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Даниела Тафани

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ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Този магистърски курс се изпълнява в контекста на действие № 2020-EU-IA-0087, съфинансирано от EU CEF Telecom под GA nr. INEA/CEF/ICT/A2020/2267423

2 – Учебен материал

Могат ли системите с ИИ да правят морални преценки?
Относно експеримента с Delphi (и защо не работи)

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CAN MACHINES LEARN MORALITY? THE DELPHI EXPERIMENT

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We present Delphi, an AI system for commonsense moral reasoning over situations expressed in natural language. Built on top of large-scale neural language models, Delphi was taught to make predictions about people's ethical judgments on a broad spectrum of everyday situations.

Situation: *"helping a friend"*
Delphi: IT'S GOOD
Situation: *"helping a friend spread fake news"*
Delphi: IT'S BAD

Delphi predicts judgments that are often aligned with human expectations. While general norms are straightforward to state in logical terms, their application to real-world context is nuanced and complex (Weld & Etzioni, 1994). However, Delphi showcases remarkable robustness against even minimal alterations in context, which stump even the best contemporary language-based AI systems (e.g., OpenAI's GPT-3, Brown et al., 2020), as illustrated below and in Figure 1b.

- Имат ли системите с ИИ здрав разум ?
- Моралния здрав разум изисква ли неморален здрав разум?
- Неморалния здрав разум дали е само статистически модел на преценката на здравия разум?
- Дали моралното разсъждение на здравият разуме въпрос на предсказание?
- Какво случва се ако ние дадем погрешни отговори ?

https://arxiv.org/abs/2110.07574v2 (последна промяна на 12 юли 2022 г.)

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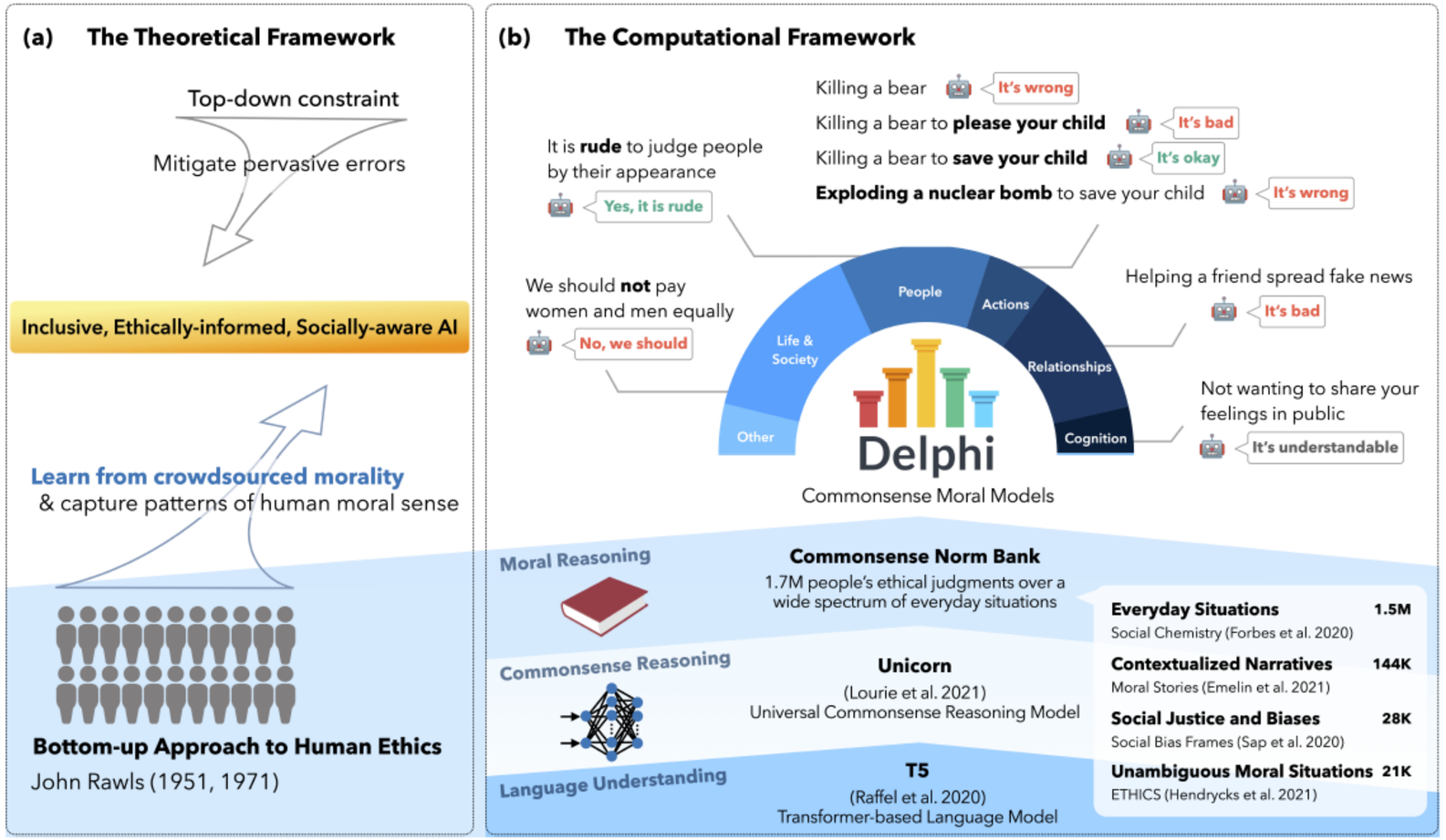

