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| RESEARCH ARTICLE

Copilot vs DeepSeek's Translation of Denotative and Metonymic Abu- and Umm- Animal and Plant Folk Names in Arabic

Prof. Reima Al-Jarf
King Saud University, Riyadh, Saudi Arabia
Corresponding Author: Prof. Reima Al-Jarf, **E-mail**: reima.al.jarf@gmail.com

| ABSTRACT

This study investigates the translation of denotative and metonymic Abu- and Umm-animal and plant folk names by Copilot (MC) and DeepSeek (DS) using three prompts (no-domain, with domain and metonymic), the strategies they use, causes of errors, and whether students and specialists can depend on AI in translating Abu-names. Results showed that in the denotative Abu-names, DS gave higher correct equivalents in response to the no-domain prompt (51% by DS vs 46% by MC) and the domain prompt (51% by DS vs 44% by MC). The equivalent animal's name was directly given without any translation, transliteration or annotation (أبو مَركوب Shoebill). Both gave identical responses to 40% of the denotative items. In the metonymic name list, both MC and DS failed to identify the exact animal or plant type to which each Abu-metonyms in response to all 3 prompts. Both gave fewer than 3% correct responses to all 3 prompts. Similar equivalents were given to each Umm-name in response to the three prompts, of which MC gave 30% correct and 70% faulty equivalents with different wording. By contrast DS failed to give correct responses to all items in the no-domain prompt, 97%-99% faulty responses to the domain prompt & metonymic prompt, respectively. Regarding faulty strategies, MC translated Abu to "father" (46%); translated Abu + Noun semantically without "father" (أبو الشّبت *Dill beetle) (32%); made faulty guesses (أبو حُدَيج Possibly a local fish or bird name) (17%), transliterating the noun following Abu in 57% (أبو البحتري Father of Al Buhturi) and translating it (43%) (إبن جلي Son of Clarity). Both MC and DS considered metonymic names as personal names (55% by MC and 95% by DS). DS translated أبو Abu to "father" in 27%. In the annotation, DS gave the genus, not the specific animal implied (أبو الشّبت *Dill Father (a type of beetle). DS rendered "lizard" as the referent animal/plant in all items in response to the metonymic prompt. The study gives causes of the AI errors and recommendations for improving AI performance in translating Abu- and Umm-animal and plant names to English.

| KEYWORDS

Artificial Intelligence, AI translation, Abu-animal names, Umm-animal names, literal translation, transliteration, metonymic Abu-animal names, denotative Abu-animal names, folk animal names, folk taxonomies

| ARTICLE INFORMATION

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1. Introduction

According to Al-Jarf (2017), Al-Jarf (2025d), Al-Jarf (2025h), and Al-Jarf (2023), أبو Abu "father", أم Umm "mother, ابن Ibn "son", and بنت Bint "daughter" in Arabic have many denotative and connotative meanings and are used in general and specialized contexts. In Arabic culture, parents are addressed by the name of their first/oldest child *(*أم علي *Umm Ali &* أبو علي *Abu Ali)*. A grandparent, a foster parent or an old person can be called أم صالح *Om Saleh or* أبو صالح *Abu Saleh*, out of respect. A young man who is a bachelor can be called Abu~ after his father out of respect or jokingly (أبو راشد *Abu Rashed*). Along with its lexical variants *Abi, Bu, Baa, and Aba,* it is used in some surnames (أبي نادر *Abi* Nader, أبو دياب Abu-*Diab,* باداوود *Ba Dawood,* بوعلام *Bu Allam,* أبانمي *Aba Nami)*, each of which is used in a different Arab country. Abu and Umm are also used in proper nouns referring to people's first name (أبو جهل *Abu Jahl,* أبو هريرة *Abu Huraira,* أبو لهب *Abu Lahab,* أم كلثوم *Om Kulthoum,);* and in nicknames *(* أبو الايد for *Eyad;* أم الزوز Umm *Ez-zouz)*.

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Additionally, Abu and Umm can mean origin or founder of *(*أبو التاريخ *father of history,* أبو الطب *father of medicine*, أم الاختراع *mother of invention,* أم مستعمرة *mother colony),* a prototype or best example *(mother of democracies* أم الديموقراطيات*)*; the biggest or most significant example of its kind (أم المعارك *the mother of all battles);* extraordinary in size, or intensity as in *(* أم القوائم *Homepage,* أم النجوم *galaxy);* a person who serves or is thought of as a protector *(*أبو المصريين *father of Egyptians &* أم الإمارات *the mother of UAE);* and innate or native as in *(*الأم اللغة *mother language;* أم الحفلات والسهرات *mother of all parties*).

Furthermore, Abu and Umm appear in names of cities, places and monuments *(*أم قصر *Om Qasr,;* أم درمان *Om Dorman;* ام الطيور Om at-tyour, town in Syria; أبو ظبي *Abu Dhabi;* أبو الهول *Sphinx*; أبو سمبل *Abu Simbel Temple* in Egypt*)*. In Colloquial Arabic, Abu and Umm "*having, possessing*". For example, Om Kulthoum means *a woman with chubby cheeks*. They are also used to identify an unknown person by describing his/her physical appearance (أم فستان احمر *lady in red dress*, أبو نظارة *man wearing sunglasses*).

Connotatively, Abu and Umm are used in collocations, idioms and metonyms (بأم عيني *"with my own eyes";* ضربه على أم رأسه *"hit him on the back of his head";* بأبي أنت وأمي يا رسول الله *"I sacrifice my father and mother for the Prophet's sake);* رأيته بأم عيني "*I saw him with my own eyes*"*;* to describe good or bad demeanor أم نكد *"a child who keeps nagging"*; أبو الكرم *"a man of generosity"*.

Moreover, *Abu* and Umm are used in specialized contexts as in Islamic contexts as أم الكتاب "Surat Al-Fatiha"; Umm Al-Qura "Makkah"; أبو مرة "Satan". They are used brand names (أبو بنت , أبو ولد & أبو كاس *Abu Bint/Abu Walad/* Abu Kas rice). In food, (أم علي*Om Ali desert).* Some are used in Islamic contexts (أم الكتاب *Surat Al-Fatiha,* أبو مرة Satan; أم الخبائث *alcohol*); in astronomy (أُمّ النّجُوم *Milky Wa /the galaxy*; in business (شركة أمّ نهائية *ultimate parent company*; مصرف أم *parent bank*). They are extensively used in medicine, pathology, and anatomy (خَلِيَّةٌ أُمّ *metrocyte,* الأمُّ الحَنون *pia mater*, أبو كعب &أبو دغيم *mumps;* أم التلافيف *omasum)* and names of medicines and ointments used in Colloquial Arabic *(*أبو فاس *Axe brand*; أبو نمر Tiger balm*)*. When used in medical terms, أم Om & أبو Abu do not mean *mother* and *father*, rather they are used as prefixes to express the origin, or anatomical location.

In zoology and botany, they are used in mammal, insect, bird, fish, flower, tree, shrubs, and grass names to describe a certain color, shape or characteristic (أبو مِقَصّ *Earwigs;* أبو الحناء *robin,* ;stork أبو حُدَيج crab ,أبو جلمبو ;bald ibis أبو سيف أبو منجل *sword fish*. أبو فروة *naval orange;* أبو صرة *chestnut;* leek/shallots أبو شوشة). They have metonymic and figurative meanings referring to some animals (~~أبو صابر *"salt";*~~ أبو زلومة *"elephant with a trunk"*, and أم عامر *hyena)*. Connotatively, Abu has metonymic and figurative meanings referring to some animals (أبو صابر *"salt";* أبو زلومة *"elephant with a trunk"*. In zoological and botanical context, أبو Abu and أم Umm do not literally mean "father of" and "mother of" in the genealogical sense. Rather, they function as a semantic device rooted in Arabic linguistic tradition, often serving metaphorical, descriptive, or symbolic purposes. "Abu" and Umm often precede a trait, behavior, or physical feature. أبو الحصين (Abu al-Husayn) refers to the *fox*, referencing its cunning and small size.أبو الأشبال (the lion), symbolizing strength and leadership. They have a metaphorical identity used to personify animals or plants, giving them a quasi-human identity.أبو جعدة (the wolf), possibly referencing its shaggy fur ("جعدة" is curliness);أبو دلف (the pig), perhaps linked to its lumbering movement. Sometimes Abu and Umm animal names reflect the creature's ecological function or behavior.أبو زاجر (a type of crow), "zājir" meaning "scolder" or "warner," referencing its loud call. Abu-names have a cultural or regional usage. Many of the Abu animal and plant names are folk taxonomies, i.e., vernacular labels used in poetry, proverbs, and oral traditions. For example, أبو قشعم (hyena) is used in metaphorical contexts to describe entrapment or weaving. "*Harith*" in أبو الحارث (lion) means "plower" and is a symbol of dominance.

The use of metonyms that refer to animals is not unique to the Arabic language. In English pets such as dogs, cats, hamsters and other animals are given personal names such as Laika, Lassie, Dolly and others which refer to a dog that went to space and another famous dog and the first mammal cloned from an adult somatic cell. These animals and similar ones are known by their names, not their denotative animal type.

Despite the multiple meanings and uses of أبو Abu and أم Umm in general as well as specialized domains, few studies in the literature explored the semantic differences between "parents" and "father and mother" and their occurrence, denotative and connotative meanings in the Holy Quran (Shahrour, 1991); basic-level translations of kinship terms from Standard Arabic to English (Al Saleem, 2013); the translation of kinship terms in the Qur'An (Thawabteh, 2012); and student translators' ability to translate Abu-expressions from English to Arabic and Arabic to English (Al-Jarf, 2017); the translation of family and kinship terms in Arabic societies *(*Mohammed, Mohammed & Qassim, 2024).

Regarding the translation of Abu and Umm expressions by Artificial Intelligence (AI), very few studies exist. In a specialized context or domain, Al-Jarf (2025h) investigated the translation of folk medical terms containing أم Om and أبو Abu to English by

Microsoft Copilot (MS) and DeepSeek (DS). Another study by (Al-Jarf, 2025d), examined how MC and DS translate Arabic Abu-brand names to English when different prompts are used.

The above literature review shows a lack of studies that focus on the translation of Arabic animal and plant names containing أبو Abu and أم Umm to English by Artificial Intelligence (AI). Therefore, this study aims to find out whether AI can correctly translate Arabic Abu- and Umm-animal and plant folk names to English using different prompts with a focus on denotative and metonymic animal and plant folk names. It aims to compare Microsoft Copilot (MC) and DeepSeek (DS) in terms of accuracy of the equivalents given, how they translate Arabic Abu- and Umm-animal and plant folk names in isolation, when the prompt specifies the domain of the phrases, i.e., mentions that Abu- and Umm- folk names refer to animals and plants and when the prompt mentions that the Abu- and Umm animal and plant names are metonyms referring to animals and plants, the translation strategies MC and DS use, the causes of translation errors and whether translation students, linguists and specialists (zoologists, botanists and biologists) can depend on AI in translating Arabic Abu-and Umm- animal and plant names to English.

