Annotated Bibliography

1. Cambria, E., & White, B. (2014). Jumping NLP Curves: A Review of Natural Language Processing Research [Review Article]. *IEEE Computational Intelligence Magazine*, *9*(2), 48–57. https://doi.org/10.1109/MCI.2014.2307227

Over the past few decades, Natural Language Processing has significantly evolved in speed, efficiency, and innovation. By reorienting the history, current state, and future of NLP with the "jumping curves" model from business management, this paper seeks to illustrate the trends of NLP and take a look into what is coming for the field. Overall, there seems to be a move towards narrative-based and more context-aware tech, which seems to be the future of NLP.

This source contains a comprehensive look at the chronological evolution and background of NLP, which can be used to discuss and explain the origins and future of NLP. The "jumping curves" model was an interesting way to orient NLP, though it may be a bit out of scope for my presentation. Still, the source contains a lot of useful definitions and explicitly touches on natural language understanding (NLU), which is great for discussing the applications of NLP.

2. Gruetzemacher, R. (2022). *The Power of Natural Language Processing*. Retrieved July 14, 2022, from https://hbr.org/2022/04/the-power-of-natural-language-processing

NLP has recently made much headway in emulating human-like language synthesis, with tools like GTP-3 from OpenAI reshaping the realm of language models and serving as a foundation to transform the field of NLP. As NLP and AI become increasingly advanced, other industries can reap their benefits. This

article explores NLP in the business industry, where NLP-driven AI is incorporated for automation and analytics, among other tasks. On the whole, language-based AI tools are projected to be a significant driving force in an increasingly data-driven world.

This article does an excellent job illustrating NLP's significance, especially regarding its applications in other industries. Due to the focus of the article being NLP in relation to business, many parts of it may be too specific for my overview style presentation. However, because the article is targeted at people in business, it has simplified explanations of complex ideas which can prove helpful for explaining NLP concepts to novice audiences.

3. Hirschberg, J., & Manning, C. D. (2015). Advances in natural language processing. *Science*, *349*(6245), 261–266. https://doi.org/10.1126/science.aaa8685

Natural language processing is a specific branch of Artificial Intelligence that aims to create machines with human-like comprehension of language. Working based on computational techniques and approaches that automate language analysis, the NLP domain has had many successes, like developments in speech recognition, translation, and generation. The adaptable nature of NLP makes its growth promising, with the incorporation of deep learning and advances in AI.

This paper does an excellent job of discussing successes and challenges regarding different NLP approaches and applications. It also gives a detailed overview of

how NLP is implemented for many of these tasks and applications, though this may be a bit complex for novice audiences to understand.

4. IBM Cloud Education. (2020). *What is Natural Language Processing? | IBM*. Retrieved July 14, 2022, from https://www.ibm.com/cloud/learn/natural-language-processing

Natural Language Processing is the basis of technologies like chatbots, digital assistants, and other everyday tech. The primary goal of NLP is to give computers a certain level of cognitive understanding of human language, using various processing tools and deep learning models. NLP uses syntax and semantics to allow computers to get a context-aware view of language and conversation. IBM Watson is one such technology that levies NLP and AI techniques to create a smart and powerful tool.

This article provides a great intro to NLP, with a high-level overview of many topics in the field. Since the article itself is an overview of NLP, it does not have too many complex ideas that would be difficult to explain to my audience. It also contains excellent examples of the many applications of NLP, which I can use to provide some context for NLP in my presentation. IBM is also a leading company in the field, so the article's insights and information can be considered impactful and relevant in explaining NLP.

5. Liddy, E. D. (2001). Natural Language Processing. *Syracuse University Surface.* Retrieved

July 14, 2022, from

https://surface.syr.edu/cgi/viewcontent.cgi?article=1043&context=istpub

Ultimately, the objective of NLP is to have computers gain true natural language

understanding and cognition, recognizing not just syntax but also context in a

similar way that humans might in conversation. Historically, NLP has been based

on statistical and algorithmic computing, but the advent of the internet and

electronic text has helped the field proliferate. NLP has a variety of approaches,

levels, and applications, and the growth and innovation in the field seem

promising.

This paper does an excellent job of explaining the history of NLP, which may be

helpful information to use as a background to NLP in my presentation. The paper

also has a detailed explanation of potential approaches and levels of NLP, but that

may be too complex to cover for an intro presentation to a novice audience. The

paper also lacks a discussion on recent developments of NLP, as it was written in

2001, making it a good source for the past of NLP but less for the present.

