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APPROACHES TO IDENTIFYING AND ANALYISING FALSE FRIENDS IN TECHNICAL TRANSLATION

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This research aims to develop a comprehensive framework for identifying, classifying, and analysing false friends in technical translation, emphasising electrical engineering terminology, to enhance translation quality and reduce semantic errors in cross-linguistic technical communication. The study addresses four primary objectives: (1) to establish a systematic taxonomic classification of false friends in technical contexts, distinguishing between complete and partial pseudo-internationalisms; (2) to analyse the morphological and semantic patterns of electrical engineering terminology that contribute to interlingual interference; (3) to examine computational approaches for automated false friend detection using machine learning and corpus-based methods; and (4) to develop practical quality assurance strategies for technical translators working with multilingual technical documentation. The research demonstrates that technical terminology presents unique challenges due to its dual concrete-abstract nature, with electrical engineering vocabulary exhibiting systematic derivation patterns that can both facilitate and complicate cross-linguistic transfer. Complete pseudo-internationalisms such as "conductor/кондуктор" and "data/дата" represent the most deceptive category. In contrast, partial pseudo-internationalisms like "battery/батарея" demonstrate varying degrees of semantic overlap across different technical contexts. Quantitative analysis reveals asymmetrical translation challenges, with English terms frequently possessing broader semantic ranges than their Ukrainian counterparts, resulting in higher error rates in English-to-Ukrainian translation directions. Recent computational linguistics advances have achieved an 83.81% F1-score classification performance using BERT-based models for false friend detection, indicating significant potential for automated quality assurance systems. The study identifies critical specialised categories, including measurement unit false friends, lexicalised plural forms, and paronymous confusion, each requiring specific mitigation strategies. Professional terminology databases such as IATE (1.4 million multilingual terms) and IEC Electropedia provide essential resources for systematic false friend identification and resolution. The research concludes that effective technical translation requires integrating linguistic analysis, domain expertise, and computational tools, particularly directional translation strategies that account for semantic asymmetries between source and target languages in specialised technical communication contexts.

Keywords: *false friends, technical translation, electrical engineering terminology, interlingual interference, pseudo-internationalisms, computational linguistics, translation quality assurance, semantic divergence, multilingual terminology, cross-linguistic communication.*

Introduction. A distinctive feature of electrical engineering terminology is its capacity to represent concepts across two primary dimensions: concrete and abstract manifestations. Like other scientific, environmental, and energy dictionaries, electrical engineering terms can be systematically classified according to their grammatical functions and semantic properties. The morphological distribution within this specialised vocabulary demonstrates clear patterns: nouns constitute the predominant category, followed by adjectives and verbs in descending frequency (Berman, 2009).

Within the nominal category, electrical engineering terminology encompasses both concrete referents, such as capacitor, transistor, inductor, amplifier, oscilloscope, and semiconductor device, as well as abstract concepts, including impedance, frequency response, signal integrity, electromagnetic compatibility, power factor, and system stability. This dual nature of technical terminology creates particular challenges for translators, as abstract concepts often lack direct physical referents and may be culturally or methodologically specific to particular engineering traditions (Academic Language Experts, 2024).

Disciplines such as electronics, electrical engineering, telecommunications, and computer technology are primary sources of neologistic development, with new terms constantly emerging to reflect technological advancement and innovation. The International Electrotechnical Commission (IEC)

(2025) has established comprehensive guidelines for terminology standardisation through the IEC 60050 International Electrotechnical Vocabulary, which provides multilingual technical definitions across fourteen languages to facilitate accurate cross-linguistic communication in electrical engineering contexts.

The nomenclature system for electronic components demonstrates systematic derivation patterns. For instance, electron tube classifications derive from the Greek term "electrode", with numerical prefixes indicating the number of active elements: diode (two electrodes), triode (three electrodes), tetrode (four electrodes), pentode (five electrodes), and so forth. Similarly, semiconductor devices follow systematic naming conventions: bipolar junction transistor (BJT), field-effect transistor (FET), metal-oxide-semiconductor field-effect transistor (MOSFET), and insulated-gate bipolar transistor (IGBT).