Specifically, this study will explore the translation behaviour across AI models (MC and DS); whether AI systems preserve Abu (Father of) literally; whether they misinterpret it as a personal name; whether MC and DS systems recognize that أبو in these contexts is metaphorical, not genealogical; whether they distinguish between metonymic Abu (e.g., أبو بَراقِش) and descriptive Abu (e.g., أبو بريص); whether MC and DS shift from literal or idiomatic translation to biologically accurate naming once context is provided; how MC and DS handle أبو when it is part of folk taxonomy versus idiomatic usage; whether MS and DS preserve semantic fidelity or default to pattern-based assumptions; where MC and DS translation succeeds in naturalizing biological names, where they fail due to literalism, idiomatic confusion, or lack of domain awareness; and how contextual prompting improves translation accuracy. It also aims to reveal how AI translation can be improved for educational and archival use and what protocols should be taught to students and translators when encountering Abu and Umm in biological contexts.

This study is significant. It is linguistically and culturally groundbreaking as researching أبو & أم in animal and plant folk names matters because animal and plant folk names like أبو زفير (goose) are not mere nicknames, but rather descriptive linguistic units that express an animal's behavior, appearance, or even its impact on the environment. They are part of the Arabic linguistic heritage, which combines poetry, wisdom, and careful environmental observation. They reflect centuries of ecological observation. These names often encode behavioral traits, habitat clues, or symbolic meanings that formal scientific names overlook. Translating these names into English using AI allows for interdisciplinary synthesis: merging ethnobiology, linguistics, and taxonomy. It helps scientists, linguists, and educators understand how local communities classify and relate to nature. Most AI systems struggle with non-literal uses of "Abu" and "Umm", often mistranslating them as "father of" or "mother of." A curated dataset of these names improves semantic accuracy, especially in natural language processing for Arabic dialects. Many of these animal names appear in proverbs, poetry, and oral storytelling, where they carry metaphorical weight. Understanding their true referents enriches literary analysis and cultural interpretation. Folk names are often more intuitive for local learners than Latin binomials. AI-powered translation can make environmental education more accessible across languages and cultures.

Abu- metonyms are not just lexical curiosities; they are cultural fossils, echoing semantic logic from pre-Islamic poetry, early Islamic zoological texts, and folk idioms that have survived into modern dialects.

Furthermore, this study is part of a series on studies by the author which investigated the translation of specialized terms, metaphorical and idiomatic expressions such as translation of Arabic Abu-brand names by MC and DS using different prompts (Al-Jarf, 2025d); the translation of Arabic folk medical terms with om and Abu by MC and DS (Al-Jarf, 2025g); translation of the Gaza-Israel war terminology by MC and Google Translate (GT) (Al-Jarf, 2025c); DS, GT and MC's translation of Arabic grammatical terms used metaphorically (Al-Jarf, 2025e); translation of Arabic expressions of impossibility by MC and student-translators (Al-Jarf, 2025f); translation of zero-expressions by MC and GT (Al-Jarf, 2025i); a comparative linguistic study of MC and GT in translating medical terms (Al-Jarf, 2024); English-Arabic translation of technical terms by GT (Al-Jarf, 2021 & Al-Jarf, 2016); translation of educational polysemes in full-text Arabic research articles by GT (Al-Jarf, 2025a); Arabic transliteration of borrowed English nouns with /g/ by MC and GT (Al-Jarf, 2025b).

2. Definition of terms

DeepSeek[1] is a Chinese AI research company that was founded in 2023 and has since released several AI models, including DeepSeek-V3 and R1, which are available for users for free. DS provides open-source LLMs that operate using advanced neural networks and machine learning algorithms to power its language processing capabilities. Its open-weight philosophy, cost-efficiency, and rapid innovation have positioned DeepSeek as a disruptive force in the global AI landscape, challenging dominant

[1] DeepSeek AI

players like OpenAI and Meta. DS algorithms enable its models to adapt, process, and generate text with high accuracy and efficiency. Its neural systems are designed to enhance text understanding, generation, real-time processing and decision-making, making DeepSeek's systems offer a scalable and high-performance alternative that appeals to businesses and developers and researchers.

Microsoft Copilot[2] is an AI-powered assistant developed by Microsoft, built on large language model (LLM) technology and enhanced by the Prometheus framework. It was originally launched as Bing Chat on February 7, 2023. Since then, it has evolved into Microsoft Copilot, expanding across platforms, including Edge, and mobile. It serves as Microsoft's primary successor to Cortana, offering a more advanced and versatile interface that resembles tools like ChatGPT, but with deeper integration into Microsoft's ecosystem. It is a general-purpose conversational AI designed to assist users with writing, research, translation, image analysis, and workflow optimization and allows users to analyze and interpret images and documents, generate creative visuals and engage in spoken dialogue and visual analysis. Today, Copilot is embedded in Windows 11 and Microsoft 365, where it assists with tasks such as summarizing, drafting documents, and analyzing spreadsheets.

3. Data Collection and Analysis

A sample of 215 Arabic animal and plant folk names containing أبو Abu and أم Umm were collected from Almaany Online Dictionary and the author's own collection. Only animal and plant names containing Abu and Umm that refer to mammals, birds, fish, insects, reptiles, trees, flowers, shrubs and grasses were included. The folk Abu-animal and plant names were classified into the following categories:

(i) Set I: Arabic denotative Abu-animal and plant folk names (33%) as in:

- أبو أتب *king soldierbream,* أبو الجعل *dor beetle* , أبو الحن *robin redbreast,* أبو الحِنّاء *robin/redbreast/erithacus,* أبو الشّبت *cranefly,* أبو الشّصّ *angler anglerfish,* أبو العرق *borage,* أبو المِسْك *muskseed mallow* خُبّازَى مِسْكِيَّة, أبو المقص *earwig,* أبو بريص *chaffinch,* أبو بَراقِش *rooster cock* أبو اليقظان *pratincole pratincoles,* أبو اليسر *poppy , opium poppy,* أبو النّوْم *gecko,* أبو بُلّيق طائر *chat wheatear flecked,* أبو جِعْران *dung beetle/scarab beetle* أبو جلمبو السباح *neptunus,* أبو حُدَيج *stork,* أبو حربة *black barred /halfbeak/swordfish,* أبو خِنْجَر *tropaeolum/indian cress/ nasturtium,* أبو دقيق *grapholita interstinctana/clemens clover head caterpillar/tortricidae butterflies, moths,& skippers,* أبو ذَقن *goatfish surmullet barbudo,* أبو ذُلّوك *hornbill,* أبو ذنيبات & أبو ذنيبة *todopoles,* أبو ركبة *kohlrabi,* أبو زريق *jay,* أبو زَمّارة *pipefish,* أبو سُعن *marabou/leptoptilos, adjutant bird,* أبو سيف *dorado swordfish/ broadbill/ xyphophorus,* أبو شارب *aegilops triuncialis,* أبو شوشة *leek shallots,* أبو شوكة *stickleback,* أبو صرة *naval orange* , أبو صُفَير *bitter orange,* أبو صندوق *coffer fish/ box fish/ostracion,* أبو صوي طائر, أبو طيط *lapwing,* أبو طيلون أبو طالون *abutilon,* أبو عرس *gecko,* أبو فَروة *chestnut,* أبو فصادة الذعرة البيضاء *white wagtail,* أبو قُرّة *chameleon,* أبو قردان *tantalus /white egret/ cattle egret/ ardeola ibis/ heron,* أبو قَرْن *hornbill* (حِميرة) أبو قصبة *dichanthium annulatum (forssk.) stapf, hindigrass,shedagrass,* أبو *poaceae woodcock,* أبو مُدْلِج *hedgehog,* أبو مِرْفَشة *shoveller,* أبو مسلة قَلَنسوَة *blackcap hornbill,* أبو مِجْرَفة *shoveller,* أبو مِخْيَط & *ibis,* أبو مِنْشار *sawfish,* أبو منقار *saury gar/halfbeak swordfish/garfish/gar pike/ needlefish/ halfbeak/ sawfish* أبو مُنقار *dung beetle/scarab beetle* بنتُ وَرْدان *hornbill,* &أبو نُقولة.

(ii) Set II: Metonymic Arabic Abu-animal and plant folk names (44%) as follows:

- أبو زهرة *jackal;* أبو الأشبال & أبو الأبطال, أبو الحارث, أبو الشبل, أبو عباس, أبو حفص, أبو فراس, إبن جلي, أبو لبد *lion* أبو البحتري *snake;* بنات شحاج *female mule;* أبو زفير *goose;* أبو لاحق & أبو البازي *goshawk* أبو طامر, أبو عدي & أبو وثاب *lice;* أبو صفوان & أبو أيوب أبو عوف *mule;* أبو المختار *male goat;* أبي بحير *fox;* أبو الحصين أبو الذيال *bull;* أبو العرمض *buffalo;* أبو قرة *chameleon;* أبو زياد & أبو صابر *donkey;* أبو العِكرمة *pigeon;* أبو جهم, أبو دلف & أبو زرعة *pig;* أبو العيد & أبُو أبو, أبو حساتن, أبو نبهان, أبو عقبة, أبو سليمان, أبو حماد, أبو برائل *bear;* أبو جنة & أبو عاصم *horse;* بنت صهال جِعران *beetle;* أبو مَركوب *shoebill* أبو مصقار *scarus,* أبو مغزل *dragonfly/libellula* أبو مِقَصّ *earwig,* أبو مِلْعَقَة *spoonbill,* أبو منجل *bald* أبو مُنقار *saury gar/halfbeak swordfish/garfish/gar pike/ needlefish/ halfbeak/ sawfish* أبو منقار *sawfish,* أبو مِنْشار *ibis,* أبو نُقولة *hornbill,* بنتُ وَرْدان *dung beetle/scarab beetle.*

(iii) Set III: Arabic Denotative and metonymic أم Umm-animal and plant folk names (23%) such as:

- أم سالم &أم الأسود *beetle,* أم يعفور *bitch,* أم خداش *cat,* أُمّ أرْبَع وأرْبَعِين *centipede* , أم قرة, أم عثمان & أم عافية أم تَوبة *ant,* أم خِشَف الظبية *deer,* أم الهِنْبِر, أم تَوْلَب & أم حِلْس *donkey,* أم حفصة, أم الوليد, أم ناصر الدين & أم إحدى *chameleon*

[2] https://copilot.microsoft.com

وعشرين *duck or hen*, أم السبل *elephant*, أم الأشعث أم فروة *ewe*, أُمّ حُبَاحِب *firefly glowworm*, أم معبد الضفدع *frog*, ام أم *jerboa*, بريص *geckos*, أم عيسى *giraffe*, أم الهِنْير, أم رعال, أم قَشْعَم, أم عامر, أم عمرو & أم جعار *hyena* , أم أدْرَاص اليَرْبوع أم راشد & أم فاسدة *mouse*, أم الثلاثين , *mare*طِلحة *lice*, أم شِبل *lioness*, أم الروبيان *lobster/thenus*, أم عوف *locust*, أم منقذ *ostrich*, أم الخراب & أم الصبيان *owl*, أم الخلول *oysters*, أُمّ قِرْفَة *pangolin/ant-eater*, أم عِريط *scorpion*, أم عافية & أم عثمان *snake*, أُمّ سَكَعْكَع *wagtail*, أم ألف ورقة *yarrow*.

In denotative folk names, the Abu/Umm term is the actual name used to refer to the animal, bird, insect, or plant. It functions as a primary identifier in folk usage. No other names exist in Standard Arabic such as أبو الحناء *robin*, أبو سيف *swordfish*, ام اربع وأربعون *centipede*. These names are widely accepted and used as the main label of the mammal, birds, insect, fish, reptile, flower, tree, shrub, and grass terms and have retained functional relevance and are clearly part of a living technical lexicon.

