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Attention: Alcallforviews@ipo.gov.uk

International Business Machines Corporation [IBM] thanks the United Kingdom [UK] Intellectual Property [IP] Office [UKIPO] for issuing the consultation “Artificial Intelligence and Intellectual Property: copyright and patents” dated 29 October 2021 [Consultation] and welcomes the opportunity to comment. We would be more than happy to continue a dialogue as the UKIPO’s work develops further.

As one of the world’s leading innovators and patentees, IBM has a keen interest in the developing policy around Artificial Intelligence [AI]. IBM is a global provider of technology products and services and is one of the UK’s largest technology employers. For more than a century, IBM has introduced revolutionary technology to the world in a responsible manner, playing a leading role in the development and delivery of AI.

We applaud the UK government’s aim, as stated in this Consultation to “secure the UK’s position amongst the global AI superpowers” and to help “the nation’s standing on the world stage”.

Please also reference IBM’s response [Response] dated 30 November 2020 to the UKIPO’s “Artificial intelligence and intellectual property: call for views” [Call for Views].

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Annex - Response form

After you have read the consultation document, please consider the questions below. There is no expectation or requirement that all questions are completed. You are welcome to only answer the questions that are relevant to you, your business or organisation.

A copy of this response form is available to download from GOV.uk.

There are two sections on this form:

A. Questions arising from this consultation

B. Information about you, your business or organisation

When you are ready to submit your response, please email this form and any other supporting documentation to Alcallforviews@ipo.gov.uk.

The closing date for responses is at 23:45 on 7 January 2022.

The options for computer generated works, text and data mining and patent inventorship are summarised in the following tables.

Computer generated works	
Option 0	Make no legal change
Option 1	Remove protection for computer-generated works
Option 2	Replace the current protection with a new right of reduced scope/duration

Text and Data Mining (TDM)	
Option 0	Make no legal change
Option 1	Improve licensing environment for the purposes of TDM
Option 2	Extend the existing TDM exception to cover commercial research and databases
Option 3	Adopt a TDM exception for any use, with a rights holder opt-out
Option 4	Adopt a TDM exception for any use, which does not allow rights holders to opt out

Patent Inventorship	
Option 0	Make no legal change
Option 1	“Inventor” expanded to include humans responsible for an AI system which devises inventions
Option 2	Allow patent applications to identify AI as inventor
Option 3	Protect AI-devised inventions through a new type of protection

Section A

Copyright – computer generated works (CGW)

1. *Do you currently rely on the computer-generated works provision? If so, please provide details of the types of works, the value of any rights you license and how the provision benefits your business. What approach do you take in territories that do not offer copyright protection for computer-generated works?*
2. *Please rank these options in order of preference (most to least preferred) and explain why.*
3. *If we introduce a related right for computer-generated works, as per option 2, what scope and term of protection do you think it should have? Please explain how you think this scope and term is justified in terms of encouraging investment in AI-generated works and technology.*
4. *What are your views of the implications of the policy options and of AI technology for the designs system?*
5. *For each option, what are your views on the risk that AI generated works may be falsely attributed to a person?*

Summary

IBM supports the selection of Option 0 – that is, forgoing the removal (Option 1) or replacement (Option 2) of the computer-generated works provision¹ in s9(3) of the Copyright, Designs Patent Act (CDPA) until adequate stakeholder discussions and evidence-gathering are undertaken. Advantageously, Option 0 does not preclude future legislative changes – it is the Option that give most flexibility.

This Consultation states that “the UK is one of only a handful of countries to protect works generated by a computer where there is no human creator”.

IBM believes that a human-centric approach to AI is necessary, where AI is designed and developed in a manner that is aligned with the human values and ethical principles of a society or community it affects². As such, IBM continues to urge the UKIPO to assess and analyse the starting premise and to involve technical stakeholders as a fundamental starting point of these discussions in order to obtain an agreed understanding of the technical details involved in AI-generated works.

¹ <https://www.legislation.gov.uk/ukpga/1988/48/section/9>

² <https://www.ibm.com/watson/assets/duo/pdf/everydayethics.pdf>

As will also be stated in more detail in the Patents section, we continue to urge for caution before legislative change, given that fuller discussions are required around at least:

- the technical details of AI-generated works. Such details, including evidence of authorship, need to be agreed upon and made transparent – more clarity is required around the differences between AI-assisted works (where AI is being used as a tool) and AI-generated works
- foundation setting, such as, agreeing upon a set of fundamental technical and legal definitions
- harmonisation across major jurisdictions, such as, with Europe, particularly given that the computer-generated works provision is not present in several other major jurisdictions
- the impact on ownership, including the ability to utilise contractual provisions
- downstream impacts on liability, infringement and enforcement
- broader societal issues, such as, ethics, given copyright frameworks are in place to encourage and incentivise human creators
- the applicability of the computer-generated works provision and of any new provisions with respect to AI as we know it today, particularly as the computer-generated works provision is several decades old and has not been tested to a great extent in UK jurisprudence
- who the “person by whom the arrangements necessary for the creation of the work are undertaken” is, for example, in complex, multi-party, cross-technology scenarios
- the resulting authorship and ownership provisions when joint authorship with a human occurs and / or when derivatives are generated
- consistency with broader legal frameworks. As stated in this Consultation, “from a legal perspective, a computer-generated work must be original if it is to receive protection. But the legal concept of originality is defined with reference to human authors and characteristics like personality, judgement and skill. It has been argued that the law is unclear and contradictory”
- the full impact on economic growth in the UK, particularly given that the computer-generated works provision is not present in several other major jurisdictions that are also at the forefront of AI technology and given that copyright can be used in conjunction with a number of other strategies, including contractual provisions as well as protection via other IP rights
- navigating a potential increase in downstream copyrightable works, particularly as in the UK, no formal requirements, such as, registration are required
- governance frameworks, such as, traceability of the provenance and lineage of computer-generated works as well as best practices involving e.g., quality, cleansing for bias

IBM would be pleased to engage further on this topic.

Copyright – text and data mining (TDM)

6. *If you license works for TDM, or purchase such licences, can you provide information on the costs and benefits of these? For example, availability, price-point, whether additional services are included or available, number and types of works covered by the licence etc.*
7. *Is there a specific approach the government should adopt in relation to licensing?*
8. *Please rank the options in order of preference (most to least preferred) and explain why.*
9. *If you have experience of the EU exception with opt out for rights holders, how has this affected you?*
10. *How would any of the exception options positively or negatively affect you? Please quantify this if possible.*

Summary

We fully support the importance that the UKIPO is giving to TDM matters, particularly post-Brexit, to ensure that the UK is able to remain competitive with other jurisdictions, which may be perceived to be more AI-friendly.