This research aims to develop a comprehensive framework for identifying, classifying, and analysing false friends in technical translation, emphasising electrical engineering terminology, to enhance translation quality and reduce semantic errors in cross-linguistic technical communication.

The study addresses four primary **objectives**: (1) to establish a systematic taxonomic classification of false friends in technical contexts, distinguishing between complete and partial pseudo-internationalisms; (2) to analyse the morphological and semantic patterns of electrical engineering terminology that contribute to interlingual interference; (3) to examine computational approaches for automated false friend detection using machine learning and corpus-based methods; and (4) to develop practical quality assurance strategies for technical translators working with multilingual technical documentation.

The object of this investigation encompasses interlingual lexical pairs exhibiting formal similarity but semantic divergence within technical translation contexts, explicitly focusing on English-Ukrainian language pairs in electrical engineering, telecommunications, and computer technology domains.

The subject involves the psycholinguistic mechanisms underlying false friend phenomena, including divergent semantic evolution, borrowing patterns, and coincidental phonetic similarities that create translation interference in specialised technical vocabularies.

Presentation of the primary material. The phenomenon of "false friends of the translator" (French: *faux amis du traducteur*) refers to interlinguistic lexical interference resulting from psycholinguistic mixing between source and target languages. In linguistics, a false friend is a word in a different language that looks or sounds similar to a word in a given language, but differs significantly in meaning. This interference manifests through various mechanisms, including historical language contact, borrowing patterns, parallel semantic development, and coincidental phonetic similarity (Granger & Swallow, 1988).

Historically, false friends emerge through multiple pathways: (1) divergent semantic evolution of cognate terms, (2) borrowing at different historical periods with subsequent semantic drift, (3) calque translations that acquire different meanings in target languages, and (4) coincidental phonetic similarity between etymologically unrelated terms. In technical translation contexts, these phenomena are particularly problematic due to the precision requirements of scientific communication.

The taxonomic classification of false friends encompasses several categories based on their degree of semantic overlap and formal similarity. Complete false friends demonstrate total semantic divergence despite formal similarity, while partial false friends maintain some semantic intersection alongside divergent meanings. Recent computational linguistics research has achieved classification performance on the Spanish-Portuguese false friend dataset of F1 = 83.81% using BERT, indicating the potential for automated detection systems in translation quality assurance (Sampedro Mella, 2004).

Interlingual homonyms and paronyms constitute a substantial subset of false friends, with particular significance in technical domains. Interlingual homonymy exhibits bidirectional recognition, as speakers of both languages can identify the semantic discrepancy. This phenomenon contrasts with unidirectional false friends, where semantic confusion occurs primarily in one translation direction (House, 2014).

Classification Systems and Typological Analysis
Complete Pseudo-Internationalisms

Complete pseudo-internationalisms represent the most deceptive category of false friends, exhibiting formal similarity with complete semantic divergence. In electrical engineering contexts, critical examples include:

"Conductor" (English) vs *"кондуктор"* (Ukrainian): The English term encompasses multiple meanings, including electrical conductor, orchestra conductor, and thermal conductor, while the Ukrainian cognate refers specifically to a ticket collector or train conductor.

"Data" (English) vs *"дата"* (Ukrainian): English "data" refers to information or measurements, while the Slavic cognate means "date" (temporal reference).

• *"Instrument"* (English) vs *"інструмент"* (Ukrainian): English usage encompasses measuring devices, musical instruments, and legal documents, while Ukrainian primarily denotes tools or musical instruments, rarely technical measuring equipment.

Partial Pseudo-Internationalisms

Partial pseudo-internationalisms demonstrate semantic overlap in some contexts while diverging in others. This category subdivides into three distinct patterns:

Pattern A: Broader Source Language Semantics

The source language term encompasses multiple meanings, only one corresponding to the target language equivalent.