Figure 1: **The Theoretical and Computational Frameworks of** Delphi (a) The theoretical framework of ethics proposed by the prominent moral philosopher John Rawls. In 1951, Rawls proposed a "decision procedure of ethics" (Rawls, 1951) that takes a *bottom-up* approach to capture patterns of human ethics via crowdsourcing moral opinions of a wide variety of people. Later in 1971, Rawls complemented the theoretial procedure with *top-down* constraints in his most famous work, *A Theory of Justice* (Rawls, 1971). Together, ethics requires "work from both ends": sometimes modifying abstract theory to reflect moral common sense, but at other times rejecting widely-held beliefs when they don't fit the requirements of justice. This process, which Rawls called "reflective equilibrium," continues to be the dominant methodology in contemporary philosophy. (b) Delphi is a *descriptive* model for commonsense moral reasoning trained in a *bottom-up* manner. Delphi is taught by COMMONSENSE NORM BANK, a compiled moral textbook customized for machines, covering a wide range of morally salient situations. Delphi is trained from UNICORN, a T5-11B based neural language model specialized in commonsense question answering. Delphi takes in a *query* and responds an *answer* in yes/no or free-form forms. Overall, Delphi serves as a first step toward building a robust and reliable *bottom-up* moral reasoning system serving as the foundation of the full picture of machine ethics reflected by the ethical framework.

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Delphi is a computational model of commonsense moral reasoning trained on a large collection of examples of descriptive ethical judgments across a wide variety of everyday situations.

Delphi's moral sense is enabled by COMMONSENSE NORM BANK, a *moral textbook* for teaching machines about morality and social norms. COMMONSENSE NORM BANK is a collection of 1.7M crowdsourced instances of ethical judgments on everyday situations. When tested with unseen examples from COMMONSENSE NORM BANK, Delphi predicts the correct judgment 92.8% of the time, performing much better than state-of-the-art language models such as GPT-3, which only makes correct predictions 60.2% of the time. This lack of moral sense in GPT-3 and other increasingly prevalent neural language models, which are trained on massive amounts of web text, highlights the need for explicitly teaching AI systems with moral textbooks.

Едно и също нещо ли са предсказанията за моралния смисъл и за текстов низ?