We recommend that the UKIPO review its positions on data that is subject to copyright and database rights with respect to use for commercial purposes by commercial entities, including for TDM purposes.

IBM supports the selection of Option 3.

AI is a set of technologies that has risen in importance exponentially over the last few years, particularly with respect to digital transformation. A diverse and numerous set of industries and sectors are already benefitting from its value, and that set continues to grow. AI is having and will continue to have significant economic and societal benefits for the UK.

TDM is a critical tool for use in AI and data analytics solutions. TDM is a form of technology-enabled analytics that allows identification of correlations and useful knowledge from data sets, large and small, in ways that can be processed and harnessed for a myriad of valuable purposes. The continued advancement of AI depends on such learning as AI is only as intelligent as the information from which it can learn.

For example, The Weather Channel's COVID-19 Incident Map powered by IBM Watson Natural Language Processing (NLP) uses maps to provide the latest and most up-to-date information for the general population on COVID-19. To populate these incident maps, IBM Watson NLP extracts data from agencies e.g., in the United States and the World Health Organization. To understand and extract the information necessary to feed the maps, IBM

Watson Discovery is used to extract insights from PDFs, HTML, tables and images, and Watson Natural Language Understanding is used to extract insights from natural language text. As a global offering, IBM Watson Discovery is an award-winning enterprise search and AI search technology that breaks open data silos and retrieves specific answers to a user's questions whilst analysing trends and relationships in enterprise data. "To meet the global challenge of COVID-19, the world must come together. IBM has resources to share, such as, supercomputing power, virus tracking and an AI assistant to answer citizens' questions"³ – in order to continue to develop and deploy responsible AI solutions and offerings, for the benefit of public good, we urge that access to data remains at the forefront of the UK government's priorities.

Copyright Exceptions

With regards to an explicit exception to copyright infringement in UK law for commercial TDM purposes, we urge the UKIPO to continue to undertake rapid and proactive steps in this regard, particularly as the UK government confirmed in January 2020 that the UK will not be implementing the Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC (Text with EEA relevance) [Copyright Directive]. The Copyright Directive provides explicit TDM exceptions for both commercial and non-commercial purposes. Once Member States have implemented the Directive (and indeed, some Member States already have done so), TDM for commercial purposes will be permissible across twenty seven countries in the EU.

Furthermore, globally, in several jurisdictions, such as, Japan, the U.S., Israel and more recently, in Singapore, TDM for both commercial and non-commercial purposes is generally permissible e.g., under fair use provisions and / or explicit legislative exceptions. We encourage the UKIPO to continue their dialogue with worldwide bodies, given that there is already precedent as to how TDM exceptions are implemented in legislation.

In drafting and implementing any commercial TDM exception, it is a vital next step that any legal and technical barriers are kept as low as possible, to ensure, for example, that commercial entities (from large corporations, to start ups and SMEs) are able to fully support and engage in commercial TDM and that speed-to-market and progress of AI solutions are not hampered, given such solutions are often developed and distributed at scale.

For example, in this Consultation and with reference to the explanatory text associated with Option 3, the UKIPO refers to Article 4 of the Copyright Directive, which contains clauses, such as, "lawful access", retaining copies for "as long as necessary" and an opt-out for rightsholders. Before similar clauses are adopted into UK law, we would urge further discussion on these aspects – particularly in conjunction with technical stakeholders who will need to understand the boundaries of these clauses.

³ <https://www.ibm.com/uk-en/impact/covid-19>

As such, IBM suggests that language relating to these clauses is kept as broad and open as possible, to allow for developments in TDM technology and to ensure that researchers and technical teams are not encumbered unnecessarily and arbitrarily in their TDM activities.

Further, with regards to reservation of rights, there are several issues to be considered. It is important that legal / technical hurdles in any transposition are kept to a minimum, because the scale at which TDM and AI solutions function can already be massive and with ongoing technology improvements, the scale is set to only further increase. Thus, any legal / technical hurdles will quickly have ramifications on speed-to-market and progress of AI solutions.

Any transposition must be kept broad and flexible enough to accommodate improvements in the advancement of the technology of de facto or standard practices. At present, machine readability (as well as cognition) of online terms and conditions is difficult to near impossible for most systems except for the most sophisticated technology. Further, in some instances, it can be difficult to determine where online terms are located / which of the available sets of online terms are applicable.

As such, IBM suggests that, at present, the most feasible method for checking reservation of rights for online content is by using common metadata. Using metadata would overcome the issue of readability, as tools to parse metadata can be implemented fairly trivially and economically. Further, use of metadata would also overcome the issue of an indeterminate location for any reservation of rights information, for example, by structuring the metadata according to a predefined format / syntax (e.g., using tags) that can be parsed at a predefined location (e.g., a robots.txt file or equivalent, which is a protocol / format that is used widely by web crawlers and web robots today).

Further, IBM suggests that for online content, TDM be permitted if prior reasonable efforts have been made to check rights reservations with respect to examining machine readable and understandable data (such as, the robots.txt file).

Open Licensing

With regards to the broader topic of data access, one solution that we recommend is the promotion of Open Data Agreements, such as, the Community Data Licence Agreements⁴, that specifically contemplate and provide for data analysis by computer-assisted and AI technologies. In particular, some agreements put terms in place to ensure that downstream recipients of data can freely use, modify, and analyse data.

⁴ <https://cdla.dev/>

Standardised or model data licence agreements can facilitate collaborative approaches for sharing data resources and have the potential to dramatically reduce transaction costs and licensing uncertainty e.g., by helping to reduce the proliferation of different licensing agreements and enabling smoother licensing mechanisms both to make data available and to consume data. This model has worked well in other communities, such as, the open source community - community-led efforts in drafting and gathering feedback (e.g., via the Linux Foundation, Apache Foundation and Eclipse Foundation) and central administration of the licenses by the Open Source Initiative⁵ have now resulted in a set of tried and trusted licenses that are widely used.

We also applaud the UK government's early work on its Open Government Licenses⁶, aimed at making public sector more readily available. We believe that building on this foundation by further encouraging and implementing Open Data Agreements that are specifically drafted with AI technologies in mind will help fulfil the UK government's aim of making public sector data available for the benefit of the public.

