles appear and the times at which they disappear are determined. The spotting also includes checking the correct duration of the caption's appearance in the video.

Translation - this part is omitted if it is a transcription into the same language as the audio. This part is also part of localization - project adaptation for the needs of audience from other countries.

Correction - error correction, tracking the continuity of subtitles, whether they fit in time, if they are well synchronized, checking the accuracy of translations, grammar, and sentence structures.

Simulation – final review of the product. Subtitler plays the video with the created subtitles and monitors whether everything is as it should be. If it is not, they return to previous steps.

As was already mentioned at the beginning of this subchapter, there are no specific guidelines for subtitlers to follow. Moreover, as people have recently seen more and more amateurish work, they can meet with different forms of subtitling. However, there exist basic advices that can be helpful.

Costal (2015) in his YouTube tutorial about subtitling introduces these basic concepts that should be respected:

Subtitles

- **Space and time constraints** – “One refers to the space that is available on the screen, another, to the time utterances or sounds last until the next one starts.” (Costal 2015, t. 1:53)
 - Space constraints - text should not be longer than two lines and should not

contain more than 42 characters per line (letters, spaces and punctuation marks included). In case of being longer than these parameters, the subtitles would draw all the attention to them, and the viewer would not be able to perceive the rest of the screen.

- Time constraints – each subtitle should remain on the screen between 1-6 seconds and reading speed should be set on 21 characters per second. Short displaying time can lead to reader's frustration from inability to get the information from the text sufficiently and longer displaying time can cause distraction and focus lost.
- **Synchrony** – “They need to synchronise the text and audio tracks.” (Costal 2015, t. 2:04)
 - Subtitles should appear when characters speak or when there are present sounds that should be described (in case of SDH subtitles).

SDH subtitles

- Different colours can be used to specify the speaker.
- They must contain special description of relevant sounds and noises, written in capital letters and placed in parentheses. (ECHO), (MUMBLES).
- Because of greater amount of the text the lower reading speed is recommended (16 characters per line or lower).
- To provide better recognition of characters' speeches, instead of colour (because some subtitle formats do not allow such customizations) could be used name tags placed in parentheses, as this example (JANNA), at the beginning of the speech. These tags should not contain any spoilers, for instance in case of detective movie with unknown murderer the tag (MURDERER) should not be added to that person until the plot reveal.

3.2. Accuracy of subtitling of the same scenes from different sources

This sub-chapter will be engaged in the main thrust of the practical part of the thesis. The aim is to assess the accuracy of subtitles from different sources and from different authors. There will be included machine-generated subtitles, professional subtitles, and amateur subtitles from one user.

Comparison of the accuracy of the subtitles will be done according to the above criteria. The following videos will be analysed:

- Scenes from the following YouTube videos:
 - The Big Bang Theory Funniest Moments of Season 1
 - The Big Bang Theory 1x5 | Incorrect equation with automatic captions.
 - Harry Potter and the Philosopher's Stone - Clip: You're a Wizard, Harry
 - Bane: “Crashing this plane... WITH NO SURVIVORS!”
 - Ford vs Ferrari (2019) – Shelby explains the loss at the Le Mans to Ford
 - Sherlock Pool Scene
- The same scenes as the chosen ones from the YouTube videos on the HBO Go and Netflix streaming platform in English with English subtitles.
- The same scenes with amateur English subtitles retrieved from the server Subscene.com as a work of users named Gfy, jnb_db, shuja1410, Black.Hawk and a1ubkh4n.

Captions and subtitles will be placed side by side in the table for comparison. Green text highlighting indicates the first line of the subtitle, yellow indicates the second line of the subtitle and grey indicated the third line of the subtitle. This highlighting cannot be applied to automatic YouTube captions because it displays them consecutively in a way that makes the first line of the caption disappear when the bottom line reaches its maximum number of characters, which appears to be set to 40 characters. The bottom row is moved upwards, and the process is repeated over and over again. Texts in brackets can be found next to the text in the table. These express either a sync note or, if the text is in italics, the correction of a bad transcription. Subtitles will be compared against the criteria defined by Costal in subchapter 3.1.

Scene 1.

This scene is a part of the first episode of the first season. The scene starts at 0:19 in the YouTube video called The Big Bang Theory Funniest Moments of Season 1 and ends at 0:45. In the HBO GO copy it begins at 2:35 and ends at 3:00. The beginning in the amateur copy is at 2:41 and the end is at 3:07 and Gfy's subtitles were used.

AUTOMATIC CAPTIONS	PROFESSIONAL	AMATEUR
00:19 think about stairs if the height of a (<i>wanna hear an interesting thing</i>) 00:25 (<i>not really</i>) single step is off by as little as two (<i>if the height</i>) 00:26 millimeters most people will trip I 00:28 don't care that doesn't seem right (<i>two milli--</i>) 00:33 it's true I did a series of experiments 00:35 when I was 12 my father broke his 00:36 clavicle they sent you to boarding (<i>Is that why</i>) 00:40 school no that was a result of my work 00:42 with lasers	2:35 You want to hear an interesting (<i>wanna</i>) thing about stairs ? 2:38 Not really. 2:39 If the height of a single step is off by two millimetres most people will trip. (<i>as little as</i>) 2:43 I don't care. 2:46 Two milli... That doesn't seem right. 2:48 No, it's true, I did a series of experiments when I was 12. 2:50 My father broke his clavicle. 2:54 Is that why they sent you to boarding school ? 2:55 No. That was a result of my work with lasers.	2:42 (delayed all the time) You wanna hear an interesting thing about stairs? 2:45 Not really 2:47 If the height of a step is off (<i>single</i>) by as a little as two millimetres... 2:50 -...most people will trip. - I don't care. 2:54 Two millime--? That doesn't seem right. 2:56 It's true. (<i>No</i>) I did a series of experiments when I was 12. 2:59 My father broke his clavicle. 3:02 Is that why they sent you to boarding school? 3:04 No. That was the result of my work with lasers

Table 3. Comparison of automatic captions, professional subtitles, and amateur subtitles of The Big Bang Theory TV series.