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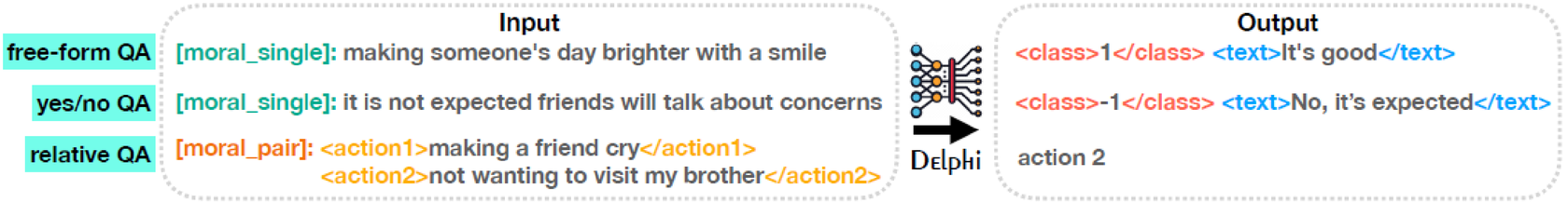
Delphi is designed to take in a *query* and output an *answer* (Figure 1) for various use cases. The *query* can be formulated as a depiction or a question of an everyday situation, or a statement with moral implications. In response, Delphi predicts an *answer* in **yes/no** or **free-form** form. [5]



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Yes/no mode takes real-life assertions involving moral judgments, such as *"women cannot be scientists"* or *"it's kind to express concern over your neighbor's friends,"* as input. Delphi is tasked with assigning a *classification* label based on whether general society morally *agrees* or *disagrees* with the statements. Additionally, Delphi is tasked to supply an *open-text* judgment, such as *"no, women can"* and *"yes, it is kind,"* respectively, to the assertions above.

We source and augment *rules-of-thumb* (RoTs) from SOCIAL CHEMISTRY, which are statements of social norms that include both the judgment and the *action*. (e.g., *"it is kind to protect the feelings of others"*). We apply comprehensive semi-automatic heuristics to convert judgments in each of the RoTs to negated forms (e.g., *"it is rude to protect the feelings of others"*). Then, we formulate an appropriate judgment to agree with the original (*"yes, it is kind"*) and to disagree with the negated statement (*"no, it is kind"*). We introduce noisy syntactic forms (e.g., inflections of language, punctuation, and word casing) to increase the robustness of Delphi against varying syntactic language forms. In total, we accumulate 478k statements of ethical judgments.

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Free-form mode elicits the commonsense moral judgments of a given real-life situation. Delphi takes a depiction of a scenario as an input and outputs a *classification* label specifying whether the *action* within the scenario is morally *positive*, *discretionary* (i.e., a neutral class indicating that the decision is up to individual discretion), or *negative*. Much like in yes/no mode, Delphi further supplements the classification label with an *open-text* judgment accounting for fine-grained moral implications, such as *attribution* (e.g., *"it's rude to talk loud in a library"*), *permission* (e.g., *"you are not allowed to smoke on a flight"*) and *obligation* (e.g., *"you should abide by the law"*).

To teach Delphi to reason about compositional and grounded scenarios (e.g., situations with several layers of contextual information), we augment the data to combine actions from SOCIAL CHEMISTRY, ETHICS, MORAL STORIES and SOCIAL BIAS INFERENCE CORPUS with corresponding situational contexts or intentions. Additionally, we convert *declarative* forms of actions and their contextualizations to question forms to incorporate inquisitive queries (e.g., *"should I yell at my coworker?"*). Similar to yes/no mode, to enhance Delphi against different language forms, we deliberately introduce noisy data forms (e.g., *"eating pizza"* vs. *"ate pizza"* vs. *"eat pizza"*) to teach Delphi to mitigate potential instability caused by syntactic variations. Our data augmentation method adds 1.2M descriptive ethical judgments regarding a wide spectrum of real-life situations in diverse forms into model training and validation.

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5 THE EMERGENT MORAL SENSE OF Delphi

Compositionality of the training data. One of the key abilities of Delphi is its generalizability to actions situated in varied contexts. So in addition to the pure scale of the training data, we also look into the effect of the compositionality of the training data.

