

No SUMMA līdz dBaby projektam

Guntis Bārzdīņš, Didzis Goško, Renārs Liepiņš



LU 76. konference
Datorlingvistikas sekcija
01/03/2018

H2020 SUMMA projekts

Guntis Bārzdiņš

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LETA Innovation Labs

<http://summa-project.eu>

ICT-16-2015 - Big data – research (01/02/2016 – 31/01/2019)



Total Costs in the Proposal:

9,858,326.25 € (Latvijai 1,16 MEUR)

BigData: Scalable Understanding of Multilingual Media (SUMMA)

The screenshot displays the SUMMA dashboard interface. At the top, there is a search bar, a date range selector (From: 2018/01/15, To: 2018/01/26), and a language dropdown (summa-clusters-es). The left sidebar contains navigation icons for Home, Storylines, Trending, Search, User Queries, Admin, and Logout. The main content area is a grid of news items, each with a title, a small image, and a category label. The largest article is about Pope Francis's flight to Chile. Other notable articles include news about the Spanish government, the Catalan independence movement, and international events like the FIFA World Cup and the UEFA Champions League.

Search: Search...
Date Range: From: 2018/01/15 To: 2018/01/26
Language: 40 summa-clusters-es

Home
Storylines
Trending
Search
User Queries
Admin
Logout

Papa Francisco: avión que traslada a pontífice aterrizó en Chile [VIDEO]

Puigdemont afirma que «trabaja» para regresar «sin ningún riesgo» a Cataluña

Papa Francisco en Trujillo: gente pugna por ingresar a Plaza de Armas [VIDEO]

Opinión: el primer año del presidente Trump

Papa Francisco: Un viernes de emoción, reflexión y deseos se vivió en Madre de Dios

¡Berraquera en CD! Rómulo Roux gana presidencia del partido united states

Pedro Sánchez anuncia en Sevilla matrículas gratis para la Universidad

El Gobierno impedirá la reunión entre Puigdemont y Torrent en la delegación del Govern ante la UE

Schulz aboga por la repetición de la gran coalición con Merkel

Papa Francisco en Lima: habrá 3 horas de tolerancia para llegar a centros de trabajo

El PP carga contra Ciudadanos por fortalecer a JpC y ERC e impedir el grupo propio popular society

¿Dónde se encuentra el kilómetro 0 de Sevilla?

Escenarios para una investidura imposible de Carles Puigdemont como 'president' politics

Serret y Comín (ERC) piden delegar su voto para el pleno de investidura

Susy Díaz rompe su silencio tras muerte de Augusto Polo Campos [VIDEO] europe

Dolores O'Riordan: ¿de qué murió la vocalista de The Cranberries?

El mejor Federer castiga a Berdych music

Los líderes de la trama Gürtel «ajustan cuentas» diez años después

"Nosotros somos Canarias"

Fuerza Popular no aceptará pedido de Kenji Fujimori, afirma Letona

El decisivo juicio a Lula marca el futuro político de Brasil corruption

El PSOE quiere para Canarias ecotasa y ley de alquiler iguales a las baleares environment

Con fe miles de fieles esperan llegada del Papa a Trujillo world

El fiscal pedirá la detención de Puigdemont en cuanto pise Dinamarca terrorism

Papa Francisco: pareja de novios espera para recibir bendición religion

Costa confiesa ante el juez que el PP valenciano "se financió con dinero negro" por orden de Camps

Sismo en Arequipa: declaran en estado de emergencia la provincia de Caravelí disasters

Zidane y su futuro: «Está claro que mi puesto está en juego ante el PSG» soccer

Las claves de la decisión del juez justice

Muere a los 103 años el poeta chileno Nicanor Parra arts

El Barcelona puede dejar sentenciada la Liga esta noche sports

El primer AVE a Castellón llega con Rajoy y media hora de retraso economy

Thaís Leal deja de seguir a Paolo Guerrero en Instagram social media

Alavés - Leganés en directo top stories



Trending



Entities



Logout

Logged in as

guntis3

Feedback

Media Item

Create a new query +

[Queries](#) > [Story: Australia - 26 years without a recess...](#) > **Media Item: Australia - 26 years without ...**

Australia - 26 years without a recession.

Added: 2 hours ago (2017-06-30 08:50 UTC)

Changed: 2 hours ago (2017-06-30 08:53 UTC)

Source: DW German Videos



Transcript:

Original Live (de)

English

Original (de)

ob es sie schon bei dem es zwischen m das herumgesprochen hat aus doch in der löst im rekord der in die sauer im jahr neunzehn hundert ein und neunzig gab es den letzten ausreißer nach unten die wirtschaft doch seit man sechszwanzig yaam deckt die wirtschaft zu um einen mi amal weniger stark aber immer im plus australien ist mit bodenschätzen reich gesegnet große mengen von eisenerz gas öl und kohle werden von australien nach china in den immobilie er inzwischen wo man dann sind teuer die regierung tritt bei der einwanderungspolitik deshalb schon auf so wird jetzt flüssiges englisch vorausgesetzt das ist dass der schlüssel für eine erfolgreiche integration in die australische gesellschaft ist für wirtschaftlichen und sozialen ab wolk um teil der australischen gemeinschafts werden muss man englisch beherrschen die büro in australien wachsen kaum noch aus den spielraum für konsum sehr stark einschränkt im vertrauen auf grenzenloses wachstum haben sich viele



Trending



Entities



Logout

Logged in as guntis3

Feedback

Media Item

Create a new query +

Queries > Story: Australia - 26 years without a recess... > Media Item: Australia - 26 years without ...

Australia - 26 years without a recession.

Added: 2 hours ago (2017-06-30 08:50 UTC)
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Transcript:

Original Live (de)

English

Original (de)

Whether it is already spoken of in between m, but in the record in the record of the sauer one hundred and ninety hundred and ninety-nine hundred and ninety-four there were the last Aussie to the bottom of the economy .but since becoming six-and-20 Yaam covers the economy to a mi Atimes less strong, but always in the plus .Australia is richly blessed with land treasures, large amounts of iron ore, gas, oil and coal are made by australs to china .into immobilia he by now .where you then are expensive .so the government is already appearing on immigration policy .that's how liquid English is now provided .this is that the key to successful integration into the Australian society is for economic and social ab Wolk around the Australian community, you must master English .the office in Australien is hardly growing, the scope for consumption very much in the confidence on borderline growth many australia high-debt have found themselves in the midst of the joy about the growth record had to be critical and they showed unrestrained .could be in austere Balz.