Looking at the automatic subtitles, it is evident that this is the worst result of the three. Technology is not yet capable of capturing fast-talking or indistinct words. In some cases, it omits whole sentences. Subtitles do not make sense in many moments. Punctuation is completely missing. The substitution of words that are pronounced similarly is also visible - *thing* and *think*.

The professional work looks much more elaborate, but even here the author did not avoid mistakes. The first appears in the first sentence, where “*want to*” is used instead of “*wanna*”. Another relates to a bad transcription of spoken words, when the subtitler omitted “*as little as*” in the second line at 2:39. The gap between a word and a question mark seems unprofessional from a stylistic point of view. As far as the number of characters per line is concerned, everything accomplishes guidelines. Complies with a maximum of 42 per line. It is evident that the author tried to balance the length of the lines. Reading speed is also satisfying. There were no problems with speech synchronization, such as delays.

Third subtitles proved to be slightly amateurish in this case. The speech sync was imperfect with a delay of about half a second. This can spoil the overall impression of the show and cause reluctance to watch further. As far as the transcription of the text is concerned, there have been errors as well as in the professional work. The word *single* was skipped in the first sentence at 2:47. There is missing “*No.*” at 2:56. As for the number of characters per line, this was exceeded here once in the second line of the text at 2:56. The author probably wanted to separate the sentences from each other, but he created an unnecessarily long caption, occupying much of the space at the bottom of the screen.

Scene 2.

The scene appears in the fifth episode of the first season. YouTube video The Big Bang Theory 1x5 | Incorrect equation starts the scene at 0:27 and end at 1:57. HBO Go copy begins at 11:18 and ends 12:45. Amateur subtitles start at 11:45 and ends at 13:17. Gfy’s subtitles were used.

AUTOMATIC CAPTIONS	PROFESSIONAL	AMATEUR
00:27 someone touched my board	11:19 Someone touched my board.	11:50 (late all the time) Someone touched my board.
00:29 Oh God my board Leonard Leonard hey	11:25 Oh, God, my board ! (Leonard, Leonard!)	11:57 Oh, God, my board. 12:01

<p>00:41 what's the matter my equations someone's</p> <p>00:44 tampered with my equations are you sure</p> <p>00:45 of course I'm sure look at the beta</p> <p>00:47 function of quantum chromodynamics the</p> <p>00:49 signs been changed yeah but doesn't that (<i>sign 's</i>)</p> <p>00:53 fix the problem you've been having are</p> <p>00:55 you insane</p> <p>00:56 are you out of your mind are you hey</p> <p>00:58 look that fixes the problem I've been</p> <p>00:59 having</p> <p>01:01 you're welcome you did this yeah I</p> <p>01:08 noticed it when I got up to get a glass</p> <p>01:09 of water so I fixed it now you can show</p> <p>01:11 that quarks are asymptotically free at</p> <p>01:13 high energies pretty cool huh</p> <p>01:16 cool</p> <p>01:19 listen I gotta get from the lab thanks</p> <p>01:21 for a great night thank you I'll see you</p>	<p>11:32 Hey, what's the matter ?</p> <p>11:34 My equations, someone's tampered with my equations.</p> <p>11:36 - Are you sure ? - Of course I am. (<i>I'm sure</i>)</p> <p>11:38 Look at the beta function of quantum chromodynamics</p> <p>11:40 The sign's been changed.</p> <p>11:42 Oh yeah.</p> <p>11:44 But doesn't that fix the problem you've been having ?</p> <p>11:46 Are you insane ? Are you out of your mind ?</p> <p>11:48 Are you... Look ! That fixes the problem I've been having.</p> <p>11:53 You're welcome</p> <p>11:56 You did this ?</p> <p>11:58 I noticed it when I got up to get a glass of water. So I fixed it.</p> <p>12:01 Now you can show that quarks are asymptotically free at high energies.</p> <p>12:04 Pretty cool, huh ?</p> <p>12:07 "Cool" ?</p> <p>12:09 Listen, I've got to get to the lab. (<i>gotta</i>) Thanks for a great night.</p>	<p>Leonard.</p> <p>12:02 Leonard!</p> <p>12:04 (late all the time) Hey, what's the matter?</p> <p>12:06 Equations. Someone's tempered with my equations.</p> <p>12:08 - Are you sure? - Of course. (<i>I'm sure</i>)</p> <p>12:10 Look at the beta function of quantum chromodynamics</p> <p>12:12 The sign's been changed.</p> <p>12:15 Oh, yeah.</p> <p>12:16 But doesn't that fix the problem you've been having?</p> <p>12:19 Are you insane? Are you out of your mind?</p> <p>12:21 Are you--? Hey, look, that fixes the problem I've been having.</p> <p>12:26 You're welcome.</p> <p>12:29 You did this?</p> <p>12:31 I noticed it when I got up to get a water, so I fixed it. (<i>a glass of water</i>)</p> <p>12:34 Now you can show quarks are asymptotically free at high energies.</p> <p>12:37 Pretty cool, huh?</p> <p>12:41 "Cool"?</p>
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01:25 at work	12:14 Thank you.	12:43 Listen, I gotta get to the lab.
01:26 you dare hold on hold on	I'll see you at work.	12:45 Thanks for a great night
01:29 what who told you you could touch my	12:16 - Hold on. Hold on !	12:47 Thank you. I'll see you at work.
01:30 board no one	12:19 Who told you you could touch	12:50 (late all the time) - Hold on. Hold on.
01:32 hey I don't come into your house and	my board?	-What?
01:33 touch your board there are no incorrect	12:21 No one.	12:53 - Who told you you could touch my board?
01:36 equations on my board oh that is so so	12:22 I don't come into your house and touch your board.	- No one.
01:45 I'm sorry I got a run if you come up (gotta)	12:25 There are no incorrect equations	12:56 I don't come into your house and touch your board.
01:47 with an adjective text me inconsiderate	on my board.	12:59 There are no incorrect equations
01:54 that is the adjective inconsiderate	12:30 Oh, that is so...	on my board.
	12:32 so...	13:05 Oh, that is so, so...
	12:35 Sorry, I've got to run. If you come up (gotta)	13:09 I'm sorry, I gotta run. If you come up with an adjective,
	with an adjective, text me.	text me.
	12:42 Inconsiderate. That is the adjective,	13:17 Inconsiderate. That is the adjective.
	"inconsiderate."	Inconsiderate.