With regards to broader points that need to be considered as data is made available and consumed, we encourage discussions with the technical community regarding measures to aid usability, such as, data governance / format / quality and the use of standards. Other issues that need to be considered include identifying data lineage and provenance as well as encouraging techniques, such as, cleansing data for bias. As thought leaders in this space, IBM is happy to facilitate such discussions with our technical community.

We would be happy to engage further to share our experiences and early / continuing work with open licensing⁷.

⁵ <https://opensource.org/licenses>

⁶ <https://www.nationalarchives.gov.uk/information-management/re-using-public-sector-information/uk-government-licensing-framework/open-government-licence/>

⁷ <https://developer.ibm.com/blogs/new-collaborative-data-license-agreement-makes-sharing-data-sets-easier/>

Patents

11. *Please rank these options in order of preference (most to least preferred) and explain why?*
12. *Would the changes proposed under Options 1, 2 and 3 have any consequential effects on the patent system, for example on other patentability criteria?*

For options 1 and 2:

13. *If UK patents were to protect AI-devised inventions, how should the inventor be identified, and who should be the patent owner? What effects does this have on incentivising and rewarding AI-devised inventions?*
14. *In considering the differences between options 1 and 2, how important is it that the use of AI to devise inventions is transparent in the patent system?*
15. *Would the UK adopting option 2 affect your global patent filing strategy, if so, how?*

For option 3:

16. *What term and scope of protection should a new right offer?*
17. *What should the criteria for grant of a new right be and why? Particularly should it:*
 - a) *Replicate the current requirements for a patent?*
 - b) *Set a different bar for inventive step?*
 - c) *Be an automatic or registered right?*

General

18. *What role does the IP system play in the decision of firms to invest in AI?*
19. *Does the first mover advantage and winner-take-all effect prevail in industries adopting AI? How would this affect the impact of the policy options proposed on innovation and competition?*
20. *How does AI adoption by firms affect the economy? Does the use of AI in R&D lead to a higher productivity?*
21. *Do the proposed policy options have an impact on civil society organisations? If so, what types of impacts?*

Summary

As a global patentee, a level of certainty is critical to IBM and we encourage the UK to continue its discussions and harmonisation efforts with other major IP offices, such as, the European Patent Office [EPO], the World Intellectual Property Organization [WIPO], and the United States Patent and Trademark Office [USPTO] on these issues.

IBM is not averse to considered and deliberate law changes and we also appreciate and understand the UKIPO's request for help via this Consultation to further the debate. As such, we have included discussion points around each of the Options mentioned.

Whilst we fully support the UKIPO's initiatives in preparing for advances in technology, **IBM supports the selection of Option 0**. We continue to urge for caution before legislative change, given that the technical details of AI-devised inventions still need to be agreed upon and made transparent and harmonised across major jurisdictions. Advantageously, Option 0 does not preclude future legislative changes – it is the Option that give most flexibility, whilst still allowing time for stakeholder consultations.

As worldwide developments and discussions around the topic of inventorship by AI progresses, IBM would be pleased to continue to contribute to the debate, bringing our breadth and depth of experiences in AI and related technology and as a long-standing user of patent systems around the globe.

Option 0 - Make no legal change

In light of the current technical and legal landscapes, **IBM is supportive of Option 0**.

Questions 11-17 of this Consultation ask for discussion of Options 1-3, however, IBM believes that in this and other forums, there is a continuing need to adequately discuss and analyse Option 0.

The substantial premise of these questions appears to be related to making legislative changes for a “generation of new AI-devised inventions”.

IBM continues to urge the UKIPO to assess and analyse this starting premise and to involve technical stakeholders as a fundamental starting point of these discussions in order to obtain an agreed understanding of the technical details involved in inventions created by AI.

Human-centric Approach to AI

IBM believes that a human-centric approach to AI is necessary, where AI is designed and developed in a manner that is aligned with the human values and ethical principles of a society or community it affects⁸.

As an in-house team, the IBM legal and policy communities have the privilege of close working relationships and discussions with our researchers and technologists. Members of our global Intellectual Property Law organisation are closely involved in all aspects of an invention from its conception right through its exploitation and also handle the complexity and interplay of patents with other IP rights in a commercial setting.

From these discussions and experiences, with regards to a scenario where a human is not involved in the creation of an invention, or where any human intervention is very minimal, we do not believe that the current generation of AI has the capacity to autonomously generate an invention.

Further, in a scenario where a human is more involved in the creation of an invention, we believe that human intervention and contribution occurs in many steps of the invention creation process – as such, even in this scenario, we are not seeing any gaps in human inventorship.

We illustrate our assertion with exemplary diagrams in Figures 1 and 2.

A simplified example of invention creation is shown in Figure 1, where an initial problem results in a solution using an AI system (shown in a hard-lined box), in which inputs are entered into an AI subsystem (shown in a dashed box), which when executed, generates output.

An example of what this workflow actually may involve in a real-world development environment is shown in Figure 2.

With reference to Figure 2, firstly, note the large number of steps that may be involved in invention conception including:

1. Building an AI subsystem e.g., by collecting and curating data; generating models and using training data to train the models.
2. Identifying a problem to be solved.
3. Preparing the input e.g., by converting the problem to be solved into input digestible by the AI subsystem; selecting inputs.

⁸<https://www.ibm.com/watson/assets/duo/pdf/everydayethics.pdf>

4. Running the AI subsystem e.g., using tuning and configuration in order to execute an AI engine comprising algorithms implemented in software and / or hardware.
5. Assessing the output of the AI subsystem e.g., filtering and selecting outputs.
- 6 to 8. Repeating steps 1 to 5 in light of the assessment(s) at step 5 e.g., using further setting, adjusting, removal, addition of parameters / configurations.
9. Completing additional inventive activity (in scenarios wherein the output is not a patentable invention).
10. Generating a solution (which comprises a patentable invention).

Secondly, in discussions with our researchers and technologists, human involvement and in most cases, heavy involvement, can be attributed at every stage. Importantly, it should be noted that human contribution is also involved at many levels of the broader architecture e.g., in interacting with the AI subsystem using interfaces; at several stages outside of the AI subsystem and also, in determining the problem and solution.

IBM is happy to facilitate further discussions with our technical community as needed.