SUMMA Platform Advantages

- ▶ **Completely self-contained**
 - ▶ No dependence on external (cloud) services
 - ▶ All components developed within SUMMA by top Kaldi, WMT, SemEval contributors
 - ▶ 9 languages: EN, DE, AR, RU, SP, LV, PT, UR, IR

- ▶ **Scalable for BigData**
 - ▶ All NLP modules are Docker containers
 - ▶ Scalable to 400 live streams on 800 servers (e.g. AWS)
 - ▶ No external licencing



examples of H2020 LT projects

Call 1 ICT-17 projects on machine translation

- [MMT](#): adaptive domain-sensitive MT infrastructure
- [QT21](#): SoA neural MT technology
- [TraMOOC](#): Translation for Massive Open Online Courses
- [HimL](#): automated translation of public health information



Examples of H2020 Big Data projects with LT dimension

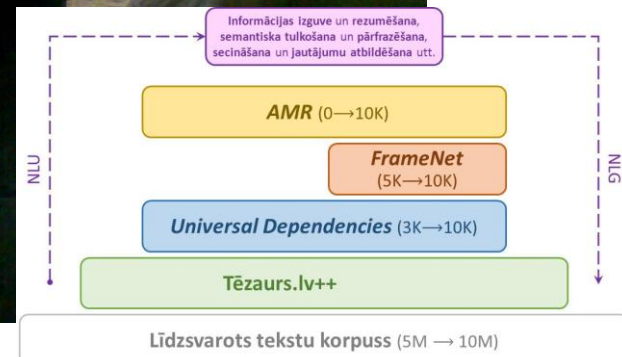
- [FREME](#): semantic enrichment of digital content
- [Kconnect](#): ML search for medical information
- [SUMMA](#): media analytics Big Data platform - automated analysis of media streams across many languages



Mazais Ansis 2008 → AILab 2017 → ...



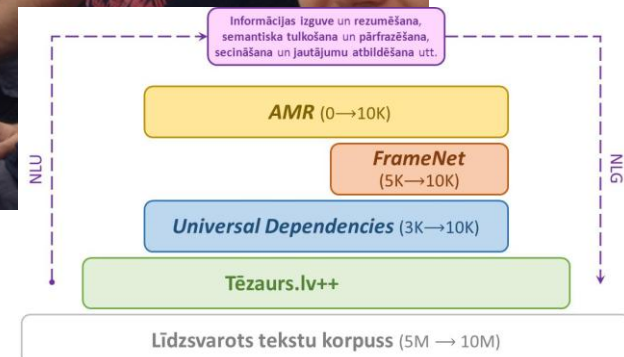
SEMANTICS	deep	MODEL	FOL (ontology), modality, scope, planning, reasoning, "discourse"
	shallow	COREFERENCE	Anaphoras, named entities Event structure
		FRAMENET	"Who did what to whom" Coarse-grained word senses
GRAMMAR		SYNTAX	Dependency links Phrase structure
		MORPHOLOGY	Lemmas POS tags



Mazais Ansis 2017: KociņšBurgerī un Tekstrade



SEMANTICS	deep	MODEL	FOL (ontology), modality, scope, planning, reasoning, "discourse"
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Presentation of Proposal idea

digital Baby (dBaby)

Towards super-human NLP quality :
Visually Grounded Language Learning

Guntis Barzdins

`guntis.barzdins@leta.lv`

LETA Innovation Labs

leta.lv

ICT Proposers' Day

ICT-26-2018-2020: Artificial Intelligence

ICT-29-2018: A multilingual Next Generation Internet

Budapest, 10/11/2017



The State-of-Art in AI

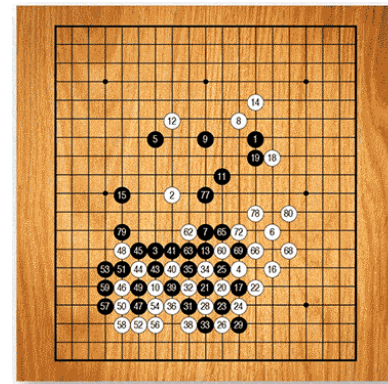
Sub-human quality Natural Language Processing (NLP)

- Interannotator agreement for training corpora ~85%
- Supervised learning from training corpora ~70% for the complete NLP pipeline*
 - ASR (WER ~15%)
 - MT (BLEU ~30%)
 - NER / NEL (F1 ~85%)
 - AMR (SMATCH ~65%)
 - KBP (TAC KBP ~30%)

Human 100%

Super-human quality Reinforcement Learning (RL)

- AlphaGO Zero ~110%♣



- 49 Atari games benchmark♦ (majority above human)

♣ D. Silver, et al. Mastering the game of Go without human knowledge. *Nature* 550 (7676): 354--359 (October 2017)

♦ V. Mnih, et al. Human-Level Control through Deep Reinforcement Learning. *Nature* 518 (7540): 529--533 (February 2015)

*Our experience in H2020 BigData-Research project SUMMA: summa-project.eu
G.Barzdins, et. al. Character-Level Neural Translation for Multilingual Media Monitoring in the SUMMA Project. *LREC 2016*, pp. 1789--1793.

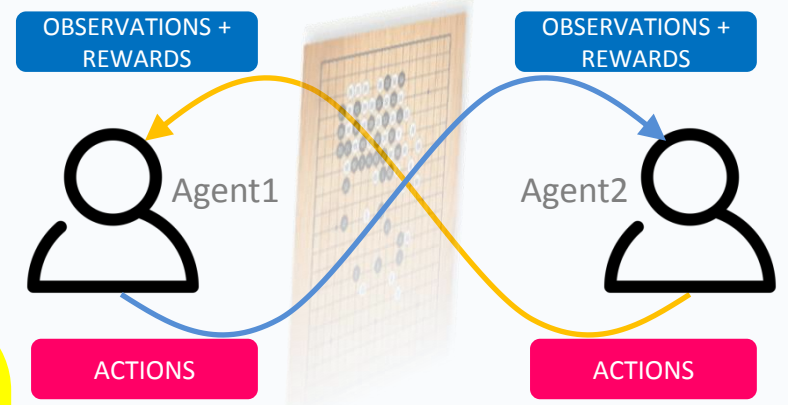
Achieving super-human NLP: dBaby

ATARI Reinforcement Learning framework



DeepMind Source: Demis Hasabis, www.youtube.com/watch?v=Psk5DLppq3o

AlphaGO Zero RL framework (DeepMind)



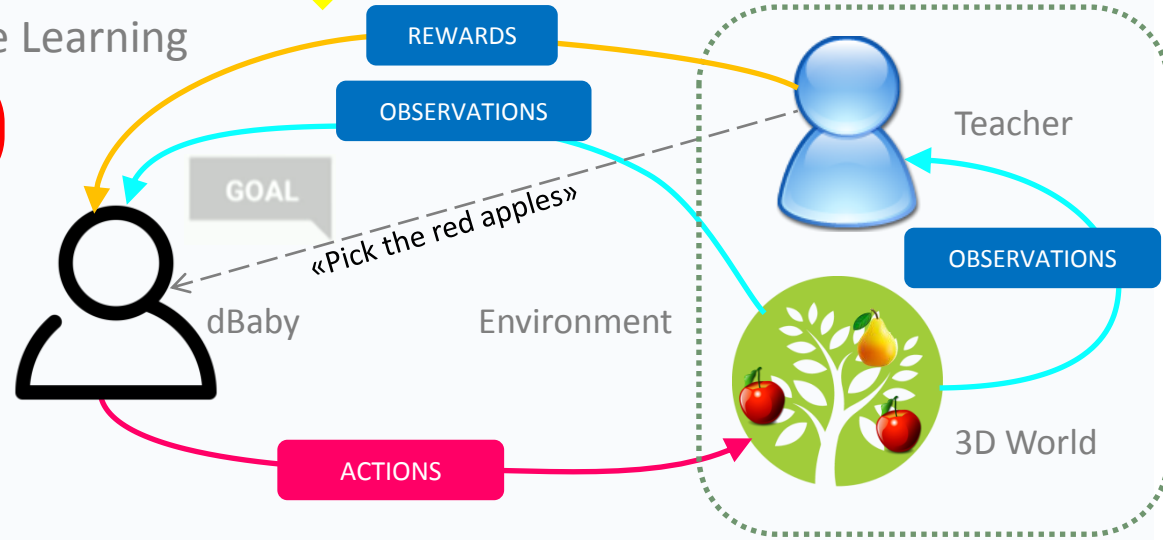
dBaby: Visually Grounded Language Learning

Vairs nemarkes korpusus...
Initially a Human Teacher teaches dBaby to do what it is told to do as per:

K.M.Herman et. Al. Grounded Language Learning in a Simulated 3D World. DeepMind Research note. <https://arxiv.org/abs/1706.06551>

Through auxiliary task dBaby is trained to also verbalize actions, achieving human-level NLP skills.