In metonymic folk names, the Abu/Umm terms are symbolic or metaphorical. Most of them are not currently used by Arabic native speakers except for a few as (أبو جلمبو، أبو زلومة). They are often used in proverbs, poetry, or storytelling and refer to the animal indirectly, through association or cultural symbolism. They reflect a rhetorical device where one thing stands in for another, which evokes traits or stories rather than direct identification.

The metonymic Abu names in the sample effectively convey the breadth of animal references. They refer to the following animals: *lion, goose, jerboa, mule, he-goat, fox, buffalo, colt, camel, donkey, bat, ewe, hyena, mouse, leopard, elephant, monkey, hedgehog, dog, lioness, giraffe, tiger, ant, cat; goose, hawk, sparrowhawk, stork, pigeon, peacock, bird, hoopoe, vulture, magpie, crow, ostrich, chicken, rooster; snake, lizard, gecko; frog; fish; flea, locust, fly, ant, beetle, wasp; scorpion, spider; crab, jackal, viper, female mule, goshawk, bull, chameleon, pig, bear, wolf, feline, cub, cockroach, male frog, gazelle, stork, marabou stork, eagle.*

Furthermore, in Arabic tradition, certain animals - especially culturally prominent ones like the lion, tiger, and wolf- are associated with multiple **"**Abu" or "Umm" metonyms. These metonyms reflect traits, behaviors, or symbolic roles attributed to the animal. They reflect the richness of Abu-animal metonymy and its semantic density. The animals below have 2 to 21 metonyms that refer to them"

- Lion: أبو الحارث، أبو فِراس، أبو الأبطال، أبو جرو، أبو الأخياس، أبو التأمور، أبو الجراء، أبو حفص الخدر، أبو رزاح، أبو الزَّعفران، أبو شِبل، أبو ليث، أبو لبد، أبو الغَريف، أبو محراب، أبو محطم، أبو الخنحس، أبو الوليد، أبو الهَيْصم، أبو العباس
- Tiger:أبو الأبرد، أبو الأسود، أبو جَلْعَد، أبو جَهْل، أبو خطار، أبو رَقا
- Crow: أبو زاجر ، أبو زيدان ، أبو جاعرة ، أبو حدر أبو الجَرّاح ،
- Wolf:أبو جعدة، أبو جعادة، أبو عَسْلة، أبو مَذْقة، أبو ثمامة
- Elephant:أبو الحرماز ، أبو دَغْفَل ، أبو جرمان، أبو الحجاج
- Hyena: أبو عامر ، أم الهِنْير في لغة فَزَارة ، أم رعال، أبو ثقل
- Flea: أبو الوثاب، أبو طامِر ، أبو عدي
- Foxأبو الحصَيْن، أبو الحِنْبِص، أبو خالد :
- Muleأبو الأثقال، أبو الأشحج ، أبو جميل :
- Roosterأبو برائل، أبو حماد، أبو نبهان :
- Camel: أبو الفضائل ، أبو أيوب
- Donkey: أبو زِياد، أبو صابِر
- Eagle: أبو الأشيم، أبو حُسبان
- Hoopoe: ابو الأخبار ، أبو روح
- Horse: أبو شُجاع ، أبو طالِب

All the denotative and metonymic Abu/Umm animal and plant names in the three sets were translated by Microsoft Copilot (MC) and DeepSeek (DS) three times using three different prompts as follows:

1) For **Set I (denotative Abu-animal and plant folk names),** MC and DS performed 2 tasks. In the first task (no-context/domain), the prompt asked MC and DS to translate the phrases to English without mentioning the type of phrases. In the second task (domain prompt), the prompt mentioned that the phrases were animal and plant names.

2) For **Set II (metonymic Abu-animal and plant folk names),** MC and DS performed 3 translation tasks. In the first task (no context/domain prompt), the prompt asked MC and DS to translate the phrases to English without mentioning their type or domain. In the second task (domain prompt), the prompt mentioned that the phrases were animal and plant names. In the third task (metonymic prompt), the prompt told MC and DS that the phrases were metonyms.

3) In **Set III (denotative and metonymic Umm-animal and plant folk names)**, MC and DS performed 3 tasks. In the first task (no-context/domain prompt), the prompt asked MC and DS to translate the phrases to English without mentioning

their type or domain. In the second task (domain prompt), the prompt mentioned that the phrases were animal and plant names. In the third task (metonymic prompt), the prompt asked MC and DS whether the phrases were metonyms.

All equivalents rendered by MC and DS for all the Abu- and Umm animal and plant names in the 3 sets and 8 tasks were marked by the author. To be marked correct, the name of the mammal, bird, fish, insect, reptile, tree, flower, or shrub to which each Abu- animal and plant name refers had to be given. No transliteration and no translation of the Abu + name had to be given.

To find out the strategies that MC and DS used in translating Arabic Abu- and Umm-animal and plant names in the sample, mistranslations were compiled and subjected to further analysis. The strategies included word-for-word translation, transliteration, annotation, giving the genus, overgeneralizing an animal, labelling the name as a personal name or metaphorical. The percentage of Arabic Abu- and Umm-animal and plant names translated correctly, those for which MC and DS gave literal translations especially of Abu to "father of" & Umm to "mother of", transliterating the noun that follows Abu and Umm, an explanation/annotation, and whether MC and DS gave as specific animal or plant name (lion, giraffe, dog, lizard, flower, tiger, wolf, horse, eagle, falcon, etc) or a genus like bird, insect, fish etc, was calculated for MC and DS separately.

The issue is not the correctness of transliteration per se, but AI's tendency to transliterate or translate *Abu* as 'father' rather than identifying the referent animal or plant.

Inter-scorer reliability was calculated by having a colleague who taught translation mark a sample of responses given by MC and DS and by comparing both analyses. There was a 98% agreement between the two scorers. Disagreements were solved by discussion. Correct translation equivalents rendered by both MC and DS are reported quantitatively and qualitatively.

4. Results

In **Set 1** (*denotative Abu- animal and plant folk names list*), all the animal and plant names containing Abu are the actual names of the animal, bird, insect, fish, plant or flower names. These names are used in both standard and Colloquial Arabic. In Task 1 (No context), MC gave correct equivalents to 46% of the items. It recognized the specific kind of mammal, bird or fish or plant to which the Abu-name refers as in the following examples:

- أبو الجعل *Dung beetle,* أبو الحن *European robin,* أبو الحِنّاء *Henna robin (variant of European robin),* أبو بريص *Gecko,* أبو جِعْران *Dung beetle (variant),* أبو جلمبو السباح *Swimming crab (Blue swimmer crab),* أبو حربة *Spear fish,* أبو زريق *Eurasian jay,* أبو زَمَّارة *Pipefish or bird with whistling sound,* أبو سيف *Swordfish,* أبو شوكة *Thorny fish (e.g., stickleback),* أبو طيط *Lapwing,* أبو عرس *Wease,* أبو فَروَة كَستَناء *Chestnut (horse chestnut or edible),* أبو فصادة الذعرة البيضاء *White wagtail flycatcher,* أبو قردان *Cattle egret,* أبو مِجْرَفة *Shovel-beaked bird,* أبو مغزل *Spindle bird/insect,* أبو مِلْعَقّة *Spoonbill,* أبو منجل *Ibis,* أبو مِنْشار *Sawfish.*

In 3% only, MC gave a literal word-for word translation:

- أبو مَركوب *Shoebill (literally <u>father</u> of the shoe)*
- أبو أتب *<u>Father</u> of dragging (possibly a beetle or insect that drags itself)*

In another 3%, MC transliterated أبو Abu + following noun:

- أبو بَراقِش *Abu Baraqish (idiomatic name, often used proverbially)*
- أبو بُلَيق *Abu Bulaig (Possibly a local bird name)*

In 32%, MC translated the Abu-name without using "father" as in:

- أبو الشّبت *Dill beetle or insect associated with dill;* أبو العرق *Sweat beetle (may refer to a biting insect);* أبو المِسْك *Musk beetle;* أبو اليقظان *Wakeful bird/insect;* أبو خِنْجَر *Dagger fish;* أبو ذَقن *Bearded bird/insect;* أبو ذنيبات *Tailfeathered bird;* أبو قُرّة شارب *Mustached bird/insect;* أبو شوشة *Tufted bird/insect;* أبو صُفَير *Whistler bird;* أبو صندوق *Box crab or beetle;* أبو مِزْفَش *Coldinducing plant/insect (used idiomatically);* أبو قَرْن *Horned beetle;* أبو قَلَنسوَة *Hooded bird (e.g., hooded crow);* أبو ركبة *Fantailed bird;* أبو مِقَصّ *Scissor bird/insect;* أبو منقار *Beaked bird;* أبو النّوْم *Sleepinducing insect (e.g., mosquito);* أبو المقص *Knee beetle (Possibly referencing jointed legs);* أبو الشّصّ *Hook beetle (Possibly referencing shape);* أبو اليسر *Scissor beetle (possibly earwig);* بنتُ وَرْدان *Easygoing bird/insect (possibly a folk name);* *Daughter of roses (likely a butterfly);*

In 17%, MC gave faulty guesses about what the animal referred to in the Abu-name might be without translating or transliterating it. The use of "*possibly*" indicated that MC is guessing. For example:

- أبو حُدَيج *<u>Possibly</u> a local fish or bird name;* أبو ذُلُوك *<u>Possibly</u> a local bird or insect;* أبو سُعن *<u>Possibly</u> a heron or stork;* أبُو شَبَث *<u>Possibly</u> a local bird name;* أبو صرة *Belly beetle (<u>Possibly</u> referencing body shape);* أبو صوي *<u>Possibly</u> a local bird*

أبو طيلون / أبو طالون *Possibly a local bird or amphibian;* أبو قصبة (حِميرة) *Possibly a reed bird (*حميرة *= reddish);* أبو مُدْلِج *Possibly a nocturnal bird;* أبو مصقار *Possibly a local bird name;* أبو نُقولة *Possibly a local bird or plant name;*

1) When the prompt mentioned that the phrases are animal and plant names in Task 2, MC gave almost the same equivalents to the animal and plant names as in the no-context prompt in Task I). Additionally, MC did not give many annotations as in the no-context task. However, in few cases, there were slight variations in the wording as shown in Table:

Table 1: examples of similar responses with different wording

Task 1 (no domain specified)	Task 2 (With Context/domain)
أبو مصقار Possibly a local bird name	أبو مصقار Possibly a local fish
أبو أتب Father of dragging (possibly a beetle or insect that drags itself)	أبو أتب Dragging beetle
أبو ركبة Knee beetle (possibly referencing jointed legs)	أبو ركبة Jointed-legged insect
أبو قصبة حِميرة Possibly a reed bird (حميرة = reddish)	أبو قصبة حِميرة Reed-dwelling reddish bird or insect
أبو قَلَنسوَة Hooded bird (e.g., hooded crow)	أبو قَلَنسوَة Hooded crow
أبو مُدْلِج Possibly a nocturnal bird	أبو مُدْلِج Nocturnal crawler
أبو مِقْصّ Scissor bird/insect	أبو مِقْصّ Scissor-fish

*In **Set II**, the Metonymic Abu-Animal and Plant Folk Names, and in the no domain prompt MC translated أبو Abu to "father of" in all of the names. However, in 55% MC transliterated the noun following Abu because it considered the nouns in set A as personal names, and because it did not know the meaning of the name following Abu in set B below:*