Transparency

If parties are seeing gaps in human inventorship, either by AI solely or jointly inventing, we believe that associated data and evidence of inventorship be made explainable and transparent.

For example, what is happening at a technical level before, during and after invention conception – why can't a human inventor be attributed? Are any fact patterns being repeatedly seen or were they isolated incidents? Are the researchers and technologists working in close conjunction with their legal team at all stages of invention conception? What are the technical parameters or thresholds involved in creating an AI-devised invention? Does the AI recognize an invention? Must it be so for inventorship to arise? Do each of the stakeholders have a common understanding of what these parameters or thresholds are? Is the understanding in line with what is being discussed by lawmakers in other major jurisdictions?

We suggest that information collation is focussed on the technical aspects that humans are proactively contributing to invention conception and that human contribution at all stages and levels of the inventing process is considered (and, not purely focussing on the AI subsystem, for example).

Such data will help inform the UKIPO and other stakeholders as to whether legislative changes are required and is likely to also help on consensus as to the scope of any required legislative changes.

Foundation Setting

Although the early beginnings of AI technology stretch back decades, many moving parts of the AI landscape as we know it today are still to solidify.

For example, as stated in our previous Response, consensus and drafting of legal and technical definitions (including around the term “AI” itself) are still in flight. We noted in the Call for Views that it stated “there is no single agreed definition of artificial intelligence”. If that is the case, are all stakeholders across multiple jurisdictions agreed on what an “AI-devised invention” means? All stakeholders should have common understanding to minimise the risk of unforeseen circumstances. Also, as can be expected, the technology continues to develop.

As lawmakers and policymakers (and, not just in the IP sphere) discuss the impacts of this disruptive technology, we would urge the UKIPO to connect with technical stakeholders to discuss the ethical and societal impacts of legislative change that allows an AI machine or system to be recognised as an inventor (indirectly via Option 1 or directly via Option 2).

As such, consideration and full consultation around these fundamental aspects by all stakeholders continues to be needed, particularly before legislative change.

Harmonisation

We applaud the UKIPO’s continuing efforts to inclusively involve stakeholders in this continuing debate. As a global patentee, harmonisation is critical and we support the UKIPO’s efforts in engaging and collaborating with other IP offices in other major jurisdictions on these issues.

We believe it is important to adopt a more cautious approach in the UK given that patent applications naming an AI system (referred to as DABUS, UK patent applications GB1816909.4 and GB1818161.0) as an inventor are currently in flight in a number of IP offices / are being reviewed in national courts⁹. For example, the EPO has recently heard appeals on the DABUS applications¹⁰. The DABUS patent applications have mainly been assessed at a formalities level – the complex issues that need to be discussed e.g., regarding the technical details of an AI-devised invention, have not been raised in detail.

⁹ <https://www.bailii.org/ew/cases/EWCA/Civ/2021/1374.html>

¹⁰ <https://register.epo.org/application?number=EP18275163&tab=main>

Indeed, other governmental bodies, such as, the EU Parliament¹¹ are also actively consulting on AI inventorship issues.

For applicants, a level of harmonisation, for example, between the UKIPO and the EPO is critical. The UK has been a valued member of the European Patent Convention (EPC)¹² for many decades. Indeed, the UK's membership of the EPC is an important consideration in an entity's patent strategy and investment decision making as well as providing for flexibility given that applicants can apply for a UK patent via two routes – either as a national patent application directly via the UKIPO or as a European patent application designating the UK via the EPO.

Further, given that an inventor is restricted to a natural person in several major jurisdictions, such as, the U.S., a premature change to the law in the UK may have impacts on an applicant's strategy for patent families.

Impacts of a Law Change on Inventorship

As detailed in our previous Response, a seemingly isolated change to inventorship could have many foreseeable and unforeseeable consequences and not just within patent law.

These consequences will be discussed in more detail with reference to Options 1 and 2, however, in summary, and with reference to our previous Response, the impacts may include analysis and consensus required on:

- the meaning of e.g., an inventor, deviser¹³, inventive step assessment
- ownership
- downstream impacts on liability, infringement and enforcement
- broader societal issues, such as, ethics and transparency as well as alignment with related fields of law and technology that are actively consulting in this area
- consistency with broader legal frameworks, such as, the EPC

Fundamentally, the majority of IP (patent, copyright) frameworks around the world are aimed to support and encourage human innovation. For example, the Paris Convention¹⁴ Article 4^{ter} states that “the inventor shall have the right to be mentioned as such in the patent”; section 13 of the Patents Act 1977¹⁵ states that “the inventor or joint inventors of an invention shall

¹¹ https://www.europarl.europa.eu/doceo/document/A-9-2020-0176_EN.html

¹² <https://www.epo.org/law-practice/legal-texts/html/epc/2020/e/index.html>

¹³ <https://www.legislation.gov.uk/ukpga/1977/37/section/7>

¹⁴ <https://wipolex.wipo.int/en/text/287556>

¹⁵ <https://www.gov.uk/guidance/the-patent-act-1977/section-13-mention-of-inventor>

have a right to be mentioned” and jurisprudence¹⁶ in the UK points to the “deviser” of an invention being a “natural person who came up with the inventive concept”.

Inventorship is also intrinsically tied to entitlement and ownership¹⁷.

Significant departures from these legal frameworks, which could indeed have major implications to innovation and investment, no matter how trivial any legislative changes may appear to be, should not be taken lightly, given the impact it could have not just within patent law, but on many other areas of law and policy.

Economic Growth and Incentives

This Consultation states that, for example, “it is not clear that this option (Option 0) is optimal to incentivise research, development and deployment of AI” and “if AI-devised inventions are unable to be patented...this may encourage the use of trade secrets, which could harm follow-on innovation”.

We strongly urge that an evidence-based and data-driven approach with UK stakeholder input to assess the potential impacts on the innovation and economic landscape be undertaken by the UKIPO before reaching a conclusion. We would also urge that any such evidence-gathering is undertaken with a view to the landscape in other jurisdictions, such as, Europe, the U.S. and Japan.

As one of the primary goals of the patent system is to provide an incentive for the advancement and development of technology, human inventors and the organisations that employ these inventors benefit from these incentives. Should there be AI that is fully capable of generating inventions without involving a human or with minimal human involvement, the question turns to whom or what should benefit and whether new incentives are required. An under incentive can result in a slower growth of innovation whilst an over incentive can result in a greater yield of ideas with lacklustre improvements – how do we achieve an appropriate balance?