Table 4. Comparison of automatic captions, professional subtitles, and amateur subtitles of The Big Bang Theory TV series.

If we look at the automatic captions from YouTube, it can be said that the words from the speech were captured very well. There are, however, errors, such as in the part that begins at 00:49, where *sign's* is mistaken for *signs*, in the part 01:19, where *from* is written instead of *to*, and in the part 01:26, for some unknown reason, "*you dare*" is written, yet there is no such sentence in the soundtrack. However, as opposed to the other transcripts, the sentence in 0:45 "*Of course I'm sure*" is correct. There is still a problem with missing periods at the end of sentences and so it is impossible to tell from the text without sound which person is speaking. Therefore, these subtitles are highly inappropriate for deaf people. Conversely, the hearing

person recognizes the end of sentences and the speakers by the sound.

The professional subtitles on the HBO streaming platform were correctly synchronized with the speech of the show's characters. However, there were few transcription errors. The first in the section 11:25, where is missing character's calling "*Leonard! Leonard!*", the second can be found at 11:36, where the character actually said "*Of course I'm sure*". The subtitle writer shortened that sentence to "*Of course I am.*". Sentences are of the same meaning, but they are not an exact transcription. Further in section 12:09 there is a less formal sentence in the show, and it is "*Listen I gotta get to the lab*". The author used a more formal form of the sentence. Aesthetically speaking, there is again an unnecessary gap between the last word and the question mark or exclamation mark. There is no gap with the periods. Apart from the aforementioned errors, which are not particularly relevant to the overall impression, the author has done a solid job. He kept the maximum number of characters per line, the maximum number of lines and reading speed as well.

Amateur work from user Gfy proved amateurish again, as it was again mis-synced with the characters' speech, which is a very unpleasant problem. However, as far as the transcript is concerned, it could be said it was more accurate than a professional job, although subtitler made the same mistake in the transcription as the professional, in section 12:08 the sentence "*Of course I'm sure*" is shortened to just "*Of course*", which is an even shorter variant than in the professional subtitles and also in part 12:31 omitted "*get a glass of water*" and replaced it with "*get a water*". However, there are fewer transcription errors than that have occurred in the work of a professional. In terms of number of characters per line, displaying time and number of lines, everything was respected. Compared to professional work, there is a slight difference in the distribution of words into lines, for example in parts 12:47 or 12:53.

Scene 3.

The scene is from the film *Harry Potter and the Philosopher's stone*. In the YouTube video called *Harry Potter and the Philosopher's Stone - Clip: You're a Wizard, Harry* the scene starts at 00:37 and ends at 02:16. In the HBO streaming platform the video begins at 13:10 and ends at 14:46. The video copy subtitled with amateur subtitles created by user with the nickname jnb_bd starts at 13:47 and ends at 15:26.

AUTOMATIC CAPTIONS	PROFESSIONAL	AMATEUR
00:37 boy I honestly (<i>haven't</i>) 00:38 useless he was a baby hurry but we're a (<i>Harry</i>) 00:41 bit more along than I would have 00:42 expected particularly rain the middle ah (<i>in</i>) 00:46 I'm not happy I am well of course you (<i>Harry</i>) 00:54 are 00:54 got something for you Fredo you've sat (<i>afraid I</i>) 00:58 on it at some point but I imagine it'll 01:00 taste for you just to say fetch it (<i>baked it</i>) 01:06 myself words at all (<i>and</i>) 01:14 thank you it's not every day your young 01:16 man turns 11 no is it hey 01:34 excuse me who are you 01:38 Rubeus Hagrid keeper of keys and grains (<i>grounds</i>) 01:42 at Hogwarts of course you know all about 01:45 Hogwarts sorry 01:47 not know blimey Harry didn't you ever (<i>no</i>) 01:51 wonder where your mum and	00:13:10 I haven't seen you (<i>boy</i>) since you was a baby, Harry. 00:13:15 (<i>but</i>) You're a bit more along than I expect Particularly in the middle. 00:13:19 I'm not Harry. (<i>I-I'm not...</i>) 00:13:24 -I am -Well, of course you are. 00:13:28 Got something for you. (<i>ye</i>) 00:13:30 Afraid I sat on it, but I imagine it'll taste fine just the same. 00:13:38 Baked it myself, words and all. 00:13:44 HAPPEE BIRTHDAE HARRY 00:13:47 Thank you. 00:13:48 It's not every day your young man turns 11, is it? (<i>hey</i>) 00:14:06 Excuse me, but who are you? 00:14:10 Rubeus Hagrid, Keeper of Keys and Grounds at Hogwarts. 00:14:15 -Of course, you know about Hogwarts. - Sorry, no 00:14:20 (<i>no? Blimey Harry, </i>) Didn't you ever wonder where your mum and dad learned it all? 00:14:25 Learned what? 00:14:26 You're a wizard, Harry. 00:14:30 -I'm a what? -A wizard.	00:13:47 I haven't seen you (<i>boy</i>) since you was a baby, Harry. 00:13:51 (<i>a small delay</i>) You're a bit more along than I expected. Particularly in the middle. 00:13:56 I'm not Harry. (<i>I-I'm not...</i>) 00:14:00 (<i>a little bit early</i>) - I am. - Well, of course you are. 00:14:05 (<i>early</i>) Got something for you. (<i>ye</i>) 00:14:07 Afraid I sat on it, but I imagine it'll taste fine just the same. 00:14:15 (<i>early</i>) Baked it myself, words and all. 00:14:24 (<i>early</i>) Thank you. 00:14:25 It's not every day your young man turns 11, is it? (<i>hey</i>) 00:14:45 Excuse me, but who are you? 00:14:48 Rubeus Hagrid, Keeper of Keys and Grounds at Hogwarts. 00:14:54 - Of course, you know about Hogwarts. (<i>all</i>) - Sorry, no. 00:14:58 (<i>early</i>) Didn't you ever wonder where your mum and dad learned it all? 00:15:03 Learned what? 00:15:04 You're a wizard, Harry. 00:15:09 - I'm a what? - A wizard.