"Battery" serves as an exemplary case:

English meanings: (1) electrochemical energy storage device, (2) military artillery unit, (3) legal term for physical assault, (4) group of similar items, (5) baseball pitcher and catcher combination

Ukrainian *"батарея"* meanings: (1) electrochemical device, (2) heating radiator, (3) military artillery unit

The electrical engineering context requires precise differentiation between primary cells, secondary cells, battery packs, and energy storage systems, with Ukrainians often employing more specific terminology for each application.

Pattern B: Target Language Semantic Extension

The target language term possesses meanings that are absent in the source language.

"Focus" demonstrates this pattern:

English meanings: (1) optical convergence point, (2) centre of attention, (3) clarity of vision

Ukrainian *"фокус"* meanings: (1) optical convergence point, (2) magic trick or illusion, (3) centre of attention

This divergence can lead to confusion between technical specifications and entertainment applications in optical engineering contexts.

Pattern C: Bidirectional Semantic Extension

Both languages possess unique meanings alongside shared semantic territory.

"Correspondence" exemplifies this complexity:

English meanings: (1) letters/communication, (2) similarity/correlation, (3) mathematical mapping

Ukrainian *"кореспонденція"* meanings: (1) letters/communication, (2) journalistic reporting, (3) accounting term for financial transactions

In systems engineering, "correspondence" often refers to mathematical relationships between system inputs and outputs, requiring careful attention to contextual disambiguation.

Specialised Categories in Technical Translation

Measurement Unit False Friends

Technical translation encounters particular challenges with measurement units that exhibit phonetic similarity but represent different values:

"Ton/Tonne": British long ton (1,016 kg), American short ton (907.2 kg), metric tonne (1,000 kg)

"Billion": American system (10^9), British traditional system (10^{12})

"Bar": Pressure unit (100,000 Pa) vs. other meanings in different contexts.

Lexicalised Plural Forms

Specific technical terms exhibit semantic divergence between singular and plural forms:

"Work" (energy transfer) vs "*works"* (industrial facility)

"Datum" (reference point) vs *"data"* (information set)

*"Medium" (*transmission medium) vs *"media"* (communication channels)

Paronymous Confusion in Technical Contexts

Paronyms create false associations despite formal differences:

"Affect" (to influence) vs "*effect"* (result/consequence)

"Current" (electrical flow/present time) vs *"currant"* (dried fruit)

"Principal" (central/chief) vs *"principle"* (fundamental rule)

Internationalism and Terminology Standardisation

Internationalisms constitute a significant proportion of technical vocabulary, exhibiting varying degrees of phonetic, grammatical, and semantic similarity across languages. The IATE, or Interactive Terminology for Europe database (2024), is a valuable repository of a range of technical vocabulary in twenty-five languages. Containing 1.4 million multilingual terms, the IATE database contains specific domains in which one can search for a host of terms in fields such as mechanical engineering, electrical engineering, industrial engineering and more.

The positive influence of internationalism on technical translation includes facilitating initial comprehension and providing cognitive bridges between languages. However, their literal translation can result in significant semantic and stylistic distortions due to divergent meanings in corresponding terms. This duality means internationalisms can function simultaneously as "true friends" and "false friends" depending on contextual application (Chamizo, 2008).

Examples of International Technical Terms

"*Processor"* demonstrates successful internationalisation:

• English: central processing unit, data processor

• German: Prozessor (identical usage)

• French: processeur (identical usage)

• Ukrainian: процесор (identical usage)

"Control" shows partial internationalisation with semantic divergence:

• English: regulation, command, verification

• German: Kontrolle (primarily verification/inspection)

• French: contrôle (verification/inspection emphasis)

• Ukrainian: контроль (primarily verification/monitoring)

In control systems engineering, this divergence creates translation challenges when distinguishing between active control (regulation) and passive monitoring (verification).