Furthermore, it should be noted that many IP offices worldwide, such as, WIPO are in any case seeing a large growth in AI related inventions¹⁸.

¹⁶ <https://publications.parliament.uk/pa/ld200607/ldjudgmt/jd071024/yeda.pdf>

¹⁷ <https://www.gov.uk/guidance/the-patent-act-1977/section-7-right-to-apply-for-and-obtain-a-patent>

¹⁸ https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

Established patent frameworks are fairly robust and we believe that inventions made with the assistance of AI technology (that is, wherein AI is used as a tool) and inventions relating to improvements in AI technology are generally already protectable under current UK patent law, subject to e.g., patentability criteria.

Further, IBM does not believe that retaining the law as it stands today would considerably impact its current strategy – IBM continues to implement a multi-faceted approach to IP, including protection and licensing of patents, copyright, trademarks and trade secrets. To the contrary, we are more concerned with the large number of foreseeable and unforeseen circumstances that rapid law changes in this area could have as well as a lack of harmonisation on these issues.

For at least these reasons, we believe that the UK patent framework is robust and sufficient and we do not see an urgency or immediate need to make hasty law changes in this area. We are of course supportive of continuing to monitor the landscape as the technology develops.

As stated in our previous Response, we would fully support the UKIPO as a shorter-term goal in creating and issuing guidance to applicants regarding e.g., patentability of AI patent applications.

Growth of AI-related Patent Applications

As stated above, many IP offices worldwide are seeing a large growth in AI related inventions¹⁹.

If law changes to AI inventorship are made in the UK and given that there is currently much ambiguity even at the starting point of the discussions e.g., around the technical details of what is occurring during conception of an AI-devised invention; patentability aspects, such as, inventive step and sufficiency as well as impacts on ownership, it is foreseeable that an even greater volume of AI related patent applications may be filed, some of which may have the potential to cause disruption downstream.

Such a set of circumstances, particularly in cases where resulting patents are not readily available for licensing, may result in navigation challenges in the AI field. Such patents would not just need to be navigated by corporate entities, but also, by SMEs, start-ups and academia.

¹⁹ https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

We applaud the UKIPO's early work on analysis of the patent landscape²⁰. We encourage the UKIPO to revisit its early work with the AI field in mind, in conjunction with landscape analysis workstreams being conducted by other IP offices, such as, WIPO²¹ and particularly, before making legislative changes in the UK around AI inventorship.

Option 1 - “Inventor” expanded to include humans responsible for an AI system which devises inventions

As explained in this Consultation, under Option 1, “a patent application would still have to name human inventors for it to be granted. The law would make clear that the inventor would be the human who made the arrangements necessary for the AI to devise the invention. This would be under the condition that no human qualifies as inventor”.

Once again, we would urge the UKIPO to continue to assess the premise that no human qualifies as inventor – as detailed in Figure 2 of the “Human-centric Approach to AI” section under Option 0, human involvement can typically be attributed at several stages of the inventing process.

We recommend an evidence-based approach to information gathering.

For example, if gaps are being seen in human inventorship, to what extent is AI simply behaving as it is programmed to? To what extent are the technical features of an AI system simply being used as a tool in order to assist inventive activity?

Some state that an AI system can create inventions that a human hadn't contemplated when programming / constructing the AI system. However, ultimately, AI as we know it today is still bounded and specific by virtue of e.g., human curated / created data, models and goals as well as human curated / selected output – most in the technical community believe that general AI²² is some way off.

Furthermore, as discussed above under Option 0, inventions made with the assistance of AI technology (that is, wherein AI is used as a tool) are generally already protectable under current UK patent law, subject to e.g., patentability criteria. In light of this, are stakeholders able to better pinpoint where any gaps in current law may lie?

²⁰

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312540/informatic-thickets.pdf

²¹ [WIPO Technology Trends 2019 – Artificial Intelligence](#)

²² <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence?lnk=fl>

Further, we assume that the language relating to “arrangements necessary for the AI to devise the invention” is associated with s9(3) of the Copyright, Designs Patent Act (CDPA) and the computer-generated works clause.

Although this seems like a simple, isolated and non-controversial change and is advocated by some, with reference to our previous Response, we caution against haste in reaching conclusions. There are several topics that would need to be addressed before enacting such a clause in patent law where a human is assigned as an “inventor by proxy”.

Firstly, copyright and patents are different and separate IP rights and care must be taken in asserting analogies²³ as mentioned by The Honourable Mr Justice Marcus Smith at the UK High Court hearing for GB1816909.4 and GB1818161.0: “The problem ...is that such rules need to be framed with a degree of care and specificity, at least where the rules regarding the property in question are statutory. No such rules have been framed in the context of patents, the statutory regime for which is contained in the Patents Act 1977.”

Further, it should be noted that the original clause s9(3) in CDPA itself (e.g., the term “arrangements necessary”) has not been tested to a great extent in UK jurisprudence and is several decades old. Its applicability and the applicability of any analogous clause in patent law to the AI landscape of today and in the future need careful consideration.

For example, what is meant by the “person by whom the arrangements necessary for the creation of the work are undertaken” with respect to patent law – who would be the appropriate person, under what circumstances, and when?

This Consultation states “that people involved in the following activities could potentially be considered human inventors:

- programming the AI, configuring the AI, operating the AI, selecting input data such as training data for the AI or recognising applications of the output of the AI”

and that “mere involvement with the development of an invention would not necessarily qualify a person as inventor”.

However, in a complex technology space, such as, AI, any number of humans in different roles, employed (or not, as the case may be) by different entities, may contribute to / “arrange” the AI system in question. For example, software developers, users, suppliers, contractors - should they all be listed as inventors? What if each of the parties made different levels / types of arrangements – would each of the arrangements be considered equal such that each of the parties are eligible as inventors? If not, how would one determine the threshold for an “arrangement”? What if the execution of an arrangement caused the original AI software algorithm and / or hardware to change such that an invention is devised – is it equitable to solely list the arranger as inventor or is the devised invention actually an

²³ <https://www.bailii.org/ew/cases/EWHC/Patents/2020/2412.html>

improvement on the original algorithm and / or hardware– in this scenario, what is equitable in terms of ownership? What if there are disputes between the human “inventors” as to the level of contributions in the arrangements – how would these be resolved?

