

Case Study C3-004
Structural Compliance in Patent NMT
 Genitive Over-Specification (De vs. Du)
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Case Study Metadata

Dataset ID: C3-004
Category: Structural Compliance — Constraint 3
Focus: Genitive Determination
Model: Generic NMT
Domain: Medical Devices / Hemodialysis

1 The Context: Class vs. Instance

In French technical nomenclature, the preposition *de* (without an article) is used to define a **Category** or **Function** (e.g., *Pompe de vidange* - Drain pump). The contracted article *du* (de + le) is used to point to a **Specific Instance** or substance (e.g., *Pompe du réacteur* - The reactor's pump).

In **MedTechPatentClaims**, the term "Blood treatment machine" refers to a generic class of device. It does not refer to the treatment of a specific patient's blood at the moment of naming.

Key Concept

The "Definiteness Bias":
 Generic NMT models prefer "fluent" speech patterns where specific articles are common. They habitually insert the definite article (*du*), transforming a generic "Type of Machine" into a specific "Machine for THE blood."

2 The Glitch: Over-Specification

In Claim 1, the model incorrectly specified the genitive relation, creating a subtle but legally significant shift in scope.

2.1 Forensic Evidence (Claim 1)

Source (English)	NMT Output (Failure)	Golden Rewrite (Correct)
"...A blood treatment machine..."	× "...Machine de traitement du sang..." (Specific Instance)	✓ "...Machine de traitement de sang..." (Generic Class)

Table 1: Genitive Determination Failure in Device Nomenclature

2.2 Why This Matters

- **Category vs. Process:** "*Traitement du sang*" implies the active process of treating specific blood. "*Traitement de sang*" defines the machine's capability/type.
- **Implicit Antecedent:** Using "*du*" implies that "The Blood" has been previously introduced or is a specific entity in the claim's environment. Since no blood has been introduced yet (only the machine), this violates the **Antecedent Basis** principle.
- **New Matter Risk:** In strict jurisdictions, implying a specific "blood" element that is not part of the claimed apparatus could be construed as adding subject matter.

3 Alignment Methodology

3.1 Compound Noun Tokenization

To fix this, we enforce a "**Zero-Article**" rule for English Noun-Adjuncts translating to French functional descriptions.

Alignment Methodology

Genitive Control Protocol:

1. **Pattern Recognition:** Detect English structure [Noun1] + [Noun2] (e.g., Blood treatment).
2. **Function Test:** Is Noun1 the *object* of Noun2 (Treatment OF Blood)?
3. **Article Suppression:** If defining a device/system, suppress the definite article in French.
4. **Transformation:** de + le → de (Null Article).

4 Key Insights

Key Concept

What This Case Study Demonstrates:

1. **Grammar is Legal Scope:** A single article (*du vs de*) changes the definition from "What it IS" (Type) to "What it DOES" (Process).
2. **Fluency vs. Accuracy:** "*Traitement du sang*" sounds more natural in conversation, but "*Traitement de sang*" is the precise technical classifier required for the patent title.
3. **Antecedent Hygiene:** You cannot refer to "The Blood" before you have introduced "A Patient" or "A Fluid Source."

Portfolio: Patent Translation AI Alignment Framework

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