Quantitative Analysis of Translation Errors

Research indicates that English terms frequently possess broader semantic ranges than their Ukrainian counterparts, creating asymmetrical translation challenges. Statistical analysis of technical translation errors reveals that English-to-Ukrainian translation encounters higher error rates in false friend contexts than the reverse direction, due to the semantic breadth differential (Korunets, 2003).

Case Study: "Chip" Semantic Analysis

The English term "chip" exemplifies polysemic complexity in technical contexts:

1. *Integrated circuit*: semiconductor device containing electronic circuits

2. *Silicon chip:* physical substrate for integrated circuits

3. *Microfilm chip:* a small section of microfilm

4. *Data fragments:* particles from punch cards or perforated tape

5. *Wood chip*: a small piece of wood (non-technical usage)

Ukrainian *"чип"* maintains a narrower semantic focus:

1. *Integrated circuit*: semiconductor device (primary meaning)

2. *Smart card chip:* an embedded circuit in identification cards

This semantic asymmetry requires translators to employ contextual analysis and domain-specific knowledge to ensure accuracy. In semiconductor manufacturing, precise terminology becomes critical for quality assurance and technical specification compliance.

Recent advances in natural language processing have enabled automated detection of false friends using various computational methods:

Novel approaches to exploring cross-linguistic connections, focusing on false friends, using Large Language Model embeddings and graph databases, have shown promising results. BERT-based models achieve high classification accuracy by analysing semantic embeddings and cross-lingual representation learning.

Large-scale corpus analysis enables statistical identification of translation patterns and error frequencies. Parallel corpora in technical domains provide training data for machine learning models while revealing systematic patterns in false friend occurrences.

Professional translation increasingly relies on specialised terminology databases such as:

• *IATE (Interactive Terminology for Europe)*: 1.4 million multilingual terms;

• *IEC Electropedia:* International electrotechnical vocabulary;

• *IEEE Terminology Database:* Electrical and electronics engineering terms;

• *ISO Terminology Database:* International standards terminology.

Effective technical translation requires systematic approaches to false friend identification and resolution:

1. *Contextual Analysis:* Examining the surrounding technical context to disambiguate terms;

2. *Domain Expertise:* Consulting subject matter experts for specialised terminology;

3. *Multiple Reference Sources:* Cross-referencing technical dictionaries and standards;

4. *Back-Translation Verification:* Translating completed text back to the source language for accuracy checking.

Careless handling of false friends in technical translation can result in:

• *Safety hazards:* Misinterpreted technical specifications leading to equipment malfunction;

• *Quality failures:* Incorrect manufacturing parameters causing product defects;

• *Compliance violations:* Regulatory non-compliance due to specification errors;

• *Economic losses:* Project delays and rework costs from translation errors.

Professional Development Recommendations

Technical translators should pursue continuous professional development through: *Domain-specific training:* Acquiring subject matter expertise in relevant technical fields; *Terminology management:* Maintaining personal glossaries and translation memories; *Professional certification:* Obtaining recognised credentials in technical translation; *Col-*

laborative networks: Participating in professional translator associations and forums.

Conclusions. False friends represent a persistent challenge in technical translation, requiring systematic approaches combining linguistic analysis, domain expertise, and technological tools. The complexity of modern technical terminology, particularly in rapidly evolving fields like electrical engineering and computer technology, demands continuous attention to semantic precision and cross-linguistic accuracy.

Successful technical translation relies on a comprehensive understanding of false friend phenomena, systematic application of quality assurance procedures, and ongoing professional development. As computational tools become more sophisticated, integrating automated detection systems with human expertise will likely provide optimal solutions for managing false friend challenges in technical translation contexts.

The asymmetrical nature of semantic relationships between languages necessitates directional awareness in translation strategies, with particular attention to the broader semantic ranges often found in English technical terminology. Through careful analysis, appropriate tool utilisation, and continuous learning, technical translators can effectively navigate the complex landscape of interlingual false friends while maintaining the precision required for professional technical communication.