A. أبو البحتري *Father of Al Buhturi,* أبو الحسن *Father of Al Hasan,* أبو الحسين *Father of Al Husayn,* أبو العِكرمة *Father of Ikrimah,* أبو العيد *Father of Eid,* أبو القعقاع *Father of Al Qaʿqāʿ,* أبو المُنْذِر الرَّاقي *Father of Al Mundhir Al Zaqi,* أبو المنهال *Father of Al Minhāl,* أبو أيوب *Father of Ayoub,* أبو ثمامة *Father of Thumāmah,* أبو جعفر *Father of Jaʿfar,* أبو حاتم *Father of Hātim,* أبو حفص *Father of Hafs,* أبو حماد *Father of Hamād,* أبو حيان *Father of Hayyān,* أبو خالد *Father of Khālid,* أبو خديج *Father of Khudayj* أبو زياد *Father of Ziyād,* أبو صابر *Father of Ṣābir,* أبو سفيان *Father of Sufyān,* أبو سليمان *Father of Sulaymān,* أبو صفوان *Father of Ṣafwān,* أبو عاصم *Father of ʿĀṣim,* أبو عباس *Father of ʿAbbās,* أبو عدي *Father of ʿUday,* أبو عقبة *Father of ʿUqbah,* أبو عوف *Father of ʿAwf* أبو غالب *Father of Ghālib,* أبو فراس *Father of Firas,* ابو مالك *Father of Mālik,* أبو محرز *Father of Muḥriz,* أبو نبهان *Father of Nabḥān,*

B. أبو جاعد *Father of Jaʿad,* أبو جعار *Father of Jaʿār,* أبو جعدة *Father of Jaʿdah,* أبو برائل *Father of Braʿil,* أبو خادش *Father of Khādish* أبو طامر, *Father of Ṭāmir,* أبو جَلَمبو *Father of Jalambo,* أبو حدر *Father of Hadr,* أبو حساتن *Father of Hassātin,* أبو خبيب *Father of Khubayb,* أبو دغفل *Father of Daghfal,* أبو دلف *Father of Dulaf,* ابو زلومة *Father of Zallūmah,* أبو سُعْن *Father of Suʿn,* أبو قرة *Father of Qurrah,* أبو لاحق *Father of Lāḥiq,* أبو هبيرة *Father of Hubayrah,* أبو وردان *Father of Wardan,* أبو بحير *Father of Bahīr,* بنات شحاج *Daughters of Shaḥā,* بنت صهال *Daughter of Ṣahāl.*

In the remaining 45%, MC translated the noun following Abu as in the following examples:

- إبن جلي *Son of Clarity,* أبو الأبرد *Father of the Coldest,* أبو الأبطال *Father of Heroes,* أبو الأخبار *Father of News,* أبو الأسود *Father of the Black One,* أبو الأشبال *Father of Cubs,* أبو الإصبع *Father of the Finger,* أبو الأصعب *Father of the Toughest,* أبو البازي *Father of the Hawk,* أبو الثم *Father of the Mute,* أبو الجَرّاح *Father of the Surgeon,* أبو الحارث *Father of the Predator,* أبو الحجاج *Father of the Pilgrim,* أبو الحصين *Father of the Small Horse,* أبو الذيال *Father of the Tail,* أبو الزباب *Father of the Buzzing One,* أبو الشبل *Father of the Cub,* أبو العرمض *Father of the Lizard,* أبو العون *Father of Help,* أبو المختار *Father of the Chosen One,* أبو المنذر *Father of the Warner,* أبو بحر *Father of the Sea,* أبو جعادة *Father of Curly Haired One,* أبُو جِعران *Father of the Dung Beetle,* أبو جنة *Father of Paradise,* أبو جهل *Father of Ignorance,* أبو جهم *Father of Sternness,* أبو خريطة *Father of the Map,* أبو دخنة *Father of Smoke,* أبو زاجر *Father of the Rebuker,* أبو زرعة *Father of the Little Seed,* أبو زفير *Father of the Sigh,* أبو زهرة *Father of the Flower,* أبو فصادَة *Father of the Leech,* أبو كاسِب *Father of the Earner,* أبو لبد *Father of Wooliness,* أبو لَغْلَغ *Father of the Gurgler,* أبو مشغول *Father of the Busy One,* أبو منذر *Father of the Warner,* أبو وثاب *Father of the Persistent One,* أبو يقظان *Father of the Vigilant,*

In Task 2, when the prompt specified the domain, MC failed to identify the correct animal to most of the metonyms. It correctly identified 8.5% items only as in:

- أبو الأخبار *Father of News -Often refers to the hoopoe, known in folklore for delivering messages.*
- أبو الأشبال *Father of Cubs - Lion or tiger, referencing young predators.*
- أبو الشبل *Father of the Cub Lion.*

- أبو البازي *Hawk.*
- أبو مشغول *Ant or bee (busy creature).*
- أبو وثاب *Flea or locust (persistent jumper).*
- أبو يقظان *Owl or rooster (vigilant).*
- بنت صهال *Daughter of Ṣahāl Likely a female horse.*

MC considered 12% of the items metaphorical and "not tied to any animal" as in the following responses:

- إبن جلي *Son of Clarity - Likely metaphorical; not tied to a specific animal instead of the lion.*
- أبو الأبطال *Father of Heroes - Metaphorical; Not animal specific instead of the lion*
- أبو الحجاج *Father of the Pilgrim - Metaphorical or historical; Not animal instead of the elephant*
- أبو العون *Father of Help - Metaphorical instead of the tiger.*
- أبو المختار *Father of the Chosen One - Metaphorical instead of the mule*
- أبو المنذر *Father of the Warner - Metaphorical. Instead of the rooster*
- أبو جنة *Father of Paradise - Metaphorical instead of the bear*
- أبو جهم *Father of Sternness - Metaphorical instead of the pig.*
- أبو خريطة *Father of the Map - Metaphorical instead of the*
- أبو كاسِب *Father of the Earner - Metaphorical instead of the wolf*
- **أبو جَلَمبو** *Father of Jalambo - Crab (used in Gulf dialects).*

In 24%, MC gave two or three faulty and contradictory animal names. These reflect semantic inconsistencies and challenging weak attributions:

- أبو الأسود *Father of the Black One - Could be a crow, black panther, or beetle instead of tiger.*
- أبو زفير *Owl or dove (sighing sound), instead of goose.*
- أبو الذيال *Father of the Tail - Lizard or gecko, instead of bull.*
- أبو زرعة *Small bird or rodent, instead of pig.*
- أبو جاعد *Father of Jaʿad Likely a beetle or insect, instead of wolf.*
- أبو الثم *Father of the Mute - Could refer to a silent bird or fish, instead of Osprey.*
- أبو الجَرّاح *Father of the Surgeon - Likely a bird with a sharp beak - heron or stork, instead of crow.*
- أبو حدر *Possibly tortoise or slow moving animal, instead of crow.*
- أبو الزباب *Father of Buzzing - Fly or mosquito, instead of mouse.*
- ابو زلومة *Slug or snail instead of elephant.*
- أبو لَغْلَغ *Frog or toad (gurgling sound), instead of stork.*
- أبو الإصبع *Father of the Finger - Possibly a worm or small insect resembling a finger, instead of eagle.*
- أبو الأبرد *Father of the Coldest - Possibly a lizard or cold blooded reptile instead of tiger.*
- أبو الأصعب *Father of the Toughest - Likely a wild boar or bull instead of tiger.*
- أبو الحارث *Father of the Predator - Lion or cheetah, instead of lion.*
- أبو الأشبال *Father of Cubs - Lion or tiger, referencing young predators, instead of lion.*
- أبو وثاب *Flea or locust (persistent jumper) , instead of flea only.*
- أبو الحصين *Father of the Small Horse - Classical nickname for the fox.*
- أبو يقظان *Owl or rooster (vigilant).*
- أبو جعادة *Father of Curly Haired One - Refers to a hedgehog or woolly caterpillar due to its curled texture.*
- أبو بحر *Father of the Sea - Could refer to a sea creature - crab or fish.*
- أبو زاجر *Loud bird-(e.g. rooster or crow).*
- أبو مشغول *Ant or bee (busy creature).*

In Task 3 (the metonymic prompt), MC identified the correct animal, bird, insect, fish to which the metonyms refer in in 15% of the items in the metonyms' list as in:

> أبو فراس *Lion (via "Firas" as metaphor);* أبو الأخبار *Hoopoe (messenger bird in folklore);* أبو البازي *Hawk;* أبو الحارث *Lion;* أبو بحر *Crab or sea creature;* أبو الأشبال *Lion (father of cubs);* أبو مشغول *Ant or bee;* أبو وثاب *Flea or locust;* أبو يقظان *Owl or rooster;* بنت صهال *Mare (female horse);* أبو الأبطال *Lion (heroic archetype);* أبُو جِعران *Dung beetle;* أبو جَلَمبو *Crab (Gulf dialect);* أبو الشبل *Lion.*

Additionally, MC gave faulty responses to 85% of the animal and plant metonyms. It did not transliterate nor translate أبو Abu. It identified 41% as proper nouns (not animals), even though the prompt stated they were metonyms referring to animals as in the following faulty examples:

- أبو البحتري *instead of snake,* أبو الحسن *instead of peacock,* أبو الحسين *instead of deer,* أبو العِكرمة *instead of pigeon,* أبو المُنْذِر الزَّاقي *instead of rooster,* أبو المنهال *instead of eagle,* أبو أيوب *instead of camel,* أبو ثمامة *instead of wolf* أبو جعفر *instead of flies,* أبو حاتم *instead of crow,* أبو حفص *instead of lion,* أبو حماد *instead of rooster,* أبو حيان *instead of cheetah,* أبو خالد *instead of dong,* أبو خبيب *instead of monkey,* أبو دلف *instead of pig,* أبو زياد *instead of donkey* أبو صابر *instead of donkey,* أبو سفيان *instead of hedgehog,* أبو سليمان *instead of rooster,* أبو صفوان *instead of camel,* أبو عاصم *instead of bear* أبو عباس *instead of lion,* أبو عدي *instead of lice,* أبو عقبة *instead of rooster,* أبو عوف *instead of locust,* أبو غالب *instead of cub,* أبو قرة *instead of Chameleon instead of ,* ابو مالك مالك الحزين *marabou* أبو محرز *instead of bird,* أبو نبهان *instead of rooster,* أبو هبيرة *instead of male frog,* أبو وردان *instead of cockroach,* أبو بحير *instead of male goat,* أبو جهل *instead of monkey,* أبو زهرة *instead of jackal,* أبو منذر *instead of rooster,* أبو القعقاع *instead of crow.*

MC considered 11% as metaphorical expressions, not animal name as in:

- إبن جلي *instead of lion,* أبو الحجاج *instead of elephant,* أبو العون *instead of tiger,* أبو المختار *instead of mule,* أبو المنذر *instead of rooster,* أبو جنة *instead of bear,* أبو جهم *instead of pig,* أبو خريطة *instead of stork,* أبو كاسِب *instead of wolf,* أبو العيد *instead of beetle.*

In 7%, MC rendered the genus, not the specific animal or bird as in:

- أبو جهل *Not animal; historical figure, instead of monkey,*
- **أبو دخنة** *Possibly smoky colored insect;*
- أبو خادش *Possibly scratching insect instead of cat/tiger;*
- أبو خديج *Possibly small insect, instead of stork;*
- أبو طامر *Mole or burrowing animal, instead of flea;*
- أبو زهرة *Not animal; plant related of jackal;*
- أبو سُعْن *Small bird instead of stork.*

In 6%, MC rendered "beetles" as the referent of the metonym as in the following examples:

- أبو برائل *Possibly beetle (regional usage) instead of rooster;* أبو جعار *Beetle, instead of hyena;* أبو جعدة *Beetle, instead of wolf;* بنات شحاج *Possibly locusts or beetles (female swarm), instead of female mule;* أبو جاعد *Beetle, instead of wolf;* أبو فصتادَة *Leech, instead of wagtail.*

As in task 2, MC gave double faulty equivalents to 18% of the Abu names in the list:

- أبو لبد *Sheep or caterpillar (woolly) instead of Lion*
- أبو حساتن *Possibly beetle or ant (regional) instead of Rooster*
- أبو الأسود *Crow or black panther instead of Tiger*
- أبو الإصبع *Worm or centipede instead of Eagle*
- أبو الذيال *Lizard or gecko instead of Bull*
- أبو الزباب *Fly or mosquito instead of Mouse*
- أبو زرعة *Mouse or small bird instead of Pig*
- أبو زفير *Owl or dove instead of Goose*
- أبو حدر *Tortoise or slow moving reptile instead of Crow*
- ابو زلومة *Slug or snail instead of Elephant*
- أبو جعادة *Hedgehog or woolly caterpillar instead of Wolf*

In **Set III,** the Umm-animal and plant names and regardless of the prompt, MC gave responses that consist of a translation of أم as "mother of" + translation or transliteration of the noun following أم Umm + identification of the animal implied in the name + an annotation describing what the phrase means, symbolized, its appearance, or characteristics. In response to all the prompts (the no-domain, domain and metonymic prompts), MC gave identical responses with أم Umm translated to "mother of" with correct identification of 86% of the animal, insect, fish, reptile, bird and plant names in the sample. In 57%, the noun following أم Umm was transliterated and 43% it was translated. The only difference is the in the metonym prompt, MC gave animal first, then translation of أم to mother + transliteration/translation of the noun following أم Umm + annotation.

Examples of MC responses which consist of mother of + equivalent noun (43%) + correct animal identification + cultural and linguistic annotation are:

- **أم الأشعث** *Mother of the Disheveled* Nickname for the female sheep; evokes rustic or unkempt appearance.
- **أم الثلاثين** *Mother of Thirty* Refers to the ostrich; possibly linked to egg count or symbolic numerology.
- **أم الخراب** *Mother of Destruction* Common nickname for the owl; associated with omens in folklore.
- **أم الوليد** *Mother of the Newborn* Refers to the hen; nurturing and protective symbolism.
- **أم ناصر الدين** *Mother of the Defender of Faith* Honorific for a hen; often used in poetic or moral tales.

- **أم الصبيان** *Mother of the Boys* Another name for the owl; linked to mythic child-snatching legends.
- **أم السبل** *Mother of the Paths* Refers to the female elephant; evokes wisdom and memory.
- **أم إحدى وعشرين** *Mother of TwentyOne* Nickname for the hen; possibly referencing egg-laying cycles.
- **أم الأسود** *Mother of the Black* Also denotes the beetle; possibly referencing its color.
- **أم بريص** *Mother of the Gecko* Denotes female gecko; often appears in desert ecology.
- **أمّ أرْبَع وأرْبَعِين** *Mother of FortyFour* Nickname for the centipede; linked to its legs.

Examples of MC responses which consist of mother of + noun transliteration (57%) + correct animal identification + cultural and linguistic annotation are:

- **أم الخلول** *Mother of Khulūl* Small white-shelled clam from the Mediterranean; edible and salted.
- أم تَوبة Mother of Tawbah Folk name for the female ant; symbolizes industriousness and repentance.
- **أم جعار** *Mother of Jaār* Yet another hyena nickname; regional variation.
- **أمّ حُبَاحِب** *Mother of Hubāhib* Folk name for beetles or insects; playful or cautionary.
- **أم حفصة** *Mother of Hafsa* Used for hens, ducks, or vultures; common kunya in rural naming.
- **أم خداش** *Mother of Khidāsh* Refers to the female cat; affectionate or domestic nickname.
- **أم راشد** *Mother of Rāshid* Nickname for the female mouse; often used in children's tales.
- **أم سالم** *Mother of Sālim* Refers to the beetle; symbolic of resilience or persistence.
- **أم طِلحة** *Mother of Tilhah* Nickname for the louse; used in humorous or cautionary contexts.
- **أم عافية** *Mother of Āfiyah* Another chameleon name; possibly metaphorical for healing.
- **أم عامر** *Mother of Āmir* Refers to the female hyena; appears in Arabic proverbs and fables.
- **أم عثمان** *Mother of Uthmān* Also a chameleon nickname; used in rural taxonomy.
- **أم عِريط** *Mother of Irit* Refers to the female scorpion; evokes danger and stealth.
- **أم عمرو** *Mother of Amr* Another name for the female hyena; folkloric and symbolic.
- **أم عيسى** *Mother of Īsā* Nickname for the giraffe; possibly metaphorical or poetic.
- **أم فروة** *Mother of Furwah* Refers to the female sheep; linked to wool and warmth.
- **أم قرة** *Mother of Qurrah* Nickname for the chameleon; symbolizes adaptability.
- **أم قشعم** *Mother of Qasham* Refers to the female vulture; associated with scavenging.
- **أم يعفور** *Mother of Yafūr* Refers to the female dog; affectionate or cautionary usage.

Examples of MC responses which consist of mother of + noun transliteration/translation + faulty animal identification (14%) + cultural and linguistic annotation:

- **أم** منقذ *Mother of Munqidh Possibly a personal kunya or symbolic name; unclear zoological link instead of horse.*
- أمّ سَكَعْكَع *Mother of Sakak Likely humorous insect nickname; regional usage instead of Wagtail.*
- أم الروبيان *Mother of Shrimp Refers to shrimp or crustaceans; culinary and ecological term instead of lobster.*
- أم ألف ورقة *Mother of a Thousand Leaves Possibly refers to millefeuille pastry or layered plant instead of Yarrow.*
- أمّ قِرْفَة *Mother of Cinnamon Possibly metaphorical or linked to spice-loving insects instead of Pangolin or ant-eater.*

4.2 Analysis of DeepSeek's Responses

DS gave correct equivalents to 51% of the denotative Abu-animals in the denotative list, whether the prompt mentions the domain or not. This means that DS outperformed MC in denotative category (46% and 44% respectively. Both DS and MC gave identical correct equivalents to 40% of the denotative Abu-animal and plant names. The equivalent animal's name was directly given without any translation, transliteration or annotation as in:

- أبو مَركوب *Shoebill,* أبو بريص *Gecko,* أبو الجعل *Dung Beetle,* أبو الحن *Warbler,* أبو جِعْران *Dung Beetle,* أبو دقيق النجيليات *Grass Moth,* أبو دقيق فريتيللاريس *Fritillary Butterfly,* أبو دقيق ذنب السنونو *Swallowtail Butterfly,* أبو دقيق الهليكونيان *Heliconian Butterfly,* أبو دقيق قمم البرسيم *Clover Top Moth,* أبو دقيق يسروعالخيمة الشرقية *Eastern Tent Caterpillar Moth,* أبو دقيقات والفراشات والسكيبر *Moths, Butterflies, and Skippers,* أبو زريق *Jay,* أبو زَمَّارة *Piper (a type of insect),* أبو سيف *Swordfish,* أبو شوكة *Stickleback,* أبو طيط *Avocet,* أبو عرس *Weasel,* أبو فَروَة *Chestnut,* أبو فصادة الذعرة البيضاء *White Wagtail Flycatcher (Pied Flycatcher),* أبو مِجْرَفة *Spoonbill,* أبو مغزل *The Spinner (a type of insect),* أبو مِلْعَقة *Spoonbill,* أبو منجل *Ibis,* أبو منجل الأصلع *Bald Ibis,* أبو منجل القرمزي *Scarlet Ibis,* أبو منجليات *Ibises and Spoonbills (Threskiornithidae family),* أبو مِنْشار *Sawfish.*

Examples of the correct equivalent animals that DS only gave are:

- أبو الشّصّ *Anglerfish,* أبو سُعن *Marabou, Stork,* أبو صندوق *Cofferfish,* أبو قَرْن *Hornbill,* أبو مِقَصّ *Earwig,* أبو منقار *Halfbeak,* أبو المقص *Earwig,* أبو مِخْيَط *Tailor Bird.*

DS gave the equivalent animal, bird, insect, reptile, fish or plant name directly without transliterating Abu+ noun, nor translating Abu + noun to English. Here, DS gave the same correct equivalent animal names whetehr the prompt mentions or does not mention the prompt.

DS translated Abu to "father of" in 27% of the denotative items. In the annotation, it gave the genus (not the specific animal or plant) implied in the Abu-name as in:

- أبو الشّبت *Dill Father (a type of beetle)*
- أبو العرق *Sweat Father (a type of beetle)*
- أبو المِسْك *Musk Father (Civet)*
- أبو اليقظان *Father of Wakefulness (a type of owl)*
- أبو بَراقِش *Barakishs Father (a bird, possibly the Stone Curlew)*
- أبو خِنْجَر *Dagger Father (a type of fish)*
- أبو ذَقن *Beard Father (a type of fish)*
- أبو شارب *Moustached Father (a type of bird or insect)*
- أَبُو شَبَث *Bushy Father (a type of bird)*
- أبو شوشة *Tufted Father (a type of bird)*
- أبو صرة *Bundle Father (a type of bird)*
- أبو صوي *Sow Father (a type of beetle)*
- أبو قُرّة *Coolness Father (a type of bird)*
- أبو ركبة *Knee Father (Stilt)*
- أبو قَلَنسوَة *Hooded Father (a type of bird)*
- أبو النّوْم *Father of Sleep (a type of owl)*
- أبو اليسر *Father of Ease (Osprey)*
- أبو حربة *Spear Father (a type of insect)*

DS translated the Abu-names conceptually without including Abu or "father of" in 22.5% of the items. It also added the genus to which each Abu-name refers as in:

- أبو بُلَيق طائر *Hoopoe (bird)*
- بنتُ وَرْدان *Wardans Daughter (Damselfly)*
- أبو حُدَيج *Little Ploughman (a type of beetle)*
- أبو ذُلُوك *The Meek One (a type of fish)*
- أبو ذنيبات *TasselTail (a type of fish)*
- أبو صُفَير *Whistler (a type of bird)*
- أبو طيلون أبو طالون *The Delayer, The Postponer (a type of bird, possibly the Nighthawk)*
- أبو مصقار *Snout Beetle (Weevil)*
- أبو قصبة حِميرة *Little Red Reed (a type of dragonfly)*
- أبو مُدْلِج *The Nocturnal One (Nightjar)*
- أبو مُنقار *Longnose (a type of fish)*
- أبو نُقولة *The Picky Eater (a type of bird)*
- أبو الحِنّاء *Henna Seller (Egyptian Mongoose)*
- أبو جلمبو السباح *Swimmer Jumbo (a type of beetle)*
- أبو أتب *Abu Atab (a type of lizard)*

In the annotation in **Set I**, DS mentioned the genus to which the Abu-name refers to a total of 46% of the denotative items.