Further, in certain scenarios, several individuals in a group may have made significant contributions to an invention in the collective sense, but where each individual contribution was not significant enough to identify a human inventor e.g., perhaps because the group was very large. In such cases, it appears improper to start with a premise or end with a conclusion that an AI system is the inventor.

Further, what analysis has been carried out in complex, cross-technology sectors, where any number of features of related technologies, such as, Cloud, Security and Quantum may also be used in invention creation – have parties adequately analysed the broader technical landscape before concluding that it was an AI system that invented? In a cross-technology scenario, are stakeholders able to isolate the AI as being the entity that is responsible for devising an invention? What happens in the scenario where different aspects of the cross-technology architecture are owned or “arranged” by different parties and these cross-technology arrangements make it possible for the AI to devise an invention?

Would any analogous clause to s9(3) in CDPA in patent law be able to be overridden by contract? Would a similar amendment to law in other jurisdictions cause an impact on remuneration for human inventors? We also note similar provisions to s9(3) in CDPA in a small number of other jurisdictions, such as, New Zealand²⁴ and we recommend that the UKIPO and other stakeholders track any related discussions.

This Consultation states that “the meaning of the term ‘inventor’ would remain as currently understood”; “there is no intention to change the well-established test that determines the actual deviser of the invention” and “if a human qualifies as inventor, then they should be named in the application as now”. Thus, would the addition of the second option (i.e., a human who made the arrangements necessary) create two tiers of inventor within the UK patent system – one where a human inventor needs to make significant contributions to an invention and one where a human simply needs to make “arrangements” for an AI to carry out the inventing? What impacts would the second option have on motivation or incentivising human inventors according to the meaning in current law? What happens in the scenario where an AI-devised invention is then improved upon by another AI and / or another human - who (or what) would be listed as inventors in this scenario?

If the second option does not involve naming a human within the current meaning of the term “inventor / deviser”, how would a counterpart application fare in jurisdictions, such as, the U.S., which has stringent requirements around naming of inventors²⁵ and where the USPTO

²⁴ <https://www.legislation.govt.nz/act/public/1994/0143/57.0/whole.html>

²⁵ <https://www.uspto.gov/web/offices/pac/mpep/s2157.html>

in its Decision²⁶ on the DABUS patent applications stated that “identifying a natural person, who did not invent or discover the subject matter of the invention, as the inventor in a patent application would be in conflict with the patent statutes”. Further, other jurisdictions, such as, Germany, have legal obligations around e.g., compensation of inventors. How would an applicant handle inconsistencies in members of the same family – e.g., an application being filed directly at the UKIPO versus a European application designating the UK?

This Consultation states that “this option would remove concerns about the validity of a patent if it were difficult to directly credit an inventive contribution to a human” and that “filing a UK patent in this case would not prejudice foreign filings”. However, for at least the reasons mentioned above, we believe that there are significant concerns with Option 1, particularly when looking at the bigger picture of an application’s family combined with a lack of harmonisation with other major jurisdictions.

This Consultation states that with Option 1, “if AI does devise an invention, an applicant may or may not disclose this in the description of their invention”. However, please reference the “Transparency” section in Option 0 – a fundamental starting point in these discussions must involve transparency. If such details are unknown, what will be the impact if such a patent application is later enforced or litigated? Who (or what) will give evidence in court proceedings? What recourse will a defendant have for an invention created by an AI system, particularly if there is a lack of transparency at invention conception and in any patent application? What options does the owner of the AI system that created an invention have if the AI system itself is found to infringe a third party patent? How will a lack of transparency impact downstream entitlement disputes? Will existing legal frameworks suffice or will these areas of law downstream from the original patent application filing also be reviewed before legislative change on AI inventorship?

As well as analysing the issues involved in invention conception, the issues involved with an AI-devised invention across its entire life must be contemplated. Downstream issues that may arise many years after the original patent application filing must be taken into account by all stakeholders in order to continue to protect and advance the UK’s economic and commercial interests for all entities in the market.

This Consultations states that “entitlement to the patent would then flow as present” and “we don’t anticipate that the current rules on entitlement should need amendment”. However, given the above discussed ambiguity and complexity on who the human(s) who made the arrangements necessary for the AI to devise the invention is, we believe that entitlement and ownership is likely to also be unclear.

²⁶[16524350_22apr2020.pdf \(uspto.gov\)](#)

We would also ask for further discussions on what impact any changes to intellectual property ownership may have on other types of property ownership.

Notwithstanding the ambiguity discussed above on inventorship, there may be several other options with regards to ownership that may be implemented. For example, entitlement matters between the parties may best be decided by employment status and / or contract. Perhaps we could consider a computing-for-hire doctrine similar to the work-for-hire copyright doctrine in the U.S., to reduce uncertainty. Alternatively, perhaps legislators may opt for the owner of the AI system to be entitled to its inventions. With regards to ownership, we would ask for adequate time for fuller discussions around the options that may be available, particularly before legislation is passed.

Although this Consultation does not mention impacts of Option 1 on patentability aspects, such as, inventive step (would the test be a skilled person in the art or a skilled machine in the art?) or sufficiency (disclosure), we believe that these issues must still be considered – even for an Option that seems like an isolated change and still names a human inventor. For example, when such a patent application is later examined or later challenged in court, if an AI system is the inventor - and given that there may not be transparency with Option 1 - how would this scenario avoid all of the upfront analysis and work that would need to be executed and agreed upon before legislative change e.g., a need to reassess benchmarks for patentability? For example, in the scenarios where an examiner is in the search or exam stage of such a patent application or where a defendant were to attempt to assess invalidity during court proceedings, what benchmarks should they be using in their analysis?

Finally, we again want to make the point about harmonisation – very few major jurisdictions have copyright law equivalent to s9(3) of CDPA. Further, the broader issues around AI inventorship are in flight and being discussed by several IP offices and government bodies worldwide – at this stage, it seems prudent for UK stakeholders to align and collaborate with other major jurisdictions.

Although we fully support the continuing debate on these issues and are honoured to be part of the conversation, given the number of open questions above (and there may be many other questions and topics raised by other stakeholders), it appears to be premature in enacting a particular Option in legislation. As stated in our response for Option 0, full and transparent discussions, starting with the fundamental issues of definitions, technical details of what is happening during invention conception etc., will help to better inform all stakeholders and may even present a number of options around inventorship and ownership that we have not yet considered.