Afterwards two dBaby copies coordinate their actions verbally to solve tasks in ATARI RL framework, achieving super-human NLP skills.



ICT
PROPOSERS' DAY

The State-of-Art in AI

Sub-human quality
Natural Language Processing (NLP)

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- 49 Atari games benchmark* (majority above human)

*Our experience in H2020 BigData-Research project SUMMA: <https://www.summa.eu>
© Borošini, et al. Character-Level Neural Translation for Multilingual Texts
Advances in the SUMMA Project, IJCI 2016, pp. 1789-1795

*D. Silver, et al. Mastering the game of Go without human
knowledge. Nature 550 (7570): 354-359 (October 2017)

*V. Mnih, et al. Human-Level Control Through Deep Reinforcement
Learning. Science 348 (6225): 1217-1221 (February 2015)

ICT PROPOSERS' DAY 2017



Neural Information Processing Systems
(NIPS), LongBeach, CA, Dec 4, 2017

How to build human-like AI?

Build a machine that grows into human-level, human-like intelligence the way a person does – that starts like a baby and learns like a child.

- The oldest idea in AI, and probably the best.
- One thing Turing, Minsky, McCarthy, Hinton, LeCun, Bengio all agree on.
- It may not be the only route, but it is the one scaling route to human-level intelligence that we actually know works, reliably and (relatively) quickly.
- For the first time in history, we are in a position to take this approach seriously, so it is a good time to try it out.

Source :

How can we give robots common sense?

Josh Tenenbaum (MIT)

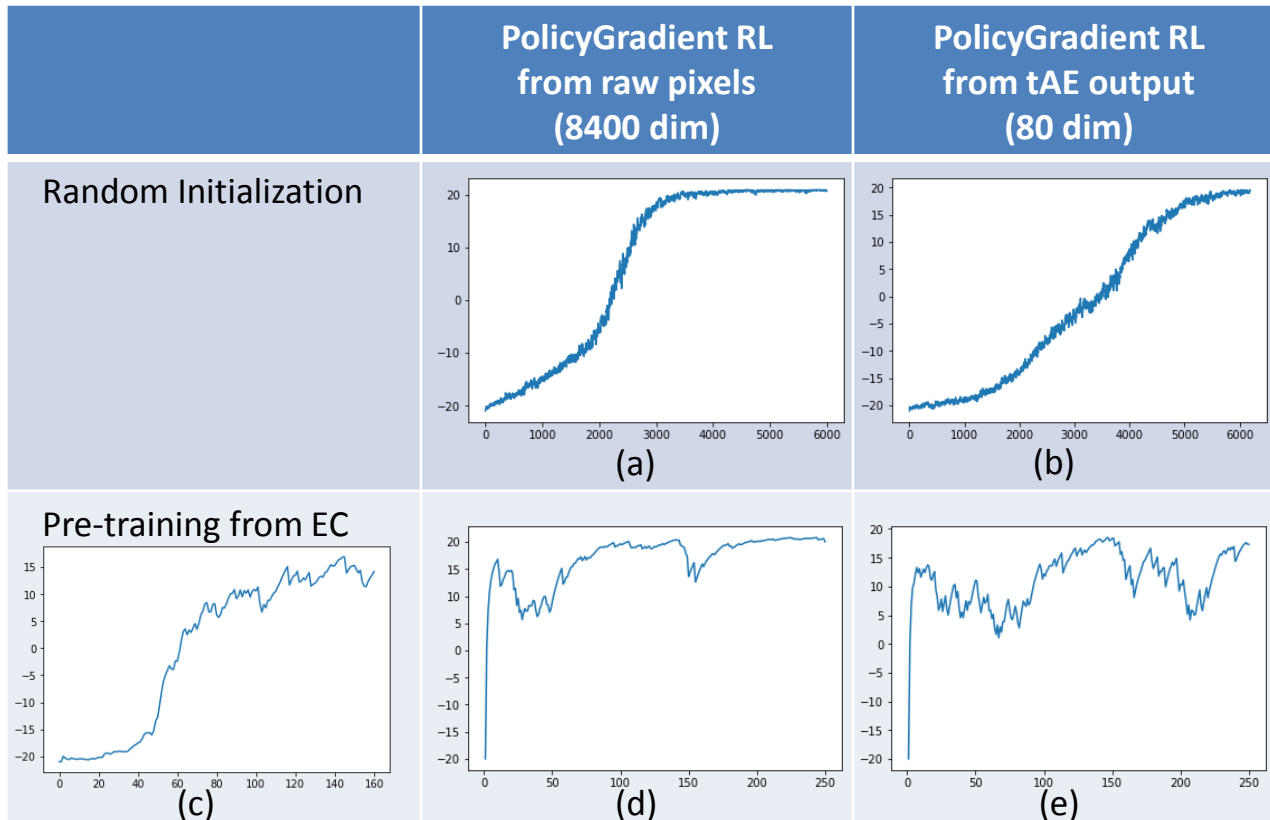
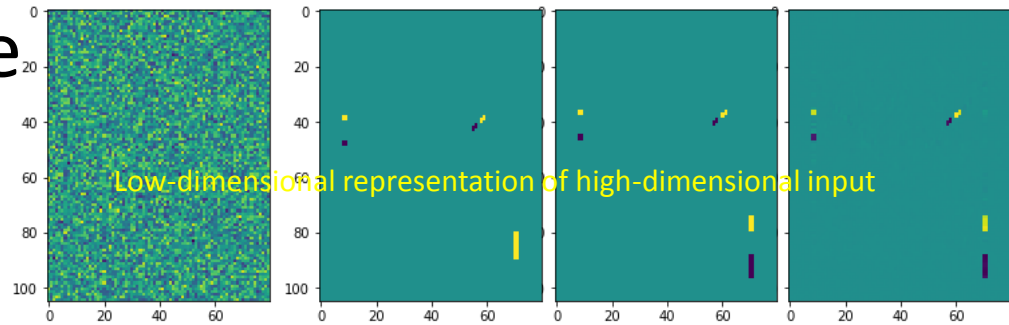


Karl Moritz Hermann, Felix Hill, Simon Green, Fumin Wang, Ryan Faulkner, Hubert Soyer, David Szepesvari, Wojciech Marian Czarnecki, Max Jaderberg, Denis Teplyashin, Marcus Wainwright, Chris Apps, Demis Hassabis, Phil Blunsom. Grounded Language Learning in a Simulated 3D World. DeepMind Research note. <https://arxiv.org/abs/1706.06551>

