



by Cassy Cormier

JULY 3 2025

‘ARRIVAL’ THE MOVIE

Through the lens of Natural Language Processing

Overview

After spaceships land on various parts across the world, linguistics professor Louise Banks must find a way to communicate with the extraterrestrial visitors.

This presentation explores the communication and language challenges Dr. Banks faced in understanding the alien visitors, and how these challenges intersect with key themes in natural language processing.



Communication themes explored in the movie



- Tool for Understanding
- Power and Fragility
- Fragility
- Unity vs. Division
- Choice
- Empathy in Communication



'ARRIVAL' THE MOVIE

KEY CHALLENGES OF NATURAL LANGUAGE PROCESSING PRESENTED IN THE PLOT



Is “Offer Weapon” a threat or gift?

NLP Themes

1. AMBIGUITY: Many words and phrases have multiple meanings.
2. IDIOMATIC EXPRESSION: When the word meaning cannot be inferred from individual words.
3. REGIONAL AND CULTURAL VARIATIONS: Language varies significantly depending on where it's spoken. The aliens were communicating with linguistic teams from all around the world.
4. TONE: Emotional meaning and intent is difficult to detect and translate.
5. LACK OF CONTEXT: Without historical or linguistic context, the words being communicated can be misinterpreted as nonsense. Louise is starting with nothing.

Louise Cracks the Code

How does Louise learns the alien language?



STEP # 1

Louise interacts with the heptapods and pictures are taken of their responses. The symbols are observed and documented for patterns.



STEP # 2

She uses step-by step methods rooted in human language learning. Step one is repeated until a dataset is created of the alien language.

STEP # 3

Once she realizes their thoughts are all formed at once instead of linearly, she can communicate, think, and perceive time like the heptapods.

SIMILAR NLP APPROACHES

RULE-BASE NLP: MATCHING WORDS TO MEANINGS BASED UPON PRE-DEFINED RULES. LOUISE USES GREETINGS AND INTRODUCTION AS A STARTING REFERENCE. GREETINGS ARE A PRE-DEFINED BARRIER TO ENTRY TO START A CONVERSATION WITH ANYONE OR ANYTHING.

STATISTICAL NLP: USING STATISTICAL METHODS TO ANALYZE LARGE AMOUNTS OF DATA TRACKING WHICH SYMBOLS SHOW UP MOST IN THE ALIEN LANGUAGE TO DETECT PATTERNS.

DEEP NLP: UNDERSTANDING MEANING FROM DEEP LEARNING MODELS . LOUISE UNDERSTOOD MEANING FROM A COMPLEX STRUCTURE OF SYMBOLS

References

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