dad learned 01:52 all along you're a wizard Harry I'm a 01:59 lot a wizard and a thumpin good and I'd (<i>what</i>) 02:02 wager once you trade up a little know (<i>trained up</i>) 02:05 you've made a mistake I mean I can't be 02:09 able wizard I mean I'm just Harry just (<i>a</i>) 02:15 Hurry (<i>Harry</i>)	0:14:32 A good one, I'd wager. (<i>thumpin</i>) once you're trained up. (<i>a little</i>) 0:14:35 No, you've made a mistake. I mean... 0:14:38 ...I can't be a wizard. (<i>a-a...</i>) 0:14:42 I mean, I'm just Harry. Just Harry.	0:15:11 A good one, I'd wager. (<i>thumpin</i>) once you're trained up. (<i>a little</i>) 0:15:15 No, you've made a mistake. I mean... 0:15:18 ...I can't be a wizard. (<i>a-a...</i>) 0:15:22 I mean, I'm just Harry. Just Harry.
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Table 5. Comparison of automatic captions, professional subtitles, and amateur subtitles of the Harry Potter and Philosopher's stone film.

This scene was chosen precisely because one of the characters, Rubeus Hagrid, has a very interesting idiolect and, moreover, most of the characters speak with a British accent, so it was meant to be a kind of challenge to the automatic captioning system. In a previous excerpt, it was evident that the system was capable of mastering complex scientific expressions, but in the video, characters spoke with an American accent, which is for many people more catchable than the British one. The differences were noticeable. The system was not able to detect differences between similar words, for example the name Harry was often replaced by the words hurry or even happy, the word *no* was rewritten as *know*, or the word *ground* was mistakenly transcribed as *grains*. Some of the transcripts made no sense as the words were not at all similar, such as the substitution of *baked* for *fetch it*. Interestingly, the system correctly rewrote the name *Rubeus Hagrid*.

Professional subtitles were well synchronized, but they contain several transcription mistakes. The section 0:13:10 originally reads "*Boy, I haven't seen you since you was a baby, Harry.*". Subtitler omitted the first word of the sentence. He also omitted the word *but* at the beginning of the following sentence. In the section 0:13:19, the author of the subtitles decided not to record in the text the stuttering of a frightened character. In the original version, the

sentence was similar to "I-I'm not Harry. Hagrid's idiolect is ignored in the section 0:13:28. Instead of "*Got something for ye.*" subtitler wrote "*Got something for you.*". At 0:13:30 in the first line is missing "*at some point*" after "*Afraid I sat on it*". Further, 0:14:20 is skipped "*Well? Blimey, Harry...*" and at 0:14:32 the word *thumpin'* is missing before "*good one*" and "*a little*" after "*trained up*". The author also did not write gaps between dash and word, which is not pretty to look at, but still appears better than gaps before question marks and exclamation marks. He also opted for a transcription of the inscription on Harry's cake (HAPPEE BIRTHDAE HARRY), apparently because the inscription was highly crooked and difficult to read.

The amateur subtitler jnb_bd apparently copied most of the text from either HBO or another professional subtitler, since the subtitles contained the exact same transcription errors, and the words were equally divided into lines. The differences between the two works were slight, for example, missing transcription of the cake inscription, gaps between hyphens and words, or a synchronization a few milliseconds apart, can be stated as differences. Amateur subtitles appeared a little before the characters started talking, but they were not so far ahead as to spoil the overall impression of the film. A regular audience would not notice this.

In both cases, professional and amateur, there was no violation of the rules, such as exceeding the limit of the number of characters per line or displaying one subtitle too long.

Scene 4.

The scene is from *The Dark Knight Rises*, made by *DC Comics*. YouTube video starts the scene at 00:05 and end at 00:57. HBO GO copy begins at 0:03:10 and ends 0:04:01. Amateur subtitles by user shuja1410 start at 0:03:22 and ends at 0:04:15.

AUTOMATIC CAPTIONS	PROFESIONAL	AMATEUR
00:05 no one cared who I was till I put on the	0:03:10 No one cared who I was	0:03:22 No one cared who I was
00:08 Mars it would be extremely painful (<i>mask, painful</i>)	till I put on the mask. 0:03:15 -If I pull that off, will you	till I put on the mask. 0:03:25 If I pull that off, will you
00:15 you're a big guy for you	die? -It would be extremely	die? 0:03:28 BANE:
00:20 (Music)	painful. 0:03:19	It would be extremely
00:22	-You're a big guy.	painful. 0:03:30