Devendra Singh Chaplot, Kanthashree Mysore Sathyendra, Rama Kumar Pasumarthi, Dheeraj Rajagopal, Ruslan Salakhutdinov (Apple & CMU), Gated-Attention Architectures for Task-Oriented Language Grounding, AACL 2018. <https://arxiv.org/abs/1706.07230>

G.Barzdins et.al. dBaby: Grounded Language Teaching through Games and Efficient Reinforcement Learning. In: <https://nips2017vigil.github.io>

tAE: predicting the future (modeling the world)



temporal AutoEncoder (tAE) name: we made it up.
It is kind of model-based approach, but drifts away

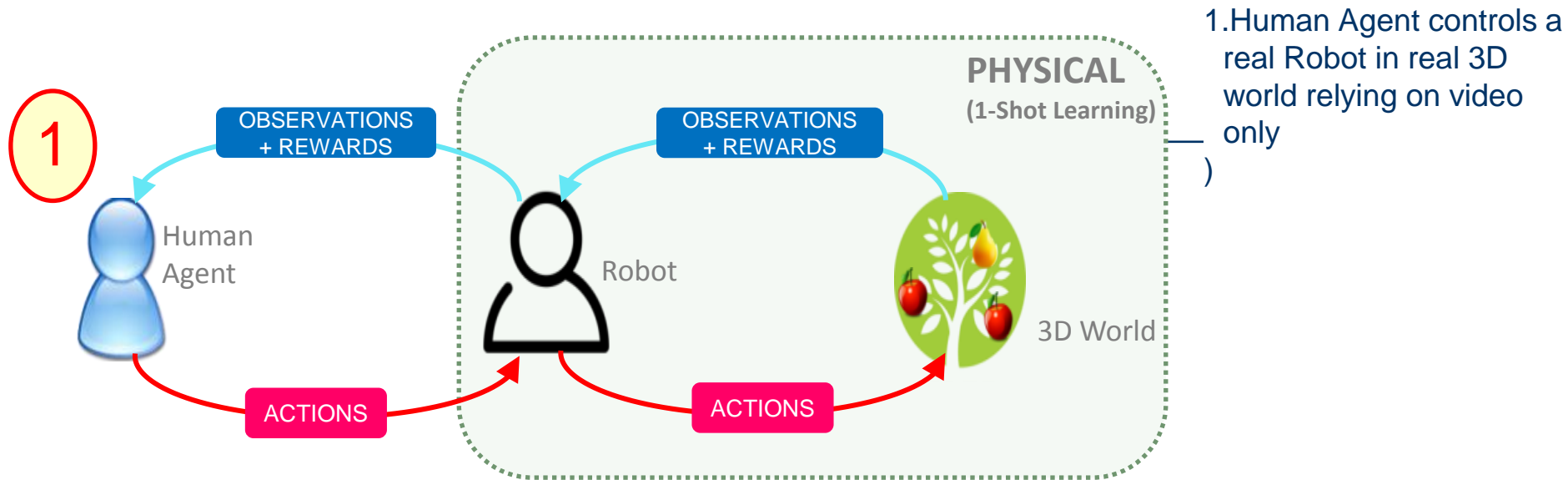
Open questions

- Sim2real ?
- Human in loop ?
- Pragmatics / multi-agent ?

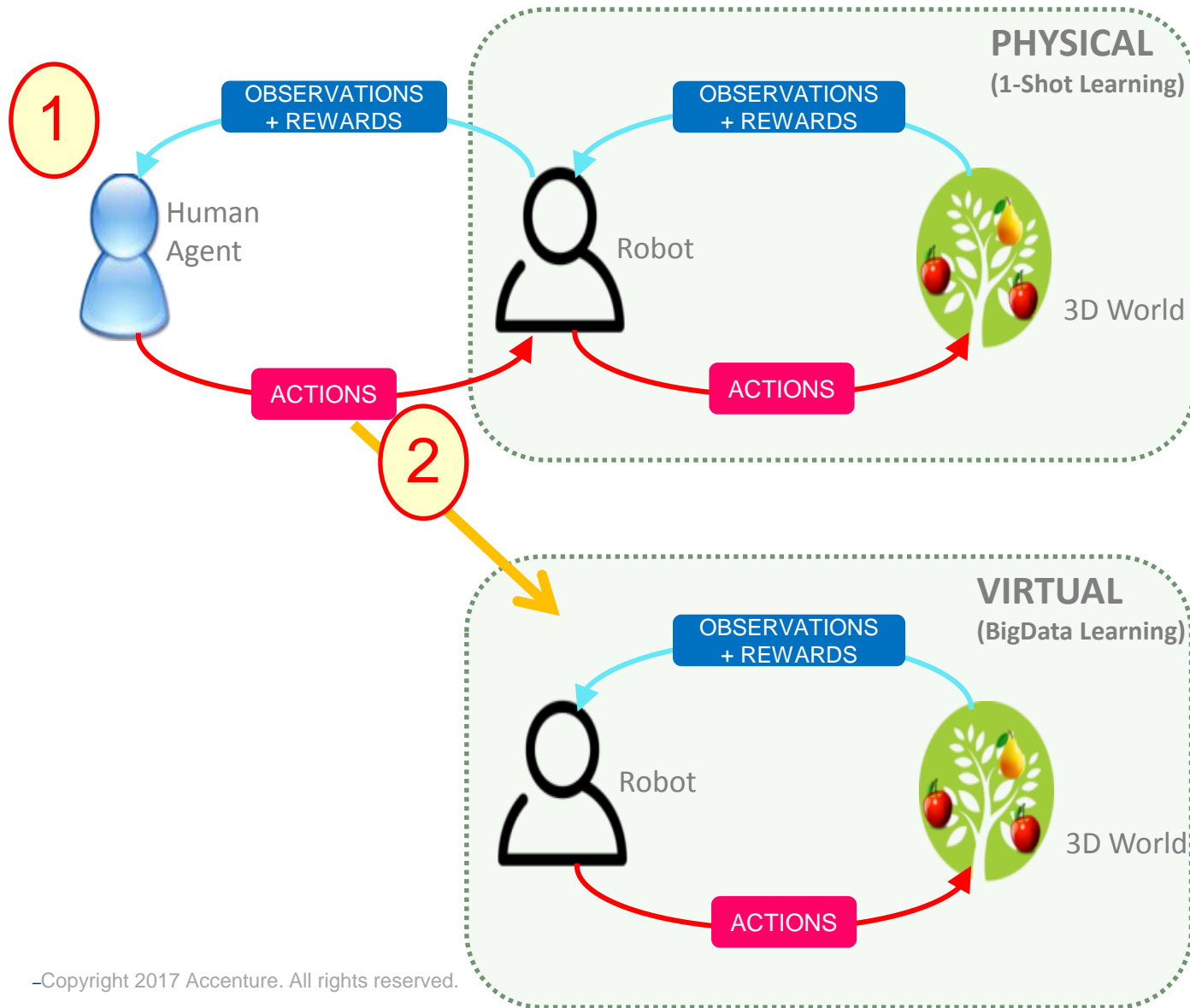
Felix Hill (Google DeepMind)

Low-dimensional dense representation (embedding) of sparse high-dimensional (1-hot or RGB) input, obtained in unsupervised manner (dense representation learns faster)