We are cognisant of the number of questions we have raised above – in terms of proactive next steps, we believe that as well as fuller discussions with technical stakeholders and policymakers, a co-ordinated effort to gather empirical evidence could be initiated. Although hypothetical examples will never be exhaustive, perhaps stakeholders could be asked about the major categories of technical parameters in AI-devised inventions they foresee or have had experience with (e.g., perhaps it will be determined that a user typically has minimal

contribution to an arrangement) – using these sets of examples may provide the basis for more specific and focussed conversations around inventorship and ownership options. Perhaps as a result of discussing multiple examples, a trend may emerge or not as the case may be. This evidence could then be used as the basis of discussions with lawmakers and policymakers.

Option 2: Allow patent applications to identify AI as inventor

This Consultation states that “the patent system would be adjusted so that UK patents protect inventions devised by AI. Unlike Option 1, it would always be transparent that a non-human inventor has devised an invention...We suggest two different ways of achieving this:

- a) amend legislation to allow AI to be named as the inventor; or
- b) amend legislation to remove the requirement to name an inventor if the invention is devised by AI”.

Given the number of open-ended questions (e.g., around who the “human who makes the arrangements necessary for AI to devise the invention” is) in Option 1 and given that Option 2 also involves legislative changes, we refer to our response above in Option 1 as much applies with respect to Option 2 also. At the most basic level, as most in the technical community believe general AI is some way off and as there is much ambiguity around the technical details involved in invention creation even when there is some / minimal human involvement, it may be very challenging to deliberately legislate in this area at this point in time.

With respect to a), although this Consultation states that “neither approach would confer AI systems with the right or ability to apply for or own patent rights”, even the legal recognition of AI as an inventor must not be taken lightly. The issues associated with allowing AI to be named as an inventor should not only be discussed with patent professionals. This would be a significant legal and policy change, with potential impacts on trade and competition and broader societal and ethical considerations. We do not believe that discussion of the question of whether AI should be allowed to be listed as inventor be limited to the legal community – this is a question that we should be asking in the first instance of our technical stakeholders and broader policy communities.

We recommend that the UK and other jurisdictions provide the availability of public platforms / forums for technical and policy stakeholders from a range of entities and sectors to have the floor on these issues.

Legal recognition of AI as an inventor requires that we be able to recognise the point at which AI has sufficient autonomy to be said to have conceived an invention. Currently there is no test or accepted set of questions for this type of determination.

Further, recognising AI legally as an inventor raises pragmatic and ethical issues - if AI can enjoy the legal status of an inventor, can it then be liable for infringement? Guilty of a crime? And, so on. These are far-reaching issues and given that several other topics relating to potential AI regulation are currently being discussed globally, for example, in the UK²⁷ and EU²⁸, we believe that it makes sense for stakeholders in the UK to not rush ahead and potentially cause conflicts with broader downstream legislation and policy initiatives.

To reiterate the point about harmonisation, we do not believe that any major jurisdictions have legislated on AI inventorship as of yet. We encourage the UKIPO to continue to collaborate and align with other major jurisdictions at this point in time – there does not seem to be an empirical set of reasons to rush as of yet.

With respect to b), removing the requirement to name an inventor seems contradictory to foundational aspects of the patent system aimed at rewarding human innovation e.g., the Paris Convention (Article 4^{ter}) and the UK Patents Act 1977 (Section 13). Further, as discussed above, some jurisdictions, such as, the U.S., have stringent requirements around naming inventors.

With regards to ownership, this Consultation states that “neither approach would confer AI systems with the right or ability to apply for or own patent rights”. Currently, we agree with that direction. The Consultation also states “under both approaches, patent law would provide a right to obtain and own patent rights for an invention devised by AI. The human closely responsible for an invention devised by AI would own the patent rights in the first instance”. However, we do not believe that the chain of title is so easily determinable given the above discussed ambiguity and complexity on inventorship and given that there may be a range of entitlement options to contemplate.

Option 3: Protect AI-devised inventions through a new type of protection

In general, new types of IP protection have been considered and implemented in the past. For example, the Semiconductor Chip Protection Act²⁹ in the U.S. From our experience, this particular Act has not been widely used. The European Union also introduced a sui generis right for the content of databases. The concepts in the associated Directive³⁰ do not appear to have been implemented in many other major jurisdictions.

Further, the introduction of new types of IP protection may result in further fragmentation when it comes to harmonisation of IP legislation, particularly if demarcated along siloed lines of technology. If a new right for AI-devised inventions is enacted, will another be put in place for Quantum, Cloud etc.? How will an entity (regardless of size) implementing complex

²⁷ <https://www.gov.uk/government/publications/national-ai-strategy>

²⁸ <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai>

²⁹ <https://www.copyright.gov/circs/circ100.pdf>

³⁰ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0009:EN:HTML>

cross-technology solutions that wishes to enter a market(s) navigate this proliferation of new rights?

The IP protection mechanisms currently in place have served us well for many years even as technology has evolved at an accelerating pace. It appears that in the main, current IP frameworks strike the balance between protecting innovators' interests and promoting further innovation by the broader communities. Therefore, IBM suggests that the focus remain on analysing the basic building blocks of IP frameworks already in place before creating any new forms of IP protection ad hoc.

Section B: Respondent information

A: Please give your name (name of individual, business or organisation).

██████████

B: Are you responding as an individual, business or on behalf of an organisation?

- 1) Business – please provide the name of your business
- 2) Organisation – please provide the name of the organisation
- 3) Individual – please provide your name

1) IBM United Kingdom Limited

C: If you are responding on behalf of an organisation, please give a summary of who you represent.

D: If you are an individual, are you?

- 1) General public
- 2) An academic
- 3) A law professional
- 4) A professional in another sector – please specify
- 5) Other – please specify

E: If you are responding on behalf of an organisation, are you?

- 1) An academic institution
- 2) An industry body
- 3) A licensing body
- 4) A rights holder organisation
- 5) Any other type of organisation - please specify

F: If you are responding on behalf of a business or organisation, in which sector(s) do you operate? (choose all that apply)

- 1) Agriculture, forestry and fishing
- 2) Mining and quarrying
- 3) Manufacturing – Pharmaceutical products
- 4) Manufacturing – Computer, electronic and optical products
- 5) Manufacturing – Electrical equipment
- 6) Manufacturing – Transport equipment
- 7) Other manufacturing
- 8) Construction
- 9) Wholesale and retail trade; repair of motor vehicles and motorcycles
- 10) Transportation and storage
- 11) Information and communication – Publishing, audio-visual and broadcasting
- 12) Information and communication – Telecommunication
- 13) Information and communication – IT and other Information Services
- 14) Financial and insurance activities
- 15) Real estate activities

- 16) Scientific and technical activities
- 17) Legal activities
- 18) Administrative and support service activities
- 19) Public administration and defence
- 20) Education
- 21) Human health and social work activities
- 22) Arts, entertainment and recreation
- 23) Other activities – please specify

13) and others

G: How many people work for your business or organisation across the UK as a whole? Please estimate if you are unsure.