was getting caught part of your plan of 00:24 Course 00:30 dr. Baba refused our offer in favor of 00:33 yours we had to find out what he told 00:36 you think I said nothing (<i>nothing</i>) 00:52 congratulations you got yourself card (<i>caught</i>) 00:55 sir now what's the next step of your 00:57 master plan crashing this food (<i>plane</i>)	-For you. 0:03:26 -Was getting caught part of your plan? -Of course. 0:03:35 Dr. Pavel refused our offer in favor of yours. 0:03:38 -We had to find out what he told you— -Nothing. I said nothing. 0:03:54 Congratulations, (<i>well</i>) you got yourself caught! 0:03:58 -Sir? (<i>now</i>) -What's the next step of your plan? (<i>master</i>) 0:04:01 Crashing this plane	You're a big guy. 0:03:32 BANE: For you. 0:03:36 Was getting caught part you your plan? 0:03:40 BANE: Of course. 0:03:46 Dr. Pavel refused our offer in favor of yours. 0:03:50 -We had to find out what he told you— -Nothing. I said nothing. 0:04:07 Well, congratulations, you got yourself caught! 0:04:10 -Sir? -Now what's the next step of your plan? 0:04:15 BANE: Crashing this plane...
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Table 6. Comparison of automatic captions, professional subtitles, and amateur subtitles of The Dark Knight Rises film.

YouTube subtitles again confused words with similar pronunciations. For example, they wrote *Mars* instead of *mask*, *card* instead of *caught*. Some words have been mistaken for utter nonsense, for example *Dr. Pavel* is rewritten as *Dr. Baba* or the word *plane* like *food*. There was also an omission of the whole sentence: "*If I pull that off, will you die?*".

The subtitles from HBO Go were well timed again, but there was the typical omission of words in the transcript. For example, the word *well* is missing at the beginning of the sentence in the section 1:13:54. The very next sentence skips the word *now* before *What's* and *master* before the word *plan*. The character limit per line and the line limit per one subtitle were not exceeded, displaying time was satisfactory, subtitles had a constant clear format.

Like other amateur subtitles, subtitles from user shuja1410 had a synchronization problem. There was up to a two-second difference between speech and the text. This very much interfered the enjoyment of the film. As for the quality of the transcript, it seems better than the HBO subtitles. However, there was also the apparently targeted omission of the word *master* before the word *plan*. For some incomprehensible reason, when character called Bane was speaking, it was pointed out in the subtitles that he was the one talking (BANE). For others, this did not appear in the subtitles. It seems like an attempt to create SDH subtitles that typically have the character's name placed in front of the text of their speech. As for the character limit per line, it was once exceeded here. In the section 1:13:46 the whole text is written in one line and its number of characters is thus equal to 46, which exceeds by 4 characters the limit recommended by Costal.

Scene 5.

The scene appears in the movie *Ford v Ferrari* from 2019, it retells the story that happened in 1966 during 24 hour lasting Le Mans race between Ford and Ferrari. YouTube video starts the scene at 00:00 and end at 01:23. HBO GO copy starts at 1:05:07 and ends at 1:06:22. Amateur subtitles created by user Black.Hawk start at 1:07:55 and ends 1:09:16.

AUTOMATIC CAPTIONS	PROFESSIONAL	AMATEUR
00:00 give me one reason why I don't fire	1:05:07 Give me one reason	1:07:55 Give me one reason
00:03 everyone associated with this	1:05:09 why I don't fire everyone associated	1:07:59 why I don't fire everyone associated with
00:05 abomination	1:05:12 with this abomination,	1:08:01 this abomination
00:06 starting with you well certain I was (<i>sir</i>)	1:05:20 (delayed) starting with you. Well, sir.	1:08:09 staring with you Well, sir...
00:17 thinking about that very question as a (<i>I</i>)	1:05:22 I was thinking about that very question	1:08:11 I was thinking About that very question
00:18 set out there you're lovely waiting (<i>sat, in your</i>)	1:05:22 as I sat out there in your lovely waiting room.	1:08:13 as I sat out there in your lovely waiting room.
00:21 room as I was waiting there I watched	1:05:28 As I was sitting there I watched	1:08:17 As I was sitting there...
00:25	1:05:28 that little red folder right	1:08:20 I watched that little

that little red folder right there go	there	red folder right there...
00:29	1:05:33	1:08:24
through four pair of hand before it (<i>hands</i>)	go through 4 pairs of hands	go through four pairs of hands...
00:32	1:05:37	1:08:26
got T of yourse that doesn't include the (<i>you</i> , ' <i>course</i>)	before it got to you.	before it got to you.
00:35	1:05:39	1:08:29
22 or so other Ford employees and	Of course, I don't include the 22 (' <i>Course</i>)	'Course that doesn't include... (<i>I don't</i>)
00:38	or so other Ford employees	1:08:31
probably poked at if before it made its	1:05:43	1:08:33
00:40	who probably poked at it before	the 22 or so other Ford employees
way up to the 19th floor all due respect	it made its way up to the 19th floor.	1:08:33
00:44	1:05:48	who probably poked at it before made
sir you can't win a race by committee	With all due respect, sir, (<i>no with</i>)	1:08:34
00:48	you can't win a race by committee.	1:08:38
you need one man in charge now the good	1:05:54	1:08:40
00:52	You need one man in charge.	you can't win a race by committee
news as I see it is it even with all the (<i>that</i>)	1:05:56	1:08:44
00:55	Now, the good news is, as I see it,	You need one man in charge.
extra weight we still managed to put ol	is that even with the all extra weight	1:08:47
01:00	1:06:03	Now, that good news, as I see it,
mr. Ferrari exactly where we want him	we still managed to put ol' Mr. Ferrari	1:08:49
01:02	exactly where we want him.	is that even with all the extra weight...
did we	1:06:07	1:08:53
01:04	Did we?	we still managed to put old Mr. Ferrari
oh yes expand well sure we hadn't we	1:06:09	1:08:55
01:16	Oh, yes.	exactly where we want him
haven't worked out how to corner yer or (<i>yet</i>)	1:06:12	1:08:57
1:19	Expand.	Did we?
stay cool or stay on the ground	1:06:14	1:09:00
	Well.	Oh, yes.
	1:06:17	1:09:03
	Sure, we haven't... (<i>hadn't</i>)	Expand.
	1:06:19	1:09:05
	We haven't worked out how to corner yet.	Well...
	1:06:22	1:09:08
	Or stay cool.	sure, we hadn't...
	Or stay on the ground.	1:09:11
		We haven't worked out how to corner yet.
		1:09:13

		Or stay cool. 1:09:16 Or stay on the ground.
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Table 7. Comparison of automatic captions, professional subtitles, and amateur subtitles of the Ford v Ferrari film.