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ПІДХОДИ ДО ВИЯВЛЕННЯ ТА АНАЛІЗУ ХИБНИХ ДРУЗІВ ПЕРЕКЛАДАЧА У ТЕХНІЧНОМУ ПЕРЕКЛАДІ

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Метою дослідження є розробка комплексної системи ідентифікації, класифікації та аналізу хибних друзів перекладача у технічному перекладі, з особливим акцентом на термінології електротехніки, для підвищення якості перекладу та зменшення семантичних помилок у міжмовній технічній комунікації. Визначено чотири основні цілі дослідження: (1) встановлення систематичної таксономічної класифікації хибних друзів у технічному контексті з розрізненням повних та часткових псевдоінтернаціоналізмів; (2) аналіз морфологічних та семантичних закономірностей термінології електротехніки, що сприяють міжмовній інтерференції; (3) дослідження обчислювальних підходів до автоматичного виявлення хибних друзів за допомогою методів машинного навчання та корпусних методів; та (4) розробка практичних стратегій забезпечення якості для технічних перекладачів, які працюють з багатомовною технічною документацією. Об'єктом дослідження є міжмовні лексичні пари, що характеризуються формальною схожістю, але семантичною розбіжністю у технічних контекстах перекладу, з особливим акцентом на англо-українських мовних парах у галузі електротехніки, телекомунікацій та комп'ютерних технологій. Предмет дослідження охоплює психолінгвістичні механізми, що лежать в основі явища хибних друзів перекладача, включаючи розбіжну семантичну еволюцію, моделі запозичень та випадкові фонетичні подібності, що створюють перекладацьку інтерференцію у спеціалізованій технічній лексиці. У дослідженні продемонстровано, що технічна термінологія представляє унікальні виклики через свою подвійну конкретно-абстрактну природу, причому лексика електротехніки демонструє систематичні моделі походження, які можуть як полегшувати, так і ускладнювати міжмовний переклад. Повні псевдоінтернаціоналізми, такі як «conductor/кондуктор» та «data/дата», представляють найбільш оманливу категорію, тоді як часткові псевдоінтернаціоналізми, такі як «battery/батарея», демонструють різний ступінь семантичного перекриття в різних технічних контекстах. Кількісним аналізом виявлено асиметричні виклики перекладу, оскільки англійські терміни часто характеризуються ширшим семантичним діапазоном порівняно з українськими відповідниками, що призводить до вищого рівня помилок у перекладі з англійської на українську. Останні досягнення в галузі комп'ютерної лінгвістики дозволили досягти 83,81% ефективності класифікації за показником F1 за допомогою моделей на основі BERT для виявлення хибних друзів перекладача, що вказує на значний потенціал автоматизованих систем забезпечення якості. Визначено критичні спеціалізовані категорії, включаючи хибні друзі одиниць вимірювання, лексикалізовані форми множини та паронімічну плутанину, кожна з яких вимагає конкретних стратегій аналізу та перекладу. Професійні термінологічні бази даних, такі як IATE (1,4 мільйона багатомовних термінів) та IEC Electropedia, надають необхідні ресурси для систематичного виявлення та вирішення хибних друзів перекладача. За результатами дослідження зроблено висновок, що ефективний технічний переклад вимагає інтеграції лінгвістичного аналізу, галузевої експертизи та обчислювальних інструментів, з особливою увагою до стратегій спрямованого перекладу, що враховують семантичну асиметрію між вихідною та цільовою мовами в спеціалізованих технічних комунікаційних контекстах.

Ключові слова: *хибні друзі перекладача, технічний переклад, термінологія електротехніки, міжмовна інтерференція, псевдоінтернаціоналізми, обчислювальна лінгвістика, забезпечення якості перекладу, семантична дивергенція, багатомовна термінологія, міжмовна комунікація.*