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PATENTS VS TRADE SECRETS FOR INVENTIONS THAT USE ARTIFICIAL INTELLIGENCE

David V. Sanker, Ph.D.

Karon Fowler

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Before we begin: Morgan Lewis and Global Technology

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Morgan Lewis Coronavirus/COVID-19 Resources

We have formed a multidisciplinary **Coronavirus/COVID-19 Task Force** to help guide clients through the broad scope of legal issues brought on by this public health challenge.

To help keep you on top of developments as they unfold, we also have launched a resource page on our website at

www.morganlewis.com/topics/coronavirus-covid-19

If you would like to receive a daily digest of all new updates to the page, please visit the resource page to subscribe using the purple "Stay Up to Date" button.

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David V. Sanker, Ph.D.

Karon Fowler

David V. Sanker, Ph.D.

David V. Sanker, Ph.D.
Silicon Valley

T +1.650.843.7260

F +1.650.843.4001

Drawing on 12 years of experience in software development, David V. Sanker, Ph.D. works with clients to build strong patent portfolios in a variety of areas, including artificial intelligence (AI), machine learning, natural language processing, data visualization software, large-scale database architecture and storage infrastructure, data analytics software, and touch screen technology. As AI tools have become widely available, inventions that use AI have become an increasing portions of his work, including inventions in industrial automation and life sciences.

Although David's current work is focused on building patent portfolios, he spent the first five years of his legal career in patent litigation, in cases before the US International Trade Commission (USITC), the US Federal Circuit, and in federal district courts. This background in litigation provides valuable insight for building strong patent portfolios.

Prior to his career in law, David earned a Ph.D. in mathematics, worked as a software engineer developing large-scale data processing applications, and was an assistant professor of mathematics at Holy Names College.

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Karon N. Fowler

Karon N. Fowler

Chicago

T +1.312.324.1000

F +1.312.324.1001

Karon Fowler has extensive experience litigating and trying intellectual property cases throughout the country, including before US district courts, appellate courts, arbitration panels, and the US International Trade Commission. She also contributes to AIA post-grant proceedings before the US Patent and Trademark Office.
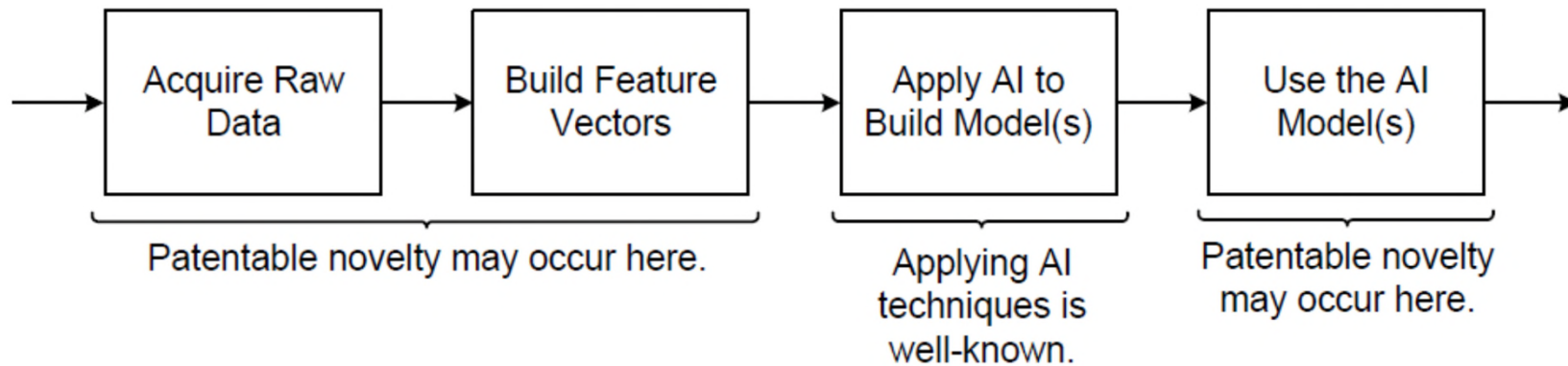
Karon has represented clients in matters involving a variety of technologies, including computer networking, semiconductor manufacturing, access control systems, wireless local area networks, and computer hardware and software.

Prior to joining the Chicago office of Morgan Lewis, Karon was based in the firm's Silicon Valley office where she worked with entities ranging from start-ups to Fortune 500 companies.

Before joining Morgan Lewis, Karon served as law clerk for Judge Eduardo C. Robreno of the US District Court of the Eastern District of Pennsylvania.
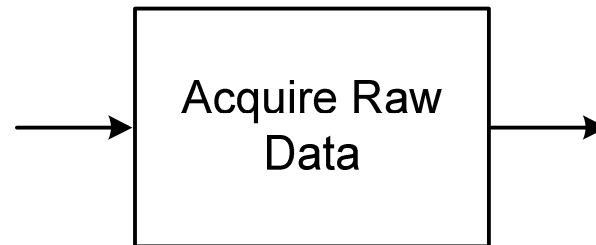
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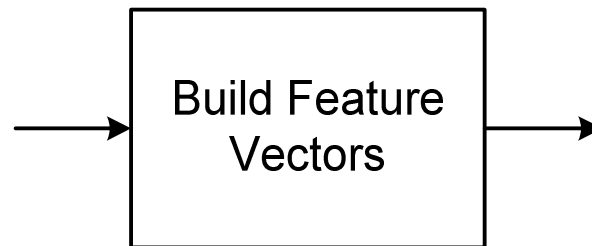
Inventions That Use AI – Simplified Framework

Acquire Raw Data	Build Feature Vectors	Apply AI to Build Model(s)	Use the AI Model(s)

Patentable novelty may occur here.