Apple Picker Roadmap

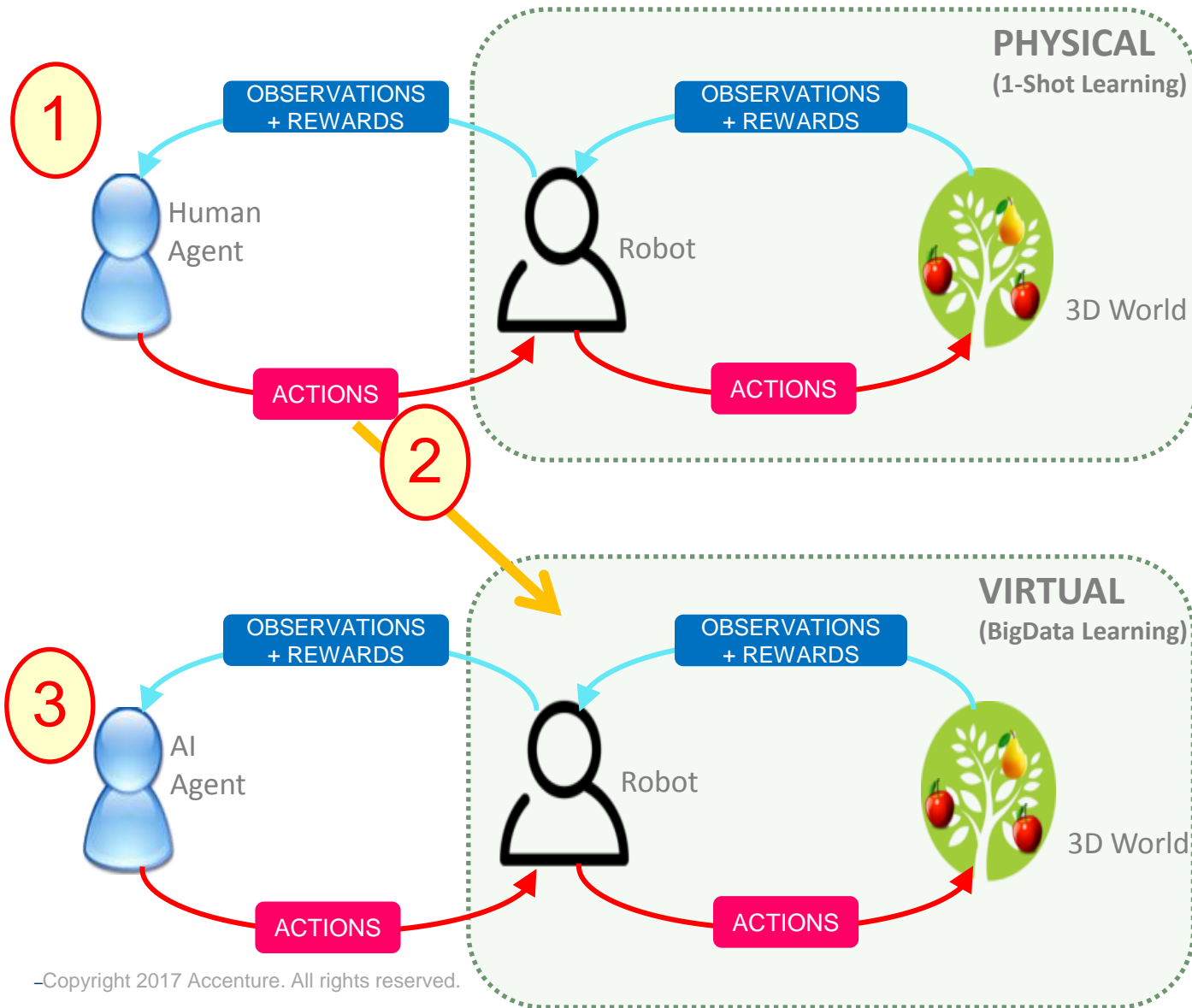


Apple Picker Roadmap



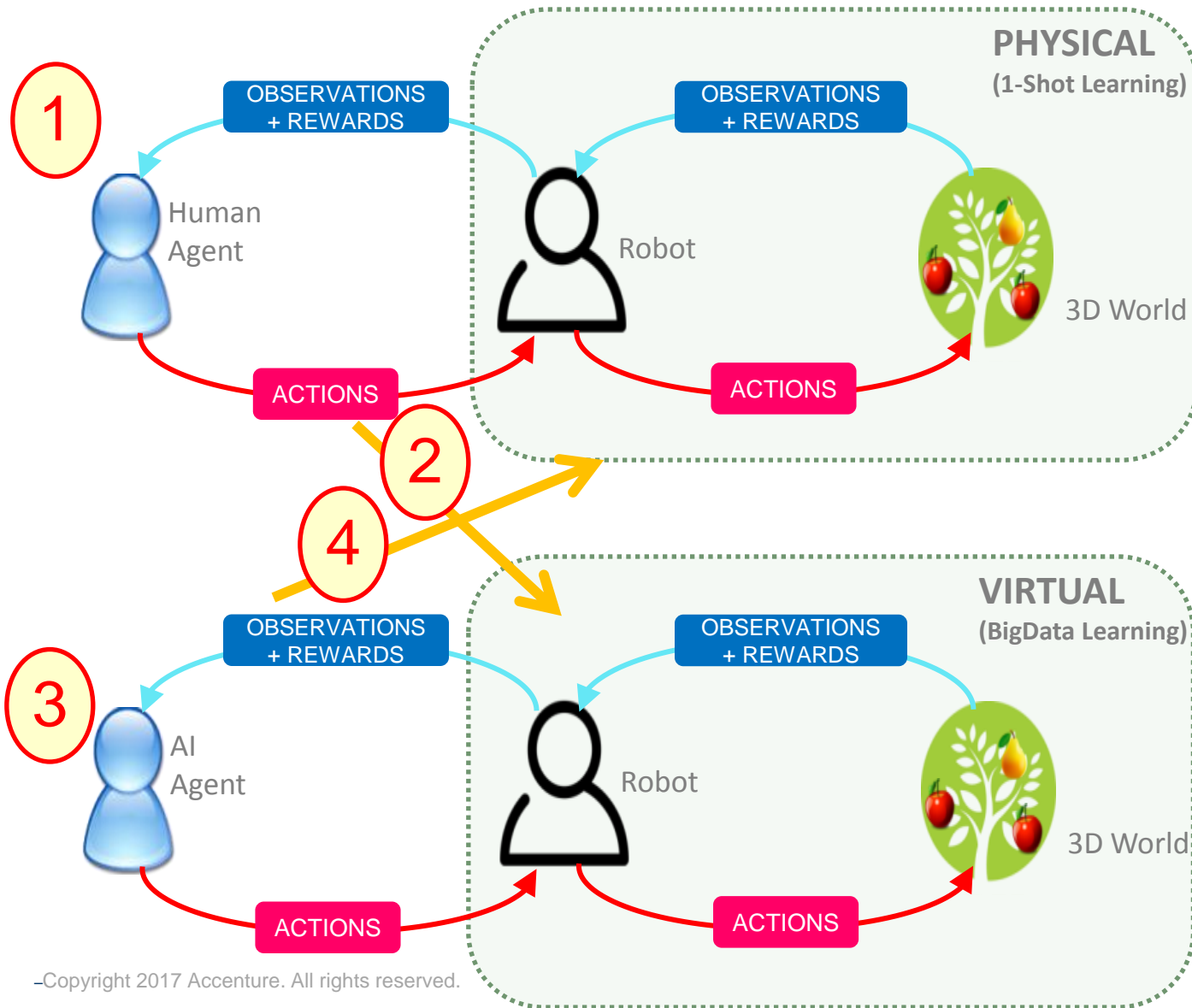
1. Human Agent controls a real Robot in real 3D world relying on video only
2. Human Agent controls a virtual Robot in virtual 3D world (video-game)