6. Mahima, Y., & Ginige, T. N. D. S. (2020). Graph and Natural Language Processing Based

Recommendation System for Choosing Machine Learning Algorithms. *2020 12th

International Conference on Advanced Infocomm Technology (ICAIT)*, 119–123.

https://doi.org/10.1109/ICAIT51223.2020.9315570

Choosing the best machine learning algorithms and models for a specific project

takes time and can be difficult for beginner programmers. Therefore, this research

proposes an NLP-based application that finds the best machine learning models for a specified project. In summary, a user can input their project idea, and the application will use various NLP and graph analytics techniques and provide the best machine learning algorithm approach for their project. With this, the application provides a solution and takes some weight off new programmers in choosing the best algorithms for their projects.

This research illustrates the usefulness of NLP even within the tech domain in helping programmers with their own work. However, for an audience of novices, this research may not pertain or resonate with them as much. Still, the paper has excellent statistics and graphs regarding the machine learning industry that illustrate different aspects of the field, such as job growth and use in different industries, which may prove helpful in my visual aid.

7. Nadkarni, P. M., Ohno-Machado, L., & Chapman, W. W. (2011). Natural language processing: An introduction. *Journal of the American Medical Informatics Association*, *18*(5), 544–551. https://doi.org/10.1136/amiajnl-2011-000464
The universality of NLP makes it useful in various fields and industries, even outside computer science. One such application is in the medical field, where NLP can be used with clinical text using data-driven approaches and pipeline systems. Still, current NLP trends do not garner 100% accuracy, so human verification is still necessary, especially in the medical field, where accuracy is paramount. Still, the future of NLP holds promise with advances in statistical NLP techniques and innovations like IBM Watson.

This source does a great job of overviewing NLP, regarding its origins and its present form while also touching on the usage of NLP specifically in the medical field. The paper also highlights some of the current shortcomings of NLP, which offers a different perspective on how the field can improve. However, its specificity regarding the medical uses, while serving as an excellent example of NLP being used in other fields, may be too specific to be worth exploring due to the time limits of my presentation.

8. Oracle Cloud. (n.d.). *What is Natural Language Processing (NLP)? | Oracle*. Retrieved July 14, 2022, from https://www.oracle.com/artificial-intelligence/what-is-natural-language-processing/

Natural Language Processing has the intention of instructing computers to be able to understand, create, and manipulate human language and is the basis of multiple innovations of today. NLP can be applied in multiple scenarios like automation, optimization, and analytics, and multiple industries end up using NLP due to its practicality. Technologically, there are various tools, libraries, and approaches that make NLP possible and are heavily used in the field today to execute NLP frameworks.

This article gives a practical and straightforward overview of NLP, which makes it a great starting point for explaining the concept of NLP to a novice audience. The article explores not only the concept of NLP itself, but also its uses and applications, which can serve as wonderful examples in my presentation. Oracle

is also a prominent company in the NLP field, so the article's insights and information can be considered pertinent and up-to-date.

9. Raina, V., & Krishnamurthy, S. (2022). Natural Language Processing. In V. Raina & S. Krishnamurthy (Eds.), *Building an Effective Data Science Practice: A Framework to Bootstrap and Manage a Successful Data Science Practice* (pp. 63–73). Apress. https://doi.org/10.1007/978-1-4842-7419-4_6

NLP is a sub-field of Artificial Intelligence that centers around teaching computers to learn and understand human language. Most of NLP is centered around the two subfields of natural language understanding and natural language generation, both of which are involved in much of the NLP tech seen in everyday life. Machines being able to understand and generate human language is the harbinger of significant technological innovations and benefits ranging from voice assistants to language translation, and much more.

This source gives a superb overview of NLP as a concept and also touches on the essential topics of natural language understanding and natural language generation. Additionally, the source contains great examples of applications of NLP which can be used in my presentation. However, I do not anticipate that the more detailed processing models the source touches on will be too useful, as they may be too complex for a novice audience.

10. Surabhi, M. C. (2013). Natural language processing future. *2013 International Conference on Optical Imaging Sensor and Security (ICOSS)*, 1–3. https://doi.org/10.1109/ICOISS.2013.6678407

One application of NLP is for people to interact and talk with a computer in human language, which could potentially be applied to express programming ideas. This paper explores the feasibility of using NLP to help with programming, specifically with loops and steps. NLP, if applied in such a domain, has the potential to change the way programmers do their work in a similar way to how it has already changed everyday life with its applications.

This source seems to be relatively short and simple in terms of its analysis of NLP's background and its possible usage in the programming domain. However, its simplicity makes it a good candidate to draw upon for my presentation tailored to a novice audience. The paper goes into examples and implementations of NLP, which can provide good context for my explanations.