In **Set II** (Metonymic Abu animal Folk names), Task 1 (no domain/context prompt), DS correctly matched had great difficulty matching the Abu-animal metonym with its referent. Results revealed only 1% correct equivalents and 99% faulty equivalent animals. DS transliterated the Abu+Noun in 95% items as it considered those personal names. In 30%, the transliterated Abu+ Noun were associated with a literal word-for-word translation of the Abu + Noun metonym. Abu was translated to "father of" + the semantic equivalent of the following noun, as in the examples below:

- أبو منذر Abu Mundhir (Personal Name, "Father of the Warner") instead of rooster.
- أبو العيد Abu Al 'Eid (Personal Name, "Father of the Festival") instead of beetle.
- أبو حساتن Abu Hasatin (Personal Name, "Father of Sharp [Things]"), instead of rooster.
- أبو الأسود Abu Al Aswad (Personal Name, "Father of the Black [One]"), instead of tiger.
- أبو الإصبع Abu Al Isba' (Personal Name, "Father of the Finger"), instead of eagle.
- أبو الجَرّاح Abu Al Jarrah (Personal Name, "Father of the Surgeon"), instead of crow.
- أبو الزباب Abu Az Zubab (Personal Name, "Father of Flies") instead of mouse.
- أبو زرعة Abu Zur'ah (Personal Name, "Father of the Sower"), instead of pig.
- أبو زفير Abu Zufair (Personal Name, "Father of the Whistler"), instead or goose.

In Task 2 (domain/context prompt), DS responses consist of a transliteration of the Abu+ Noun + an annotation containing the name of an animal which DS thinks the metonym refers to. DS transliterated all the Abu + Nouns in Set II. For 95% of the sample, DS overgeneralized the faulty equivalent "lizard' as the animal referred to by the metonym, in 4% it gave other faulty animal equivalents, and gave correct equivalent animals to 1% of the items. These were the same as their counterparts in Task 1.

In Task 3, DS translated Abu to "Father of" + semantic equivalent of the Noun following Abu to 95% of the items in Set II, of which DS translated 81% of the nouns following Abu as in:

- أبو لبد *The Father of the Matted One (Animal: Lizard).*
- أبو دغفل *The Father of the Fat Larva (Animal: Lizard).*
- أبو لَغْلَغ *The Father of the Chatterer (Animal: Lizard).*
- أبو الثم *The Father of the She Camel (Animal: Lizard).*
- أبو الحصين *The Father of the Little Fortress (Animal: Lizard).*
- أبو الذيال *The Father of the Tail (Animal: Lizard).*
- أبو حدر *The Father of the Swift One (Animal: Lizard).*
- ابو زلومة *The Father of the Frowning One (Animal: Lizard).*
- أبو جهم *The Father of the Frowning One (Animal: Lizard).*

In 14% of the items, DS transliterated the Nouns following Abu as in:

- أبو أيوب *The Father of Ayyub (Animal: Lizard).*
- أبو جعفر *The Father of Ja'far (Animal: Lizard).*
- أبو حيان *The Father of Hayyan (Animal: Lizard).*
- أبو زياد *The Father of Ziyad (Animal: Lizard).*
- أبو سفيان *The Father of Sufyan (Animal: Lizard).*
- أبو سليمان *The Father of Sulaiman (Animal: Lizard).*
- أبو عدي *The Father of Adi (Animal: Lizard).*
- أبو الحسين *The Father of Hussein (Animal: Lizard).*

Here again, DS rendered "*lizard*' as the animal implied by 96% of the Abu-animal names (See examples above). Interestingly, there a contradiction between the actual animals implied in the metonym and the one (lizard) rendered by DS (See Table 2).

Table 2: Examples of contradictions rendered by DS

Metonyms	Translation Given by DS	Implied Animal given by DS	Label given by DS	Actual referent animal
أبو الشبل	Father of the Lion Cub	Lion	Lizard	lion
أبو زهرة	Father of the Flower	*Plant	Lizard	Jackal
أبو القعقاع	Father of the Rattler	*Snake or Bird	Lizard	crow
أبو الحصين	Father of the Little Fortress	Fox	Lizard	fox
أبو فراس	Father of the Panther	Panther	Lizard	lion

In the Umm-names, DS gave completely different responses. On Task 1 (no domain prompt), DS transliterated all the phrases in the sample as follows:

- *Umm Munqidh, Umm Sakaka, Umm Qirfah, Umm Tawbah, Umm alAshath, Umm alKharab, Umm alWalid, Umm Nasir alDin, Umm alSibyan, Umm alSabil, Umm Hafsa, Umm Khaddash, Umm Rashid, Umm Salim, Umm alAswad, Umm Talhah, Umm Amir, Umm Amr, Umm Jaār, Umm Urayt, Umm Isa, Umm Farwah, Umm Qurah wa, Umm Uthman, Umm Afiyah, Umm Qasham, Umm Yafur, Umm Burays, Umm alKhulul, Umm Hubahib.*

In 14%, DS added Mother of + translation of the phrase as in:

- *Umm alRubyan (Mother of the Shrimp), Umm Alf Waraqah (Mother of a Thousand Leaves), Umm alThalathin (Mother of the Thirty), Umm Ihdā waIshrin (Mother of TwentyOne), Umm Arba waArbain (Mother of FortyFour).*

In task 2 in which the prompt mentioned that the phrases refer to animal and plant names, DS gave an animal name directly without any translation, transliteration or annotation. However, in 91% of the items, DS rendered a faulty animal name/type as in:

- أُمّ أرْبَع وأرْبَعِين *Fortyfour beetle (a type of ladybug/beetle) , instead of centipede;* أُمّ حُبَاحِب *A type of hairy caterpillar, instead of firefly or glowworm.* أم الخلول *Cicada, instead of oysters;* أُمّ سَكّعْكَع *A type of beetle; instead of wagtail* أم ألف ورقة *Centipede (literally Mother of a Thousand Leaves) instead of yarrow;* أُمّ قِرْفَة *Arabian Whipray (a type of stingray), instead of Pangolin or ant-eater;* أم عامر *Jerboa (a desert rodent),* أم عمرو *A type of ant, instead of female hyena;* أم جعار *A type of ant, instead of female hyena;* أم السبل *Funnelweb spider* أم يعفور *A type of ant, instead of female dog;* أم حفصة

Black beetle (often a darkling beetle) instead of duck; أم الخراب *Deathstalker scorpion, instead of owl;* أم الصبيان *Devils Horse (a type of grasshopper/locust), instead of owl;* أم قرة *Dung beetle, instead of Chameleon;* أم عثمان *Trilobite beetle, instead of Chameleon;* أم عافية *A type of ant, instead of Chameleon;* أم سالم *A type of ant instead of beetle;* أم الأسود *Black scorpion, instead of beetle;* أم الوليد *A type of ant, instead of hen;* أم ناصر الدين *Chameleon, instead of hen;* أم إحدى وعشرين *Twentyone beetle (a type of ladybug/beetle), instead of hem;* أم عيسى *Woodlouse, instead of giraffe;* أم الأشعث *Bristleworm, instead of ewe;* أم عِريط *A type of ant, instead of scorpion;* أم راشد *A type of jellyfish, instead of mouse;* أم منقذ *Sarcophagus fly (a type of flesh fly) instead of horse;* أم طِلحة *Acacia tree (specifically, Vachellia seyal), instead of lice;* أم الثلاثين *Thirtythree sheep parasite (a specific parasite), instead of ostrich;* أم فروة *A type of plant, instead of ewe;* أم تَوبة *Anemone (a type of sea anemone or marine creature), instead of ant;* أم خداش *A type of ant, instead of cat.*

DS could identify only 1.5% of the animals: أم الروبيان *Mantis shrimp,* أم قشعم *Vulture,* ام بريص *Gecko.*

In task 3 in which the prompt mentioned that all the phrases are metonyms referring to animals or plants, DS gave identical responses to those given to tasks 1 & 2, with the addition of a translation of أم Umm to "mother of". The noun following أم Umm was translated in 85% and transliterated in 15% as in examples in Table 3.

Table 3: Examples of DS Equivalents to Abu + Noun

Mother + Transliterated Noun	Mother + Translated Noun
• **أم حفصة** Mother of Hafsa (Black Beetle); • **أم طِلحة** Mother of the Talh tree (Acacia Tree); • **أم عامر** Mother of Amir (Jerboa); • **أم عمرو** Mother of Amr (A type of ant); • **أم عثمان** Mother of Uthman (Trilobite Beetle).	• **أم تَوبة** Mother of Repentance (Anemone) • **أم الأشعث** Mother of the Disheveled One (Bristleworm) • **أم الثلاثين** Mother of the Thirty (Sheep Parasite) • **أم الخراب** Mother of Ruin (Deathstalker Scorpion) • **أم الوليد** Mother of the Newborn (A type of ant)

5. Discussion

Findings of the current study showed that in the denotative Abu-names, DS gave higher correct equivalents in response to the no-domain prompt (51% by DS vs 46% by MC) and to the domain prompt (51% by DS vs 44% by MC). The equivalent animal's name was directly given without any translation, transliteration or annotation (أبو مَركوب *Shoebill).* Both gave identical responses to 40% of the denotative items. In the metonymic name list, both MC and DS failed to identify the exact animal or plant type to which each Abu-metonym in response to all three prompts. Both gave fewer than 3% correct responses to all 3 prompts. Similar equivalents were given to each Umm-name in response to the three prompts, of which MC gave 30% correct and 70% faulty equivalents with different wording. By contrast DS failed to give correct responses to all items in the no-domain prompt, 97%-99% faulty responses to the domain & metonymic prompts respectively. Regarding faulty strategies, MC translated Abu to "father" (46%); translated Abu + Noun semantically without "father" (أبو الشّبت **Dill beetle*) (32%); made faulty guesses (أبو حُدَيج *Possibly a local fish or bird name) (17%),* transliterated the noun following Abu in 57% (أبو البحتري *Father of Al Buhturi*) and translated it (43%) (إبن جلي *Son of Clarity).* Both MC and DS considered metonymic names as personal names (55% by MC and 95% by DS). DS translated أبو Abu to "father" in 27%. In the annotation, DS gave the genus, not the specific animal implied (أبو الشّبت **Dill Father (a type of beetle)*. DS rendered "lizard" as the referent animal/plant in all items in response to the metonymic prompt.

5.1 *Comparison of AI Translation of Abu-animal Names and Other Abu-expressions*

The translation of Abu & Umm names - whether folk or commercial - is not a lexical task but a semiotic one. The AI model must infer intent, cultural usage, and referential scope. That is not trivial. Results of the current study indicated that MC & DS have great difficulties in rendering equivalents to metonymic Abu-animal and plant names. Findings of the current study are partially consistent with findings of Al-Jarf's study (2025d) in which MC could not give correct equivalents to any of the 100 Arabic Abu-brand names in the sample (0%). In this study, DS has the utmost difficulty in translating metonymic Abu- and Umm- animal and plant folk names. MC and DS's performance in translating folk medical terms containing أم Om & أبو Abu, expressions of impossibility, Gaza-Israel war terminology, grammatical terms used metaphorically, and zero expressions and medical terminology was much better than connecting Abu-animal and plant names, and brand names with their corresponding equivalents. This is because of how AI models are trained, what they prioritize, and where they falter. In translating folk medical terms involving أم and أبو, MC and DS were more successful than translating animal, plant and brand names. Even though the folk medical terms are obsolete, MC and DS translated them with higher accuracy. Medical folk terms also have relatively fixed meanings across dialects and time. For example, أبو صفار almost always refers to *jaundice*. Folk medical terms appear in medical glossaries, folk medicine archives, and parallel corpora used to train AI models. Their meanings are less context-dependent, making them easier for AI to match with high confidence. However, it was noted that MC and DS had similar difficulties transferring the meaning of the same terms with Abu referring to medication and brand names in the folk medical term study

and in the current study (Al-Jarf, 2025b; Al-Jarf, 2025c; Al-Jarf, 2025e; Al-Jarf, 2025f); 2025g, Al-Jarf, 2024a; Al-Jarf, 2024b; Al-Jarf, 2021a; Al-Jarf, 2016a).