Although again in the automatic subtitles there were minor disagreements in understanding some words, such as the combination of the words you and ‘*course* in *yourse*, one could say that this time the transcription was quite solid for an automatic system. Fewer errors were recorded. The only problem that occurs in all cases of automatically created captions is that there is a lack of punctuation, correct recognition of uppercase and lowercase letters and, in particular, recognition of the end of a sentence and recognition of different speakers.

There was a time delay in the HBO go subtitles for the first time in part 1:05:22. However, the rest of the text was in line with the speech. There are minor variations in the transcription, for example at 1:05:48 there is actually no word *with*. Also, in the part 1:06:17 is not *haven’t* but *hadn’t*. In none of the lines was the character limit exceeded, displaying time was not too short or long, subtitles had a suitable font and were easy to read.

The Black.Hawk’s captions were also satisfying in terms of font and readability, but again there was an unpleasant time shift between speech and text. It seems like a typical feature of amateur subtitles. In terms of the accuracy of the transcript, however, they were better off than the captions from HBO, there was only one mistake and that was in part 1:08:29, where there is no “*that doesn’t*”, in fact here was said “*I don’t*”. Subtitles were also distinguished from professional ones by the distribution of words into lines, these being, shall we say, more stretched. The author did not make much use of the two-line option, preferring to give most of it at one line. Other than a synchronization problem, no rule defined by Costal was exceeded.

Scene 6.

This BBC show used to be very popular in recent years as it was telling stories about modern Sherlock Holmes, portrayed by famous actor Benedict Cumberbatch. YouTube video scene starts at 00:01 and ends at 0:55, Netflix version of the scene begins at 1:21:52 and ends at 1:22:42, amateur subtitles by a1ubkh4n start at 1:21:44 and end at 1:22:39.

AUTOMATIC CAPTIONS	PROFESSIONAL	AMATEUR
00:00 and told you my call	1:21:52 I thought you might call.	1:21:44 I thought you might call.
00:16 it's not a british army browning l9a1 in	1:22:07 Is that a British Army Browning	1:22:00 (delayed 2 sec.) Is that a British Army Browning
00:19 your pocket or are you just pleased to	L9A1 in your pocket, 1:22:11 or are you just pleased to see me?	L9A1 in your pocket, 1:22:04 or are you just pleased to see me?
00:23 see me both Jim Moriarty hi Jim Jim from	1:22:14 Both.	1:22:09 (delayed) Both
00:37 the hospital	1:22:18 Jim Moriarty.	1:22:12 (delayed) Jim Moriarty. Hi.
00:40 oh I really make such a fleeting (<i>did</i>)	1:22:20 Hi.	1:22:17 Jim?
00:42 impression but I was opposed what was (<i>then, that,</i> <i>suppose</i>)	1:22:20 Jim?	1:22:20 Jim from the hospital?
00:45 wrong all the point (<i>rather</i>)	1:22:23 Jim from the hospital?	1:22:23 Oh, did I really make
00:48 don't be silly someone else is holding a	1:22:27 Oh, did I really make such a fleeting impression?	such a fleeting impression? 1:22:27 But then, I suppose,
00:51 rifle I don't like getting my hands	1:22:30 But then, I suppose, that was rather the point.	that was rather the point. 1:22:32 Don't be silly.
00:54 dirty	1:22:36 Don't be silly. Someone else is holding the rifle.	Someone else is holding the rifle. 1:22:37 I don't like getting my hands dirty.

Table 8. Comparison of automatic captions, professional subtitles, and amateur subtitles of the Sherlock TV series.

YouTube has done moderately good work, but miracles cannot be expected from a still-imperfect system. There have been errors based on poor understanding of the sound. The worst part was 00:42, where the words *then, that a suppose* are missing from the sentence. Suppose is replaced by a similar-sounding *opposed*. However, the system was able to transcribe the

weapon's name correctly. It has been seen in previous excerpts that the system is capable of picking up and transcribing complex scientific words, here we can see the correct transcription of military terminology.

This is the first time a video from streaming platform Netflix has been used, and the differences with HBO Go were apparent. First, Netflix uses a different font that may be a little too thick. Second, Netflix is not afraid to divide the subtitle into up to three lines, which is undesirable under the rules defined by Costal. This error occurred twice in this short scene, and it made the text visibly take up more space than it should. However, the synchronization was well done, and the number of characters was also not exceeded.

Amateur subtitles worked very oddly in this case. Sometimes they were fairly accurate, sometimes they were delayed by two seconds. It acted pretty strange. As for the transcript, it was done better than Netflix for not exceeding the line limit. Font was also more pleasant, but of course this depends on a personal preference.

3.3. Practical part summary

It is visible that professional subtitles had the best performance in all comparisons. However, it is not appropriate to say that due to numerous errors, the automatic and amateurish subtitles are of absolutely poor quality. As far as automatic subtitles go, this technology is far from being followed through, but it is already helping people who cannot understand English from listening. Despite some nonsenses, the people make out the basic core of the conversation. Sometimes they even work perfectly well, which was seen in Scene 2. The system is capable of recognizing complex phrases and scientific or other terminology. It is certain that technology will improve over the time and in future we may achieve perfect automatic subtitles in any situation only through this voice-recognition system.