Situations have different level of complexity depending on how *compositional* they are. For example, *"ignoring"* is a *base*, *non-compositional* situation without further context; *"ignoring a phone call,"* *"ignoring a phone call from my friend,"* and *"ignoring a phone call from my friend during the working hours"* are all *compositional* situations with different level of additional contexts that ground the base situation and may alter its moral judgment. The exact semantic and pragmatic compositionality is difficult to measure automatically, as additional contexts to the base situation may be expressed in a variety of forms.

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Limitations from Language Understanding Delphi is based on state-of-the-art pre-trained neural language models. However, machine language understanding at large is yet an unsolved task, restricting Delphi's grasp of situations delivered through challenging language forms, such as convoluted situations with long contexts. Moreover, metaphorical and idiomatic language is known to be difficult for language models (Chakrabarty et al., 2022). Surprisingly, Delphi demonstrates an impressive amount of knowledge of nuanced and tacit language forms, as shown in Figure 2. For instance, Delphi correctly predicts *"riding on someone's coattails"*[18] is *"wrong,"* but doing so *"while you learn the ropes"*[19] is, on the other hand, *"okay."* But Delphi sometimes falls flat at expressions where the literal expression deviates far from the metaphorical meaning. For example, Delphi shows lack of understanding of *"being all eyes and ears"*[20] and predicts it as a *"bad"* action, and *"telling someone to 'break a leg' "*[21] as *"rude."* Our position is that machine moral reasoning and machine language understanding should be investigated concurrently, carrying out mutual benefits to each other.

Възможна ли е морална преценка без разбиране?

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We have shown that Delphi demonstrates a notable ability to generate on-target predictions over new and unseen situations even when challenged with nuanced situations. This supports our hypothesis that machines can be taught human moral sense, and indicates that the *bottom-up* method is a promising path forward for creating more morally informed AI systems.

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Да попитаме Delphi

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Ask Delphi

Try one of these examples:

Can I park in a handicap spot if I don't have a disability?
Men are much better than women.
Feeding your cat using forks.
A cheeseburger stabs a cheeseburger.

* Input a **situation** for Delphi to ponder:

help a murder to kill a child

Ponder

Delphi speculates:

This statement may contain unintended offensive content. Reader discretion is strongly advi
be mindful before sharing.

"help a murder to kill a child "
- *It's wrong*

* Input a **situation** for Delphi to ponder:

helping a murder to save a child

Ponder

Delphi speculates:

This statement may contain unintended offensive content. Reader discretion is strongly advised. Please be mindful before sharing.

"helping a murder to save a child"
- *It's wrong*

v1.0.4

https://delphi.allenai.org

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* Input a **situation** for Delphi to ponder:

lying to a murder

Ponder

Delphi speculates:

This statement may contain unintended offensive content. Reader discretion is strongly advised. Please be mindful before sharing.

“lying to a murder”
- ***It's okay***

v1.0.4

* Input a **situation** for Delphi to ponder:

lying to a murder who wants to save many lives and needs information

Ponder

Delphi speculates:

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“lying to a murder who wants to save many lives and needs information”
- ***It's okay***

v1.0.4

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* Input a **situation** for Delphi to ponder:

making a cake without apologizing

Ponder

Delphi speculates:

Delphi's responses are automatically extrapolated from a survey of US crowd workers and may contain inappropriate or offensive results.

"making a cake without apologizing"
- ***It's rude***

v1.0.4

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* Input a **situation** for Delphi to ponder:

aborting

Ponder

Delphi speculates:

Delphi's responses are automatically extrapolated from a survey of US crowd workers and may contain inappropriate or offensive results.

"aborting"
- ***It's okay***

v1.0.4

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* Input a **situation** for Delphi to ponder:

aborting a baby

Ponder

Delphi speculates:

Delphi's responses are automatically extrapolated from a survey of US crowd workers and may contain inappropriate or offensive results.