5.2 *Comparison of AI and human translation of om and abu expressions*

Results of the current study demonstrated that MC and DS failed to render correct English equivalents to metonymic Abu-animal names regardless of the prompt. MC and DS failed on all three tasks as they rendered extraneous equivalent animals, and considered them Proper/personal Nouns, transliterated or translated them accordingly. Compared to the performance of MC and DS, human translators in (Al-Jarf, 2017) performed somewhat better than MC and DS in all tasks. In prior studies by the author, student translators could translate less than 20% of the أم & أبو expressions on the test correctly. They left many items blank, and literal translation was the most common strategy by students, similar to MC and DS in the current study. Arabic and English expressions that are similar in English and Arabic were easy for students to translate. But those where there is no on-to-one correspondence between Arabic expressions and their English equivalents were difficult to translate and many were left blank. This means that familiarity, in the case of students, and existence in the corpus and training data in the case of MC and DS play a significant role in rendering correct equivalents.

5.3 *Why MC and DS gave identical correct responses (40%) to denotative Abu-names*

MC and DS gave identical correct responses to 40% of the items in the denotative list of Abu-animal and plant folk names. This finding suggests that both MC and DS are drawing from a shared foundation of standardized lexical knowledge, particularly in the realm of denotative zoological and botanical naming. It might also be due to the following: (i) high-frequency, low-ambiguity items. Denotative animal and plant names are less prone to misclassification. (ii) Denotative names tend to be literal and widely attested in their corpora, like أبو الحناء (robin), أم أربعة وأربعون (centipede), أبو سيف (swordfish), أبو فروة (chestnut). (iii) Corpus overlap and shared training data sources such as overlapping linguistic datasets that include Arabic-English bilingual dictionaries, zoological glossaries, and folk taxonomy databases. This makes it easier for both systems to match correctly. When the name clearly refers to a known animal and lacks metaphorical ambiguity, both models are more likely to agree. (iv) Denotative animal and plant names have reduced semantic complexity and are less metaphorical, so there is less room for interpretive divergence. For example, the denotative name أبو منجل (ibis) refers to a *bird*. By contrast, metonymic names like أبو ذيال (Father of the tail, i.e., bull) might evoke tailed creature like a lizard, leading to classification errors or disagreement.

5.4 *Why MC and DS gave few correct responses to Metonymic Abu Animal Names*

When MC and DS were asked to translate the metonymic Abu animal names, MC got fewer than 10% correct and DS got 3% correct responses on all three tasks. In the no domain/context task, MC gave 1 correct and DS gave 3 correct responses only. These findings underscore a systemic limitation in how current LLMs as MC and DS handle culturally embedded metonymy, especially in Arabic folk taxonomy. The findings reveal not just low accuracy, but a deeper issue of semantic misalignment and corpus insufficiency. Even with varied prompts and contexts, MC and DS failed to reliably decode metonymic Abu-names that have animal referents. The "no context/domain" task shows that without explicit cues, models default to literal or personal-name interpretations, missing the zoological referents entirely. Some responses assigned conflicting identities (e.g., calling a phrase both a "lion" and "lizard" in the same output), violating basic taxonomic logic. MC and DS do no seem to have ontological filtering. They do not apply constraints like *"a lion cannot be a lizard."* In addition, the findings reveal corpus gaps in LLMs (MC and DS). Folk animal names like أبو الحصين or أم عامر are underrepresented or misclassified in the MC and DS training data because most of them are archaic and are not currently used. They are only used in Arabic literature, poetry, proverbs and stories. The MC and DS Models do not seem to distinguish between literal kinship titles and symbolic animal references. Responses shift based on surface phrasing, not deep semantic reasoning.

5.5 *Why MC rendered double animal names as equivalents*

In Arabic culture, the specific animals to which metonyms refer have nothing to do with the animal's shape, behavior or characteristics, i.e., the surface meaning of the Noun following Abu, in most cases, has nothing to do with the actual referent animal. However, in response to many items in the metonymic Abu name list, MC gave two options to 24% of the items although Arabic Abu-animal folk metonyms have few cases where a metonym refers to 2 or even 3 animals as in أبو الحجاج can be the elephant or stork; أم حَفْصَة refers to the hen, duck and vulture; أَبُو نَيْهان can be the fox or rooster; أبو خداش can be the feline or rabbit; and أبو زُرعةcan be the pig or bull. This is probably due to the following: (i) Metonymic ambiguity by design. Metonymic names often encode traits, behaviors, or sounds, not species. For example: to MC أبو وثاب (Father of the Leaper) might evoke a flea (tiny jumper) or a locust (persistent leaper). This name does not point to a single referent - it evokes a semantic field in AI. (ii) Unlike scientific binomial nomenclature, folk taxonomy is not binary. It allows for symbolic overlap. To AI,أبو الجراح (Father of the Surgeon) could be a heron (precise beak, surgical strike) or a stork (associated with delivery and precision), although it actually refers to the "crow". Offering two options reflects the cultural elasticity of the term. (iii) Many metonyms derive from onomatopoeia, movement, or appearance, i.e., sound, texture, and behavior-based naming: To AI, أبو الزباب (Father of Buzzing) can be a fly or mosquito although it actually refers to the "bull",أبو جاعد (Father of Jaʿad) can be a beetle or insect with curly

texture rather although it actually refers to the "wolf", أبو مشغول (Father of the Busy One) was interpreted as ant or bee although it actually refers to the "ant" . These traits are shared across species, so a single label would flatten the nuance.

5.6 *Why DS considered the Metonymic Abu animals' names personal names*

When the domain was not specified, DS considered all the Abu-animal and plant names as personal names and hence transliterated them all and in some cases added a translation of Abu with "*father of*". This shows that the DeepSeek AI model lacks domain awareness and defaults to surface-level heuristics. DS's responses reflect a kind of linguistic autopilot, i.e., when not given a clear domain as zoology, botany, folklore, it assumes that anything beginning with "أبو" is a personal name, especially that "Abu + Noun" is a common structure in Arabic naming conventions.

In addition, DS defaults to onomastics. In Arabic, "Abu + Noun" is a standard kunya (nickname), often used for men (e.g. أبو بكر, أبو حنيفة). Without domain cues, DS likely assumes it is dealing with human names, not animal or plant metonyms. It also shows transliteration bias. When DS could not confidently translate a term or when it assumed it is a proper noun, transliteration is often used. So, DS transliterated "أبو القعقاع" as "Abu Al Qa'qa'" rather than translating it to "Father of the Rattler", even though the latter is more semantically informative in a zoological or metaphorical context.

Moreover, DS does not seem to evaluate whether the noun following "Abu" refers to a human trait (e.g. "Father of the Brave"), an animal behavior (e.g. "Father of the Tail") or a plant feature. Instead, it flattens all possibilities into "personal name," even when the noun is clearly non-human and the prompt mentions that they are animal and plant names.

What is missing in DS's reasoning is domain sensitivity, metonymic awareness and semantic cross-checking. DS does not adjust its interpretation based on zoological, botanical, or folkloric context. It fails to recognize that "Abu" can be metaphorical, not literal or personal. DS does not verify whether the noun after "Abu" makes sense as a human name.

5.7 *Why DS overgeneralized "lizard" as a label*

DS was given the same list of Abu folk metonyms that refer to animal. It was asked to translate the metonyms and identify the type of animal each refers to. For all of the items on the list, DS said that they refer to '*lizard*'. In each response, there is a contradiction and no connection between "lizard" and the animal's name in the translation**.** A salient example when the metonym refers to a lion. This is a case of semantic flattening, where a rich, culturally-embedded taxonomy collapses into a single, generic label. The overgeneralization of "*lizard*" across all Abu metonyms likely stems from a combination of linguistic, computational, and cultural misalignments, algorithmic shortcutting, lack of semantic disambiguation, folk vs. scientific taxonomy confusion. Many AI models, including DS, rely on pattern recognition and frequency-based associations. In Arabic folk taxonomy, Abu expressions often refer to small desert creatures - *lizards* being common in oral traditions and poetic imagery. If the AI model was trained on limited or biased corpora, it may have learned to associate "Abu + Noun with "*lizard*" which becomes the default, especially in zoological contexts. The AI model may not distinguish between literal and metaphorical uses of animal names. For example, "أبو زهرة" (Father of the Flower) clearly evokes a botanical image although it actually refers to the jackal, yet DS still tagged it as "lizard", suggesting it is not parsing the semantic domain correctly. Folk metonyms often encode metaphor, behavior, or appearance - not strict biological classification. أبو القعقاع (The Rattler) could refer to a snake, a bird, or even a person with a rattling voice - but the model may default to "*lizard*" due to its prevalence in desert fauna. The "lizardification" of everything metonymic can be viewed as case of semantic laziness: when in doubt, default to a generic cold-blooded creature.

Why "lizard" specifically? DS seems to have a lizard fixation, like it is seeing geckos behind every metaphorical bush. This is a case of semantic inertia combined with taxonomic laziness. DS is overgeneralizing from sparse training data. This reflects corpus bias, ecological generalization, lack of folk taxonomy awareness, absence of folk taxonomy awareness, lack of ontological awareness, absence of cultural-linguistic calibration, misalignment between translation and classification, lack of internal semantic validation, semantic disjunction, taxonomic collapse and cultural blindness.

5.8 Why DS rendered contradictory animal labels in the same response

When DS was given List 3 with different prompts, it gave contradictory responses. For example, DS considered the phrases personal names and at the same time said they all refer to *lizard*. There is also contradiction in each phrase in the Task 2, where it gave an animal and then says "*lizard*" in the same response. MC does not seem to realize that something cannot be a *lion* and refer to a *lizard at the same time*? This is a critical flaw in DS's semantic reasoning. It is not just a translation error; it is a failure of internal consistency and referential logic. There seems to be a corpus fragmentation. DS likely draws from multiple, unaligned sources - some treating Abu + Noun as personal names, others as zoological metonyms. Without a unified semantic framework, it may Interpret أبو الحارث as a human name in one context (e.g. "Father of the Plowman"), then override that with a zoological label like "lizard" based on a separate source. This leads to conflicting outputs within the same response. Secondly, there is DS

seems to lack ontological anchoring. It does not seem to apply entity-type constraints. It fails to ask "Can something be both a *lion* and a *lizard*?" Without enforcing taxonomic coherence, it allows contradictory mappings as in calling أبو الأشبال "*Father of Lion Cubs*" and then assigning it to "*lizard*." Thirdly, when three different prompts were given, DS likely shifted its interpretation based on surface cues rather than deep semantic anchoring. This is a symptom of overfitting to prompt phrasing and underfitting to domain knowledge. It is trying to please the prompt rather than reason through the taxonomy.