As far as amateurs are concerned, some people may not be able to do good manual timing, however, the problem with synchronization may be that different lengths of film copies are available online and if someone creates subtitles according to the one, they have, resulting subtitles may not fit the copy of another. This is probably the biggest problem with subtitles of this type. You need to download and search for multiple variants until at least one fits the videos you have available. Therefore, it cannot be said unequivocally that the work was done badly.

4 Conclusion

To conclude the bachelor's thesis, I would like to add that it was interesting to delve into the depths of the subject of subtitles and subtitling. It was still a bit of a challenge, as not too many articles and scholarly studies have been done on the subject, yet it is something that some of us encounter every day. However, only few people have some idea about what stands behind the small text on the screen. The objectives set at the beginning of this work have been met. The theoretical part contains basic information about what the subtitles are, how they were created, provides a historical view on the evolution of subtitling technology. Then mentions the current technology used in this field, and last but not least, there are chapters dedicated to the media that use the subtitles and the target groups for which they are primarily intended. Finally, a practical part was made to assess the accuracy of subtitles. This was compared between automated YouTube subtitles, professional subtitles from HBO Go and Netflix and amateur subtitles from the database Subscene.com. Professional work has proved to be the most reliable, but there are factors that have had an impact on the outcome, such as the fact that amateurs create subtitles based on the videos available to them and these videos can vary in length from other copies, therefore subtitles do not have to fit to all by timing.

It is certain that subtitling has a continuing future in more areas than just in the world of films and television. It is possible that in the future humanity will encounter subtitles during ordinary conversations with foreigners, at business meetings or at international conferences. Not only on a screen, but quite possibly as part of their vision. The future is heading towards automation in all directions, and it is very likely that this sphere will also be dominated by machines. The question is how long this will take, since a comparison of the automatically generated transcript with manual subtitles has shown that the technology is still lagging behind.

The practical part of the bachelor's thesis showed that currently the automated captioning system from YouTube is still unfinished and needs many improvements, but these are limited by the current technology and therefore it will take some time till improvements are made. However, it is still better than nothing and, moreover, the technology is moving forward in leaps and bounds. We may encounter a perfect speech-recognition system in a few years. If full automation would be achieved, these systems could also be used, for example, for translations of books. But the problem will continue with deaf-mutes and hard-of-hearing. Subtitles enable them to comprehend the audio-visual media but passing on the emotions will be a long shot. E-subtitles could catch on, but this is not the right solution for small children who cannot read.

And what more, once everything is machine-made, how do we make sure that machines would recognize emotions and generate subtitles based on them? Surely, new solutions need to be devised and forms of fonts and the like improved.

5 Rozšířený abstrakt

Tato anglicky psaná bakalářská práce s názvem Technologie titulků ve filmech a médiích se dopodrobna zabývá technologií titulků a jejich využitím v běžném životě. Jelikož na toto téma doposud nebylo vytvořeno mnoho výzkumů, snaží se tato práce přinést nové poznatky do této oblasti. Na začátku byly stanoveny cíle, kterých mělo být v práci dosaženo. Tyto cíle byly: prozkoumat technologii titulků a jejich použití ve filmech a jiných médiích, stanovit skupiny lidí, pro které jsou titulky určeny a podrobně popsat, jak jim titulky pomáhají a na závěr porovnat přesnost titulků na základě předem stanovených kritérií. Bakalářská práce je rozdělena na krátký abstrakt, prohlášení, obsah, úvod, teoretickou část, praktickou část, závěr, rozšířený abstrakt, seznam zdrojů, seznam tabulek a seznam obrázků použitých v dokumentu.

V jeden a čtvrt stránkovém úvodu je krátce představena situace, která dala možnost vzniku titulků. V dnešní době jsou média všudypřítomná v lidských životech a nemálo významnou roli pro média představuje zvuk. Ten však nebyl vždy jejich součástí, jelikož technologie na začátku 20. století nebyly tak dokonalé, aby byla možná implementace zvuku k obrazovým záznamům. Némé filmy tehdy byly doprovázeny samostatnými titulky, prostříhanými mezi filmovými obrazy, které předávaly publiku verbální sdělení, odehrávající se ve filmu. Postupem času se technologie posunula a bylo již možné přidat zvukovou stopu k filmovým obrazům. I přes to titulky pokračovaly dál, jelikož zvuk nezajistil porozumění v případě, pokud sledující nemluvil jazykem zvukové stopy anebo byl neslyšící. Dále je v úvodu stanoven cíl práce a jsou stručně popsány jednotlivé kapitoly.

Druhou hlavní kapitolou práce je teoretická část. Ta je rozdělena na několik podkapitol. První z nich je podkapitola, zabývající se základní definicí titulků. Rozebírá se zde, co jsou titulky, na jaké skupiny se dělí a jaké vlastnosti tyto jednotlivé skupiny mají. Vysvětlení je doplněno o přehlednou tabulku. Následující podkapitola se jmenuje Stručná historie titulků a již podle názvu se zaměřuje na historické okolnosti, které vedly ke vzniku titulků a také rozebírá okolnosti vývoje titulků do dnešní podoby. Jako první se zde zmiňuje předek titulků, takzvané supertitulky, které byly používány v dobách oblíbenosti oper. Běžný návštěvník opery nedokázal pochopit, o čem se v ní zpívá, jelikož většina oper byla tradičně v italštině, a proto byl přeložený text ukazován na plátně či kulise nacházející se nad jevištěm. Následně jsou zde zmíněny samostatné titulky, které prolínaly scény v němých filmech, a problémy, které vyvstaly s příchodem zvuku. I přes to, že byl zvuk velmi inovační, většina filmů pocházela z USA a lidé z anglicky nehovořících zemí neměli šanci porozumět ději. Jelikož byl dabing

velmi finančně náročný, mnoho zemí zvolilo titulky jako řešení jazykové bariéry. Krátce jsou zde popsány i moderní technologie, kterým se ale více věnuje podkapitola s názvem Technologie titulků.