- 1) Fewer than 10 people
- 2) 10–49
- 3) 50–249
- 4) 250–999
- 5) 1,000 or more

5)

H: The Intellectual Property Office may wish to contact you to discuss your response. Would you be happy to be contacted to discuss your response?

Yes

I: If you are happy to be contacted by the Intellectual Property Office, please provide a contact email address.



J: Would you like an acknowledgement of receipt of your response?

Yes

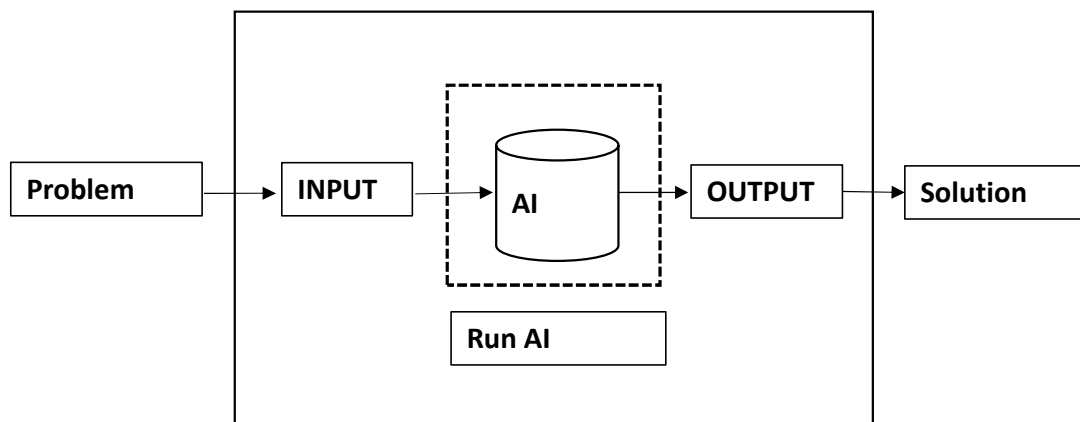


Figure 1

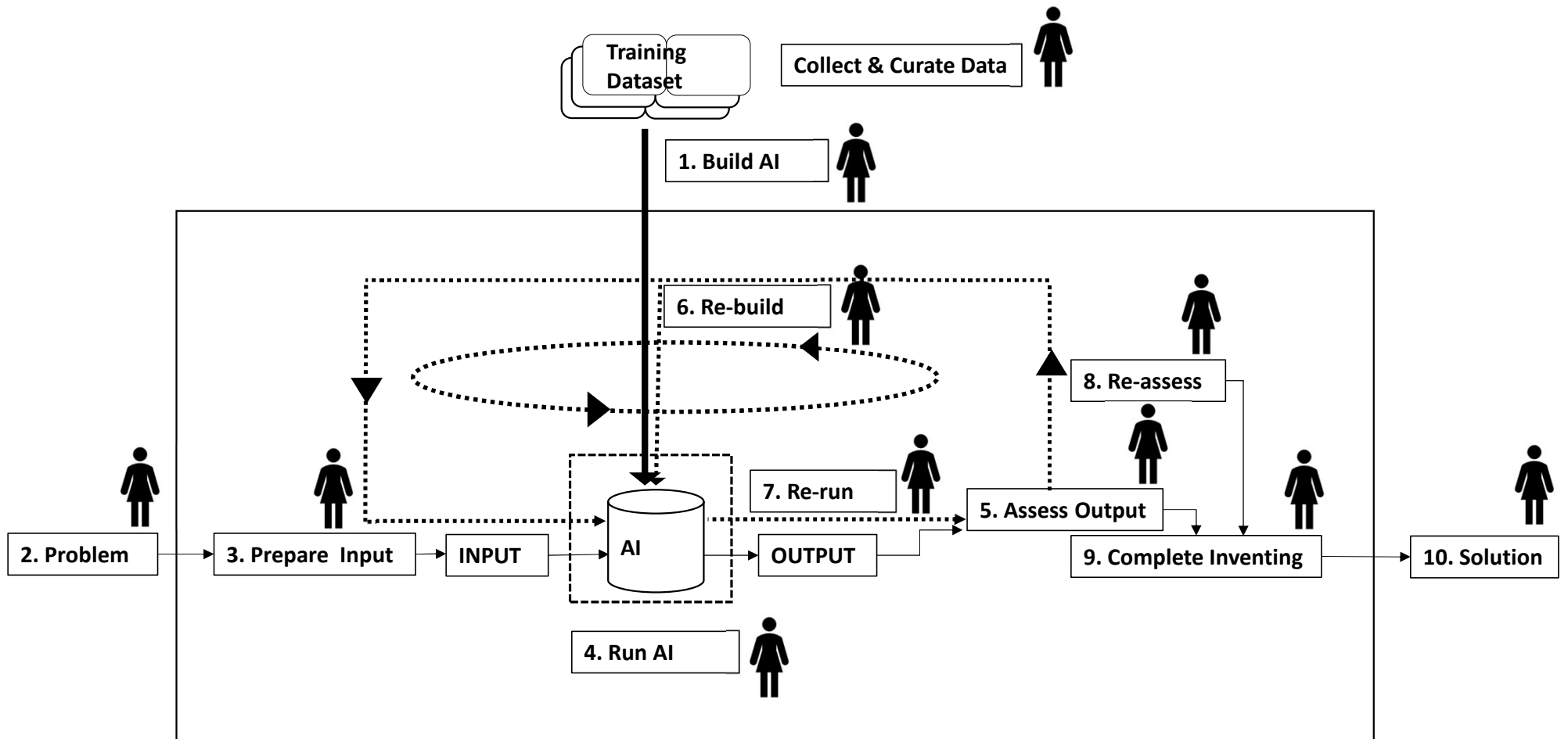


Figure 2