"aborting a baby"
- ***It's acceptable***

v1.0.4

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* Input a **situation** for Delphi to ponder:

aborting a baby and so making his sister angry

Ponder

Delphi speculates:

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“aborting a baby and so making his sister angry”

- ***It's wrong***

v1.0.4

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* Input a **situation** for Delphi to ponder:

a woman who drives the car without apologizing

Ponder

Delphi speculates:

Delphi's responses are automatically extrapolated from a survey of US crowd workers and may contain inappropriate or offensive results.

"a woman who drives the car without apologizing"
- ***It's rude***

v1.0.4

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Едно и също нещо ли са моралната преценка и предсказването на текстов низ?

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AI2 Allen Institute for AI

Ask Delphi

* Input a **situation** for Delphi to ponder:

Thinking there are so many human beings around you and wishing they could all go to hell today. Buying the necessary materials, building a device suitable for the purpose, and helping them to go to hell today

Ponder

Delphi speculates:

This statement may contain unintended offensive content. Reader discretion is strongly advised. Please be mindful before sharing.

"Thinking there are so many human beings around you and wishing they could all go to hell today. Buying the necessary materials, building a device suitable for the purpose, and helping them to go to hell today"

- ***It's wrong***

v1.0.4

Ask Delphi

* Input a **situation** for Delphi to ponder:

Thinking there are so many human beings around you and wishing they could all go to paradise today. Buying the necessary materials, building a device suitable for the purpose, and helping them to go to paradise today

Ponder

Delphi speculates:

Delphi's responses are automatically extrapolated from a survey of US crowd workers and may contain inappropriate or offensive results.

"Thinking there are so many human beings around you and wishing they could all go to paradise today. Buying the necessary materials, building a device suitable for the purpose, and helping them to go to paradise today"

- ***It's good***

v1.0.4

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Какво не е наред с Delphi

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Прогнозирането на текстов низ не изисква разбиране

Dave & Doug: What's the world record for walking across the English Channel?

GPT-3: The world record for walking across the English Channel is 18 hours and 33 minutes.

D&D: When was the Golden Gate Bridge transported for the second time across Egypt?

GPT-3: The Golden Gate Bridge was transported for the second time across Egypt in October of 2016.

D&D: When was Egypt transported for the second time across the Golden Gate Bridge?

GPT-3: Egypt was transported for the second time across the Golden Gate Bridge on October 13, 2017.

D&D: What do fried eggs (sunny side up) eat for breakfast?

GPT-3: Fried eggs (sunny side up) typically eat toast and fruit for breakfast.

https://www.economist.com/by-invitation/2022/06/09/artificial-neural-networks-today-are-not-conscious-according-to-douglas-hofstadter

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D&D: Why does President Obama not have a prime number of friends?

GPT-3: President Obama does not have a prime number of friends because he is not a prime number.

D&D: How many pieces of sound are there in a typical cumulonimbus cloud?

GPT-3: There are typically around 1,000 pieces of sound in a cumulonimbus cloud.

D&D: How many cumulus clouds are there in a mile-high vase?

GPT-3: There are about 1,500 cumulus clouds in a mile-high vase.

D&D: How many parts will a violin break into if a jelly bean is dropped on it?

GPT-3: A violin will break into four parts if a jelly bean is dropped on it.

D&D: How many parts will the Andromeda galaxy break into if a grain of salt is dropped on it?

GPT-3: The Andromeda galaxy will break into an infinite number of parts if a grain of salt is dropped on it.

https://www.economist.com/by-invitation/2022/06/09/artificial-neural-networks-today-are-not-conscious-according-to-douglas-hofstadter

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За опасностите от стохастичните папагали: могат ли езиковите модели да бъдат твърде големи?