Apple Picker Roadmap



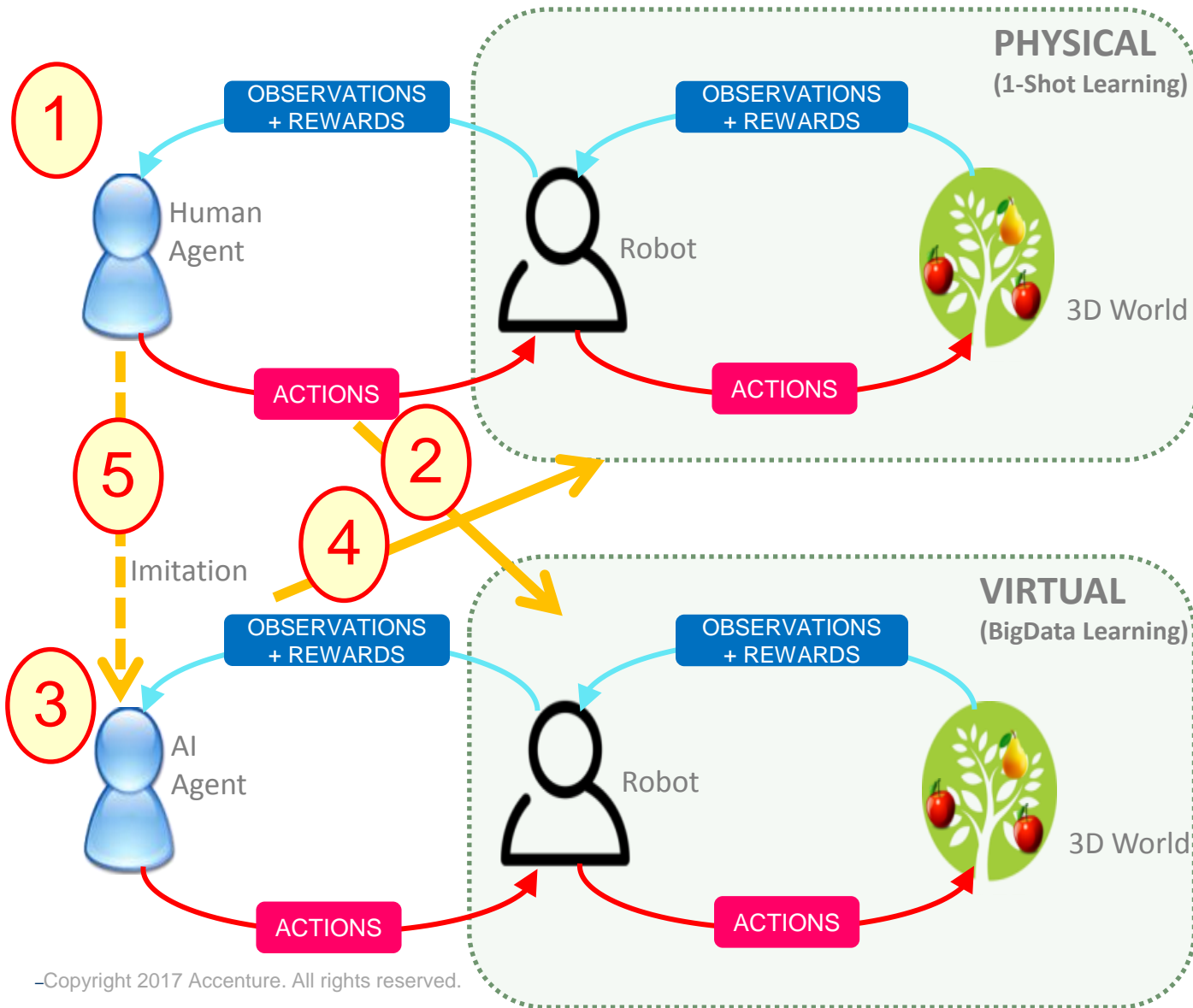
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4. An AI Agent trained on large variety of virtual 3D worlds controls a real Robot in real 3D world

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4. An AI Agent trained on large variety of virtual 3D worlds controls a real Robot in real 3D world
5. Improve the AI Agent performance by learning to imitate Human Agent actions

Describing Images with Humans in the Loop



human
teacher

"The photo is showing a woman playing tennis, not a man."



machine



~~"A man is playing tennis in a tennis court."~~

"wrong"

Describing Images with Humans in the Loop

The UD tagging is wrong, it should be Marisa DEPREL Butnere, because Gname always DEPREF Fname.



human teacher

text = Šajā mācību gadā Aizkraukles novada ģimnāzijas 8. klasē mācījās Marisa Butnere no Amerikas.

ID	FORM	LEMMA	UPOSTAG	XPOSTAG	FEATS	HEAD	DEPREL	DEPS	MISC
1	Šajā	ši	DET	pd0fsIn	Case=Loc Gender=Fem Number=Sing PronType=Dem	3	det	3:det	
2	mācību	mācība	NOUN	ncfpg4	Case=Gen Gender=Fem Number=Plur	3	nmod	3:nmod:gen	
3	gadā	gads	NOUN	ncms1	Case=Loc Gender=Masc Number=Sing	9	obl	9:obl:loc	
4	Aizkraukles	Aizkraukle	PROPN	npfsg5	Case=Loc Gender=Fem Number=Sing	5	nmod	5:nmod:gen	
5	novada	novads	NOUN	ncmsg1	Case=Gen Gender=Masc Number=Sing	6	nmod	6:nmod:gen	
6	ģimnāzijas	ģimnāzija	NOUN	ncfsg4	Case=Gen Gender=Fem Number=Sing	8	nmod	8:nmod:gen	
7	8.	8.	ADJ	xo	NumType=Ord	8	amod	8:amod	
8	klasē	klase	NOUN	ncfs15	Case=Loc Gender=Fem Number=Sing	9	obl	9:obl:loc	
9	mācījās	mācīties	VERB	vmysi330an	Evident=Fh Mood=Ind Person=3 Polarity=Pos Reflex=Yes0		root	0:root	
10	Marisa	Marisa	PROPN	npfsn4	Case=Nom Gender=Fem Number=Sing	9	nsubj	9:nsubj	
11	Butnere	Butnere	PROPN	npfsn5	Case=Nom Gender=Fem Number=Sing	10	flat:name	10:flat:name	
12	no	no	ADP	spsg	-	13	case	13:case	
13	Amerikas	Amerika	PROPN	npfsg4	Case=Gen Gender=Fem Number=Sing	10	nmod	10:nmod:no	SpaceAfter=No
14	.	.	PUNCT	zs	-	9	nunct	9:nunct	



machine

A correct Universal Dependencies labeling of the Latvian sentence «Šajā mācību gadā Aizkraukles novada ģimnāzijas 8. klasē mācījās Marisa Butnere no Amerikas.»

"wrong"

Describing Images with Humans in the Loop



human
teacher

Kā tu to zini?!



machine



Marisa Butnere

Because of Visually grounded language learning!
AutoEncoder, HD-computing /Embedding, EpisodicMemory, KNN

Describing Images with Humans in the Loop



human
teacher

Right!
Label this
sentence
with UD!