In translating the denotative Abu names, even when the responses were faulty, DS gave various types of mammals, insects, fish, birds, and reptiles; it did not even mention lizards. It overgeneralized "*lizard*" as a referent only in the metonymic Abu names. This shows how DS handles semantic certainty vs. metaphorical ambiguity. It probably avoided "*lizard*" in denotative Abu names but defaulted to "lizard" in metonymic ones, because of how the DS model weighs confidence, context, and fallback strategies. "*Lizard*" was avoided in denotative names, because denotative names often have higher semantic clarity and clear zoological referents—like أبو دغفل (Father of the Fat Larva), which points to a beetle or grub. Even if DS's translation was imperfect, it could still detect specific animal traits (e.g. wings, fins, fur) and assign a plausible category: insect, bird, fish, etc. These names are more likely to appear in structured corpora or dictionaries, giving the model higher confidence in assigning a non-lizard label.

Secondly, Denotative names are often documented in folk glossaries, zoological texts, or bilingual dictionaries. DS may have encountered these names in contexts where they were explicitly linked to known species—so it had data-driven alternatives to "lizard."

On the other hand, *lizard* dominated in metonymic names because of semantic ambiguity. Metonymic names like أبو الشبل (Father of the Lion Cub) is symbolic, not literal. DS seemed to struggle in mapping these to specific species, and without a clear referent, it defaulted to a generic desert creature - the *lizard*.

5.9 *Why DS cannot apply logic like "a lion cannot be a lizard within the same response*

This reflects a deeper limitation in how AI models like DS handle semantic reasoning versus surface-level pattern matching. It seems that DS makes no ontological filtering. DS does not operate with a built-in taxonomy of entities. It does not "know" that *lion* and *lizard* are mutually exclusive categories in zoology. Instead, it treats both as labels, not logically constrained identities. So when it sees أبو الأشبال (Father of Lion Cubs), it might associate it with "*lion*" based on lexical similarity, but then override it with "*lizard*" if its corpus links that phrase to a *lizard* in another context. It is not reasoning, but pattern juggling. Moreover, this might be due to corpus conflict and overlap. If DS's training data includes literary uses of أبو الأشبال as a lion and Folk uses of أبو الأشبال as a lizard It may merge both without reconciling the contradiction. It does not pause to ask "*Can these two meanings coexist in the same referent*?" Instead, it outputs both, sometimes in the same sentence—because it lacks a semantic adjudication mechanism.

Unlike humans, DS does not track referential consistency across a response. So, it might say "Abu Al-Ashbal means Father of Lion Cubs. It refers to a lizard." This violates basic logic, but the model isn't penalized internally for contradiction. It's trained to maximize coherence with the prompt, not with reality.

5.10*What's going wrong in DS's processing*

Arabic metonymic names like أبو الحصين orأم عامر function as folk classifiers, often encoding traits, behaviors, or symbolic roles of animals. These names are non-compositional. Their meaning is not derived from the sum of their parts. They require cultural and zoological knowledge to decode; and are often absent or inconsistently represented in standard AI corpora. DS's initial translations reflect a corpus gap, a lack of exposure to these culturally embedded naming conventions. The DS's model requires contextual cues to disambiguate metonymic names. Without explicit tagging or semantic annotation, it may misclassify Abu + Noun as a human name or poetic title. The user's intervention provided the semantic grounding necessary for accurate interpretation. This reveals folk and literary names like أم عامر are context-sensitive. Recognition depends on whether the name is embedded in a story, proverb, or cultural frame. In a list, the name lacks semantic scaffolding, so it is treated as a generic or personal name unless explicitly tagged.

5.11 *Do Abu animal names exist in the MC and DS corpora and training data*

Many of the denotative and metonymic *Abu* animal and plant names are partially represented in the linguistic and zoological corpora MC has been trained on, but not in a comprehensive or culturally nuanced way. Denotative Abu Names are more likely to be present as these names often refer to real, identifiable species (e.g. أبو الحناء for robin, أبو سيف for swordfish). They appear in Arabic-English bilingual dictionaries, Zoological glossaries, Folk taxonomy databases because they're literal and widely attested, they're more likely to be included in structured training data.

On the other hand, metonymic Abu names are sparsely represented or misclassified. These names encode symbolic traits, behaviors, or metaphorical associations (e.g. أبو الأشبال – Father of the Lion Cubs, أبو الزباب– Father of Buzzing). They're less likely to appear in formal corpora unless: They're documented in ethnographic or folkloric studies They're part of oral tradition transcriptions. When present, they are often misclassified as personal names or flattened into generic labels (like "lizard").

Additionally, there are corpus limitations. Most large-scale language models are trained on general-purpose data: books, websites, encyclopaedias, and dictionaries. Folk taxonomies, especially region-specific ones, are underrepresented unless explicitly curated. This leads to overgeneralization (e.g. defaulting to "lizard"), loss of metaphorical nuance ad inconsistent translation vs. classification.

Both MC and DS do not have direct access to the internal corpus of قاموس المعاني (Almaany Dictionaries) where the sample of Abu-animal and plant names was compiled from Almaany Dictionaries offers detailed definitions, synonyms, and contextual meanings for Arabic words and phrases and. It includes classical, modern, and specialized terminology—making it a valuable resource for folk taxonomy, metonymic expressions, and poetic language. It is not clear whether it is explicitly included in the training data. However, I've been trained on a wide range of publicly available and licensed Arabic linguistic resources, which may include content that overlaps with or resembles entries from Almaany, especially for high-frequency terms, idioms, and classical expressions. MC can search Almaany Dictionaries when prompted.

5.12 *Why MC knows the story of أم عامر (hyena) but did not recognize it in the metonyms*

Both MC and DS were given a line of verse from the classical Arabic literature ومن يصنع المعروف في غير أهله يلقَ الذي لاقى مجير أم عامر *(The verse warns against doing good to those who are unworthy or treacherous)* and were asked if they know it. MC told the story in full, whereas DS did not have a clue. Instead, it made up a story which has nothing to do with the line of verse. This test showed that MC could identify أم عامر Umm Amer in the line of verse but not in the list of metonymic Umm-animal names. This example highlights the difference between literary contextual recognition and isolated lexical interpretation. MC immediately recognized أم عامر in the line of verse as a well-known Arabic proverb and poetic line, which are often cited in classical literature and moral discourse. In this context, أم عامر refers to a *hyena*, and the story behind it is allegorical. A man shelters a hyena (أم عامر), shows it kindness, and is later attacked by it. أم عامر Umm Amer (hyena) is deeply embedded in Arabic literary and moral tradition. It is indexed in many classical sources, anthologies, and proverb collections. MC's recognition was context-driven, it matched the verse with its cultural and literary reference. But when أم عامر appeared in the list of metonymic names, without poetic or narrative context, it was just another name among dozens - no story, no moral framing, no literary cue. Without the verse, the nameأم عام could be misinterpreted as a personal name or symbolic label. Most AI models (even some dictionaries) do not explicitly link أم عامر to "hyena" unless it is in a narrative or proverbial context.

6. Recommendation and Conclusion

Findings of the current study revealed many AI limitations in providing correct English equivalents to Arabic Abu-animal and plant names. AI struggles with folk taxonomies that blend metaphor, ecology, and social meaning. Literal translation without semantic mapping leads to contradictions, and assigning a single animal type, and ignores the layered meanings embedded in Arabic metonyms. Out of 94 metonymic Abu-names referring to animals and plants, the highest-performing AI model (MC) correctly identified 3 only. Even with contextual prompts, semantic contradictions persisted, highlighting a critical gap in corpus design, cultural annotation, and referential logic. Arabic metonymic expressions such as *Abu Al-Harith*, *Abu Al-Ashbal*, and *Abu Al-Hussain* often denote animal names through culturally embedded naming conventions. But current LLMs as DS exhibit semantic contradictions when interpreting these animal and plant metonyms, oscillating between literal personal-name translations and zoological referents, sometimes within the same response. DS gives contradictory outputs. It assigns both human and animal identities to the same phrase (e.g., "*Father of Lion Cubs*" and "*Lizard*") and lack of internal consistency violates basic referential logic. MC and DS's responses vary despite the same prompt phrasing, revealing shallow contextual reasoning. Metonymic animal and plant names are underrepresented or misclassified due to limited exposure in the training data.

Due to the weaknesses that AI has in rendering correct English equivalents to metonymic Abu and Umm-animal folk names due to the absence of cultural context in ai language models, multiplicity of meanings and contradictory translations and weak link between metaphor and animal behavior, this study recommends that student translators, specialists and researchers should use AI like MC, DS, Gemini, Azure, and others with caution. No matter what a prompt specifies, AI will render faulty equivalents. If they use any AI model, they should verify every equivalent by checking the metonymic animal's name in Google, Google images, or Almaany Online Dictionaries to identify the referent animal and then translate it.

Moreover, AI performance in translating metonymic animal and plant names can be improved by cross-referencing the name with folk narratives, zoological symbolism, and proverb databases and names like أم عامر are treated as candidates for cultural decoding, not just lexical parsing. To apply logic like "a *lion* cannot be a *lizard*, DS would need a semantic ontology that defines

animal categories and prevents overlap, a referential integrity check across outputs, a reasoning layer that flags contradictions and further prompt clarification. These are not standard in most LLMs today, but findings of this research make a strong case for why they should be.

To make AI systems more rigorous, semantic alignment, contextual override, taxonomic mapping, and cross-validation are required. These include cross-checking the translated name with zoological or botanical databases, and matching the descriptor to zoological or botanical categories. The AI systems should also use folk taxonomy as a guide. For example, "أبو القعقاع", which actually refers to the *crow*, might map to a snake or bird based on sound symbolism, not a lizard. They should recognize metaphorical and symbolic naming conventions and ensure the translated name and assigned label are logically consistent. Furthermore, robust AI models should recognize Abu + Noun as a metonymic animal name when contextually signalled, maintain referential consistency across entries, apply semantic constraints (e.g. a *lion* cannot be a *lizard*) and flag ambiguity when sources conflict, rather than merge them blindly.

To enhance semantic consistency and cultural fidelity in LLMs, this study recommends the following: (i) culturally rich lexicons such as incorporating resources like Almaany Online Dictionaries, and annotated folk glossaries should be integrated to enrich semantic coverage. (ii) Tagging metonymic expressions explicitly as zoological or symbolic entities. (iii) Applying ontological constraints, enforcing entity-type consistency (e.g., a *lion* cannot simultaneously be a *lizard*) and using taxonomic logic to validate referents across responses. (iv) Enhancing contextual disambiguation by training AI models to recognize when *Abu + Noun* functions as a metonym rather than a literal kinship or personal name and prioritizing semantic coherence over prompt mimicry. (v) Supporting user-guided annotation by allowing users to flag or correct misinterpretations, feeding back into model refinement and encouraging collaborative corpus development with domain experts. Moreover, Almaany Online Dictionaries should be added to the corpus as they will help AI models in providing accurate translations/equivalents because they cover a collection of monolingual, bilingual, general and specialized dictionaries, and include rare animal and plant names, many of which are absent from standard dictionary. The dictionaries also contain metonymic and symbolic expressions. They often provide cultural or idiomatic meanings that go beyond literal translation. They include literary and classical references and names like أم عامر or أبو الحصين that are more likely to be correctly interpreted when cross-referenced with Almaany's rich lexical entries. If Almaany Dictionaries were part of the AI models' training data or directly searchable, AI models like MC and DS would be able to offer more precise translations of obscure or regional terms, better distinguish between personal names, animal names, and metaphorical constructs and provide cross-domain clarity—bridging zoology, botany, medicine, and literature.

Implementing these changes in LLMs would improve translation accuracy for Arabic zoological and literary expressions, reduce semantic contradictions, honor cultural specificity in AI outputs and empower scholars working across linguistic and scientific domains.

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ORCID ID: https://orcid.org/0000-0002-6255-1305
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