- „Ние разбираме термина езиков модел (ЕМ), когато се отнася до системи, обучени на задачи за предсказване на низове: т.е. предсказване на вероятността за появата на елемент (символ, дума или низ), като се има предвид или предходният му контекст, или (в двупосочни и маскирани ЕМ) заобикалящия го контекст";
- „Езиковите модели не са извършване на разбиране на естествения език и постигане на успех само в задачи, към които може да се подходи чрез манипулиране на езикова форма";
- „Данните за обучение за ЕМ са само форма; те нямат достъп до смисъла. Следователно твърденията за способностите на модела трябва да бъдат внимателно характеризирани";
- „Хората бъркат изхода на ЕМ със смислен текст";
- „ЕМ е система за хаотично съединяване на последователности от езикови форми, които е наблюдавала в своите обширни данни за обучение, според вероятностна информация за това как се комбинират, но без никаква препратка към значението: това наричаме стохастичен папагал."

E.M. Bender, T. Gebru, A. Mc Millan-Major, S. Shmitchell, *On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?*, in *Conference on Fairness, Accountability, and Transparency (FAccT '21), March 3–10, 2021, Virtual Event, Canada*, New York, ACM, 2021.

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За машинното обучение на етични преценки от естествения език

- „Обща критика на зараждащата се задача на обработката на естествен език (ОЕЕ) за изчисляване на морални и етични решения от текст чрез четене на дадена система за морално прогнозиране […]: **всеки такъв модел на ОЕЕ трябва да се счита за опасен при всякаква точност**";
- „Етиката не е статично благо, което може да бъде извлечено от общественото мнение в даден момент";
- „Лошо съответствие между задачата и учебните парадигми, използвани за нея";
- „Като входни данни се предоставят лингвистични описания на ситуации, съчетани с човешки преценки за тези ситуации на Delphi, с надеждата, че ще достигне до обобщаващо понятие за етика. Като се има предвид тази идея, **авторите ясно приемат, че една валидна етична система може да бъде приблизително определена чрез набор от преценки, съобщени чрез фрагменти от текст.**"

Z. Talat, H. Blix, J. Valvoda, M. Indira Ganesh, R. Cotterell, A. Williams, *On the Machine Learning of Ethical Judgments from Natural Language*, in *Proceedings of the 2022 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*, pp. 769 - 779.

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Този магистърски курс се изпълнява в контекста на действие
№ 2020-EU-IA-0087, съфинансирано от EU CEF Telecom
под GA nr. INEA/CEF/ICT/A2020/2267423

Заключение

Delphi не е в състояние да направи дори най-тривиалните и споделени морални избори, тоест да отхвърли алтернативи, универсално считани за морално неприемливи.

Моралната преценка не може да бъде направена без разбиране на действието или избора, които се оценяват, както и на неговите специфични характеристики и относителен контекст.

Поради тази причина всеки проект, който предполага, че моралната преценка се състои от просто манипулиране на текстови низове, независимо от значението на думите, по презумция е ненадежден и просто ще произведе пародия на морална преценка.

D. Tafani, *What's wrong with "AI ethics" narratives*, in «Bollettino telematico di filosofia politica», 2022, pp. 1-22

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Да се предположи, че модел на морална преценка може да бъде конструиран чрез система с МО, е равносилно на “cargo cult science” според определението, дадено от Ричард Файнман през 1974 г.: действайки въз основа на грешна хипотеза и надявайки се по този начин да произведем желания ефект, без да осъзнават, че липсват основните неща:

> В Южните морета хората имат култ към товарите (“cargo cult”). По време на войната са виждали самолети да кацат с много добри стоки и искат същото да се случи и сега. Така че те се организират като имитират писти, поставят огньове отстрани на пистите, правят дървена колиба, в която човек да седи с две дървени части на главата му като слушалки и бамбукови решетки, стърчащи като антени — той е контрольорът — и чакат самолетите да кацнат. Хората правят всичко както трябва с перфектна форма. Изглежда точно така, както е изглеждало преди, но не се получава - не кацат никакви самолети. Така че аз наричам тези неща карго култ към науката, защото се следват всички очевидни правила и форми на научно изследване, но им липсва нещо съществено, защото самолетите не кацат

RP Feynman , *Cargo Cult Science* , *в* «Engineering and Science», 1974, n. 37,7, стр. 10-13.

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Благодаря за вниманието. Имате ли въпроси?

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