Meitenes vecvecāki līdz Otrajam
pasaulē karam dzīvojuši Latvijā, un arī
viņa sevi uzskata par latvieti.



machine

Latvian text «Meitenes
vecvecāki līdz Otrajam
pasaulē karam dzīvojuši
Latvijā, un arī viņa sevi
uzskata par latvieti.»

Describing Images with Humans in the Loop



human
teacher

Great!



machine

Meitenes vecvecāki līdz Otrajam
pasaules karam dzīvojuši Latvijā, un arī
viņa sevi uzskata par latvieti.

ID	FORM	DEPS
1	Meitenes	2:nmod:gen
2	vecvecāki	7:nsubj
3	līdz	6:case
4	Otrajam	6:amod
5	pasaules	6:nmod:gen
6	karam	7:obl:līdz
7	dzīvojuši	0:root
8	Latvijā	7:obl:loc
9	,	14:punct
10	un	14:cc
11	arī	12:discourse
12	viņa	14:nsubj
13	sevi	14:obj
14	uzskata	7:conj
15	par	16:case
16	latvieti	14:xcomp
17	.	7:punct



Varu ieteikt studēt Latvijā

[Apskatīt komentārus \(0\)](#)

20.04.2011

Attēlā: Aristoteļa svētkos 2009. gadā. Ģirts Mandrovickis, Danute Ražuka-Ēbela, Marisa Butnere un Laura Sviklāne

Varu ieteikt studēt Latvijā

Agates Vucinas saruna ar Amerikas latvieti Marisu Butneri, Latvijas Universitātes medicīnas studentu

Kāpēc tavi vecāki atbalstīja tavu vēlmi dzīvot un mācīties Latvijā?

Mani vecāki vienmēr atbalstījuši savus bērnus. Brālis Dainis gribēja mācīties Vestpointas Militārajā akadēmijā, viņi atbalstīja arī mana brāļa Kristapa studiju nodomus. Es izvēlējos studēt medicīnu Rīgā. Man bija 18 gadu, kad atbraucu uz Latviju mācīties, taču es runāju ar citiem latviešiem Amerikā, kas man jautāja: – Kāpēc tieši uz Latviju, kāpēc nepalīki Amerikā? Man patīk Amerika, taču man ļoti patīk arī Latvija.

Daudzi Amerikas latvieši Latvijā pavada atvaļinājumu, bet mācās ASV augstskolās. Kādi ir tavi galvenie iemesli, kāpēc atbrauci studēt uz Latviju?

Amerikā mēs mācāmies latviešu skolās par Latviju, kultūru un tradīcijām, taču, kad pirmo reizi 13 gadu vecumā tēvs mani atveda brīvdienās uz Latviju, es iemīlēju šo zemi. Šeit ir grūti, taču visur pasaulē ir gan grūtības, gan arī labas īpašības. Šeit jūtos kā mājās, savā tēvzemē... Arī Amerikā tā jūtos, bet man šeit ir ļoti daudz radnieku. Amerikā man ir tikai vecāki, brāļi, vecmāmiņa un divas tantes, visi pārējie radi dzīvo šeit.

Amerikā viss notiek ļoti ātri, bet šeit cilvēki vairāk bauda dzīvi. Piemēram, universitātē man ir daudz jāmācās, bet es varu sarunāt ar pasniedzējiem, konkrētu laiku, kad likšu eksāmenus, kad rakstīšu kontrol darbus, ir labas attiecības starp pasniedzējiem, un visu var paspēt izdarīt. Kopš 2009. gada septembra darbojos LU Medicīnas fakultātes studentu pašpārvaldē.

<http://www.laiks.us/jauno-laiks?mobile=ok&gads=2011&b=1&lbu=14050>

Potenciāls LZP granta pieteikums

- Potenciāli NLP beyond gisting (accuracy)
- Spiežam uz «Human in the Loop AI»
- Spiežam uz «Visually Grounded Language»
- Spiežam uz Sim2Real robotu
- Ar LETA CV sistēmu mes tur jau gandrīz bijām
 - Interfeisā varēja labot AI kļūdas
 - Tikai nepratām tos labojumus ņemt vērā

Profile Extractor (LETA)

The screenshot shows the Profile Extractor (LETA) web application interface. The browser address bar displays the URL: `bebrs.ailab.lv:7000/#/databases/mkold/entities/2199813/summaryframes/1744312/frames/2`. The page title is "LETA visualization".

At the top, there are navigation tabs: "CV Personas", "CV Organizācijas", "Personas", "Organizācijas", "Entiņu meklēšana", "Kartiņa: Gordons Brauns", "Faktu redaktors", and "Nepabeigtie fakti". The current view is "Kartiņa: Gordons Brauns".

The main content area shows the profile for "Gordons Brauns" (ID: 2199813). The profile type is "persona" and the birth date is "bez dzimtes". There are filters for "Filtrēt:" and "Kārtot: jaunākie". The "Rādīt:" section has checkboxes for "Derīgs" (checked), "Jāpārbauda!" (checked), "Slēpts" (unchecked), and "Nederīgs" (unchecked).

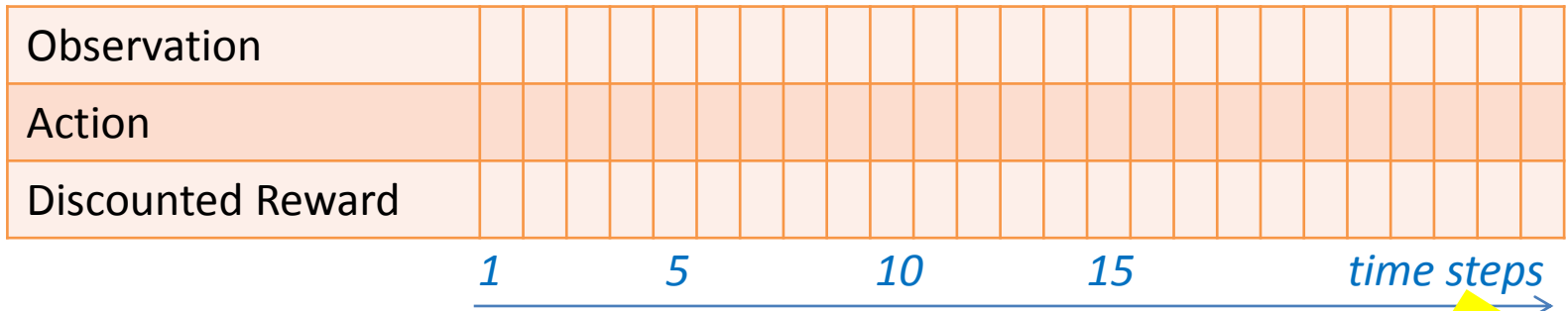
The profile is divided into several sections:

- Apbalvojumi, interesanti fakti un izteicieni**:
 - [1] *datums* Gordons Brauns ieguva formālu karalienes Elizabetes II piekrišanu. (Derīgs ✓, Nederīgs ✗, Cits ▾)
 - [1] *datums* Gordons Brauns informē: " Noteikti pastāv problēmas ar cilvēku izslēgšanu no troņa pārmantošanas tiesībām , un noteikti ir problēmas , kuras jāatrisina . (Derīgs ✓, Nederīgs ✗, Cits ▾)
- Nodarbošanās un publiskā darbība**:
 - [1] *datums* Gordons Brauns bija ekonomikas ministra amatā. (Derīgs ✓, Nederīgs ✗, Cits ▾)
 - [2] *datums* Gordons Brauns bija aizsardzības ministra amatā. (Derīgs ✓, Nederīgs ✗, Cits ▾)
 - [1] *datums* Gordons Brauns bija finanšu ministra amatā. (Derīgs ✓, Nederīgs ✗, Cits ▾)
 - [10] *datums* Gordons Brauns bija finanšu ministra amatā. (Derīgs ✓, Nederīgs ✗, Cits ▾)
- Īpašumi un finanses**
- Incidenti un tiesvedības**:
 - 4329222 pieminējums avota my_D8E4AE24-A8A4-4562-968D-6C98994BC72E teikumā nr. 7 [rediģēt >>](#)
 - 4201206 pieminējums avota my_89B87409-B8CF-11D8-89DF-00096B78513F teikumā nr. 29 [rediģēt >>](#)
 - 3918246 pieminējums avota my_B2C53357-71D1-467D-8F34-D3CAC201B34A teikumā nr. 5 [rediģēt >>](#)
 - 3846812 pieminējums avota my_518D5896-D5B7-44AB-A737-975B2BB5EC9F teikumā nr. 3 [rediģēt >>](#)
 - 3832206 pieminējums avota my_E34F3206-3DEA-4EAC-A14B-BC46521F0F30 teikumā nr. 2 [rediģēt >>](#)
 - 3814010 pieminējums avota my_46F60F94-0D5A-46CB-98D0-90C2B5B64F8F teikumā nr. 16 [rediģēt >>](#)

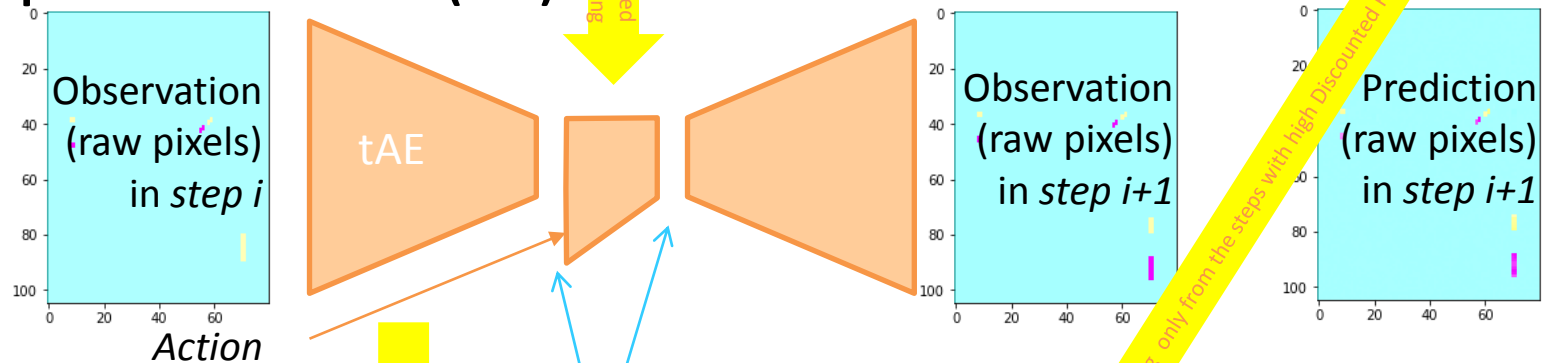
A red circle highlights the fact "[10] datums Gordons Brauns bija finanšu ministra amatā" in the "Nodarbošanās un publiskā darbība" section. A red arrow points from this fact to a red text overlay: **- 10 mentions consolidated into the single fact**.

On the right side, there is a sidebar with a search bar and a list of facts. The visible text includes: "atrisinat Āfrikas problēmas .", "5. Lielbritānijas finanšu", "ministrs Gordons Brauns", "Being_employed Employee", "kas iestājas par parādu", "atcelšanu , BBC televīzijai", "atzīmēja , ka sabiedriskā", "doma , baznīcas un", "cilvēktiesību grupējumi", "pēdējā laikā jau ir", "ietekmējuši lēmumus šai", "joma , tomēr vienlaikus", "atzina , ka Āfrikas", "nabadzības problēmas", "risināšana ir " mūža darbs".

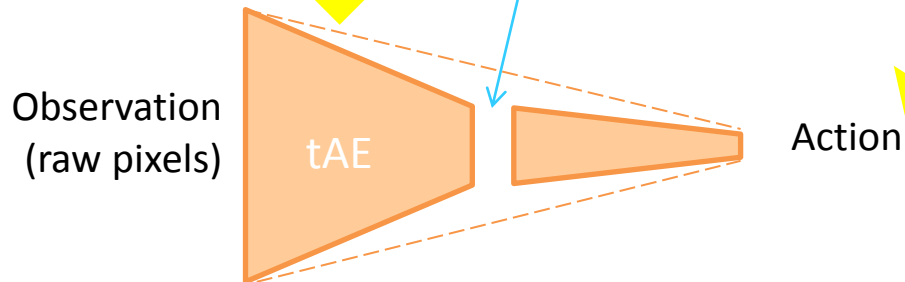
Episodic Memory



temporal AutoEncoder (tAE)



Policy Gradient RL



Episodic Control

- no forgetting (like DB)
- single neuron per time step
- in FPGA implementation discounted reward lookup time for kNN not dependent on EM size (like RAM)

Top jauns H2020 pieteikums

- Būtībā SUMMA-2: beyond gisting (accuracy)
- Spiežam uz «Human in the Loop AI»
- Ar LETA CV sistēmu mes tur jau gandrīz bijām
 - Interfeisā varēja labot AI kļūdas
 - Tikai nepratām tos labojumus ņemt vērā

Grounding in visual environment

Statistical language models learned from text-only corpuses form the dominant paradigm in modern natural language understanding. While effective for many applications, these text-only distributional approaches suffer from limited semantics as they miss the interactive environment in which communication often takes place, i.e., its symbols are not grounded. Statistical approach also ignores interactive feedback from the end-user (correcting the errors produced by the learned model) due to statistical insignificance of the single corrected error.

The alternative “Human in the loop AI” paradigm is guided by the Reinforcement Learning via grounded one-shot learning from the end-user feedback (often regarded as Teacher).

Grounded one-shot learning is akin to data input into database – each new or modified fact there needs to be entered only once thanks to unambiguous identification (grounding / linking) of the involved entities. The legacy approach in natural language understanding has been linking selected entities to Wikipedia articles, but recently visual grounding of language has demonstrated some success in the Visually-Grounded Interaction and Language (ViGIL) NIPS 2017 Workshop (<https://nips2017vigil.github.io/>). Language grounding into visual models enables Reinforcement Learning to be applied to the natural language understanding problems.

Deep learning approaches are promising for grounding because they are capable of learning high-level semantics from low-level sensory data in both computer vision and language: embeddings learned from text modality are shown to enable zero-shot learning in visual modality and vice versa via descriptions, e.g. “zebra is like a horse only with stripes”. In addition, deep reinforcement learning provides an elegant framework for grounded language acquisition from interaction with an external environment or a Teacher.