Tato kapitola poskytuje pohled na titulky z technického hlediska. Nejprve jsou probrány první technologie, pomocí kterých titulky vznikaly. Například lze zmínit optickou metodu, která byla jedna z prvních široce využívaných technologií, metodu mechanických procesů nebo technologie chemického titulkování. Za nejrevolučnější ze všech je zde považována laserová technologie, vyvinutá v roce 1988 a která jako první zahrnovala práci s počítačem.

Poté je pozornost přesunuta na moderní technologie, které jsou používány v současnosti. V této části je zdůrazněn vliv DVD na vývoj titulkování, jelikož DVD nabízí dabingy a titulky v mnoha jazycích na jednom malém disku. Nakonec největší rozvoj přišel s příchodem internetu, který dal lidem možnost sledovat více typů médií na jednom místě. Kromě toho nabízí sdílení různých souborů a streamování on-line videí, což je v posledních letech mezi uživateli internetu velmi oblíbené. Je zde zdůrazněn i fakt, že díky internetu vznikly volně dostupné titulkovací programy, které fungují na běžném osobním zařízení, a tak je nyní práce titulkáře nejen záležitostí profesionálů, ale i amatérů. Na principu volného sdílení vznikly různé amatérské titulkové databáze, které nabízí titulky k tisícům filmů a seriálů. Většinou je uživatelé připojí k ilegálně staženým kopiím, ale dá se s nimi pracovat i v případě vlastnictví legální kopie.

Jelikož jsou v současné době pro tvorbu titulků nejčastěji používány různé programy, je v této bakalářské práci i stručný popis, který se snaží čtenáři vysvětlit, jak tyto programy fungují, jaké funkce nabízí, jaké jsou mezi nimi rozdíly. Titulky lze převést do mnoha digitálních formátů, ty jsou přehledně zobrazeny v tabulce, která se nachází v podkapitole Formáty titulků.

V závěru podkapitoly o moderních technologiích se objevuje i novinka posledních let, systém automatického titulkování a strojový překlad. Podrobný rozbor popisuje, jak se takovéto titulky generují a jak moc přesně v současné době fungují. Na tuto část navazuje podkapitola řešící budoucnost technologie titulků, která vypadá velmi zajímavě. Ať už se jedná o titulkovací brýle, které by fungovaly jako živý překladač při jakékoliv konverzaci mezi cizinci, nebo o vylepšený strojový překlad a automatický titulkovací systém. Všechny tyto technologie by teoreticky mohly nahradit práci překladatele, která by se následně stala zbytečnou.

Dalším cílem, stanoveným na začátku, bylo představit různá média, která titulky používají

v praxi, a popsat způsoby, jakými je lidem přinášejí nebo k čemu je využívají. Televize, kina, internet a počítačové hry – to jsou média, definována jako ty nezákladnější. Ke každé kategorii přiřazen podrobný text vysvětlující způsoby, jakými dané médium titulky využívá. Například pro televizi je velmi důležité poskytovat titulky divákům v živých vysíláních, jelikož často přináší důležité zprávy z okolí i ze světa a jsou často prvním zdrojem informací pro mnoho jedinců.

Náplní poslední podkapitoly teoretické části jsou cílové skupiny lidí, pro které jsou titulky primárně určeny. Podkapitola je rozdělena na tři části, z nichž první se věnuje hluchoněmým a špatně slyšícím lidem, kteří by se bez titulků neobešli při sledování videí. Je zde však zmíněn problém, s kterým se setkává většina hluchoněmých, a to, že nedokážou z pouhého textu rozeznat tóny a emoce, které jsou patrné jen z hlasu mluvící osoby. Děj je tedy pro ně ochuzený o emocionální část. Jako možné řešení se zde nabízí nápad emocionálních titulků, které jsou podrobněji popsány v textu. Druhá část se zabývá lidmi, kteří titulky používají z důvodu nepochopení původnímu jazyku filmu a třetí ostatními skupinami, jako například lidmi s Aspergerovým syndromem.

Praktická část prvně definuje nepsané titulkovací procesy a pravidla, kterých by se měl správný autor titulků držet. Jsou zde definována kritéria jako například maximální počet znaků na řádek jednoho titulků, zobrazovací čas či správná synchronizace. Na základě těchto kritérií byly hodnoceny a porovnávány tři typy titulků. Porovnání přesnosti titulků probíhá následovně: byla vybrána určitá scéna z daného filmu či seriálu. Tato scéna byla dohledána na platformě YouTube, na streamovací platformě HBO Go nebo Netflixu a na DVD. Scéna byla na YouTube puštěna s automaticky generovanými titulky, na streamovacích platformách s profesionálními anglickými titulky a na DVD s amatérskými anglickými titulky staženými z databáze Subscene.com. Titulky pak byly v jejich přesném znění a časováním přepsány do tabulky vedle sebe pro lepší porovnání. Pod tabulkou je dostupný slovní rozbor, který do detailu rozebírá rozdíly mezi třemi typy titulků, jejich chyby anebo naopak jejich kladné vlastnosti. Toto porovnání bylo provedeno šestkrát s titulky z různých filmů a seriálů, aby se lišili nejen autoři textu, ale také například přízvuky postav mluvících ve scéně. V závěru praktické části je sepsáno shrnutí výsledků, které poukazuje na to, že jako nejlepší se ukázala být profesionální práce ze streamovacích služeb, avšak nelze přímo odsoudit amatérskou práci, jelikož je možné, že autor pracoval s kopií jiné délky, a proto se zde objevila špatná synchronizace.

V závěru je sepsáno celkové shrnutí bakalářské práce, zhodnocení, zda byly splněny jednotlivé cíle a také problematika, která vyvstává z některých zjištění, jako například, že

strojové překlady jsou stále nedokonalé nebo nutnost výzkumu, který by zjišťoval, jak zařídit, aby byly stroje schopné generovat emocionální titulky.

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