Applying AI techniques is well-known.

Patentable novelty may occur here.

Inventions That Use AI – Simplified Framework

```
        ┌──────────────┐
──────▶ │  Acquire Raw │ ──────▶
        │     Data     │
        └──────────────┘
```

- Are any of the data elements new?

- Are any of new data elements non-obvious?

- If an inventor identifies a new data for use, it could be enough for patentability.

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Inventions That Use AI – Simplified Framework

```
              ┌─────────────────┐
    ────────► │  Build Feature  │ ────────►
              │     Vectors     │
              └─────────────────┘
```

- Have the raw data elements been combined, organized, or manipulated in new ways?

- Simple Boolean combinations of data elements can be handled by the AI engine, but there are many types of calculation that are beyond what current AI engines can do.

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Inventions That Use AI – Simplified Framework

Apply AI to Build Model(s)

Applying AI techniques is well-known.
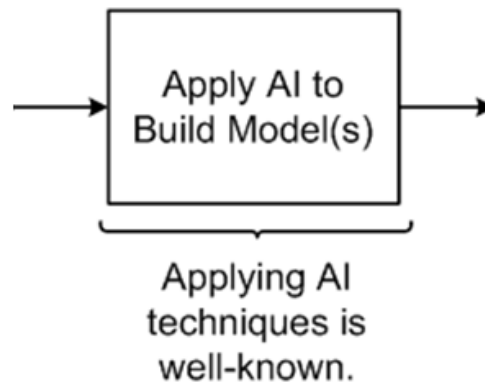
- Using AI is rarely novel because such use mostly uses AI techniques, algorithms, or software developed by others.

- Thus, unless you have invented a new AI Algorithm (or a meaningful variation), this step does not mean patentability.

Inventions That Use AI – Simplified Framework

```
          ┌──────────────┐
   ───────▶│   Use the AI  │───────▶
          │   Model(s)    │
          └──────────────┘
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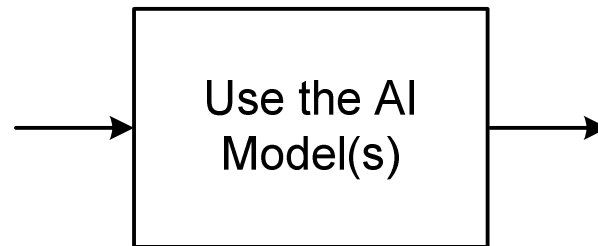
- Is the AI output used in a new way?

    - Is the AI output a piece of data used to determine what action to take next?

    - Is the AI output part of a novel User Interface?

- Just displaying a result would not lead to patentability, but using the output as one part of a decision process might be patentable.

General Rules for Selecting Patents or Trade Secrets

1. Is there an invention?

- There are many things worth protecting that would not be classified as "inventions", such as data.

- The determination of what is "patent-eligible" can depend on the assigned Examiner.

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General Rules for Selecting Patents or Trade Secrets

2. Will the invention be publicly visible?

- If people can "see" the invention, then patent protection is the only option (e.g., a software user interface).

- Reverse engineering is legal

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General Rules for Selecting Patents or Trade Secrets

3. How easy is it to detect infringement?

- This question generally addresses the same issue as visibility, but expressed in a different way.

- If it is too difficult (or impossible) to identify infringement (even with reverse engineering), then a patent would not have much value.

- Infringement evidence can be acquired during litigation discovery, but it could be very costly to pursue litigation only to discover there is no infringement.

Use Trade Secret Protection When …

1. There is no human inventor

35 U.S.C. § 100: (f)The term "inventor" means the **individual** or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.

35 U.S.C. § 101: **Whoever** invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

April 22, 2020: USPTO decided that DABUS (Device for the Autonomous Bootstrapping of Unified Sentience)—a type of connectionist AI—could not be named as an inventor on a patent application for an improved beverage container.

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On the topic of non-human inventors ...

See "Can the US Patent and Trademark Office handle 'artificial inventors'?", published in the *Daily Journal* on September 30, 2019.

https://www.morganlewis.com/-/media/files/publication/outside-publication/article/2019/daily-journal-can-the-uspto-handle-artificial-inventors.ashx

We are preparing a supplement to this article, which should be published in July, 2020.

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Use Trade Secret Protection When ...

2. The human contribution is just providing initial data

Some inventive AI platforms are substantially automated, but require some initial input parameters to get started.

Example 1: Use an AI system to formulate a metal alloy, starting from an initial specified composition.

Example 2: Use an AI system to formulate an integrated circuit (IC) chip based on a supplied sample.

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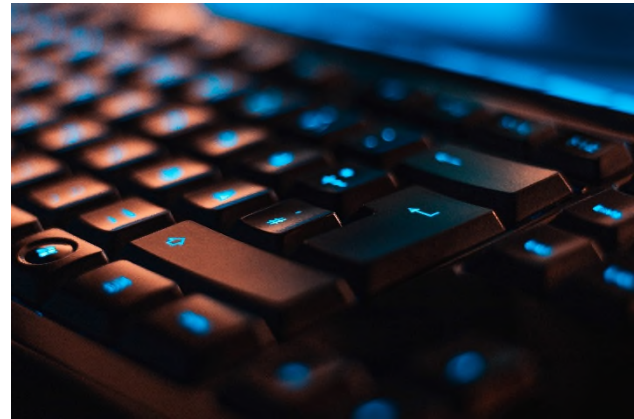
Use Trade Secret Protection When …

3. The non-AI concepts are an "Abstract Idea"

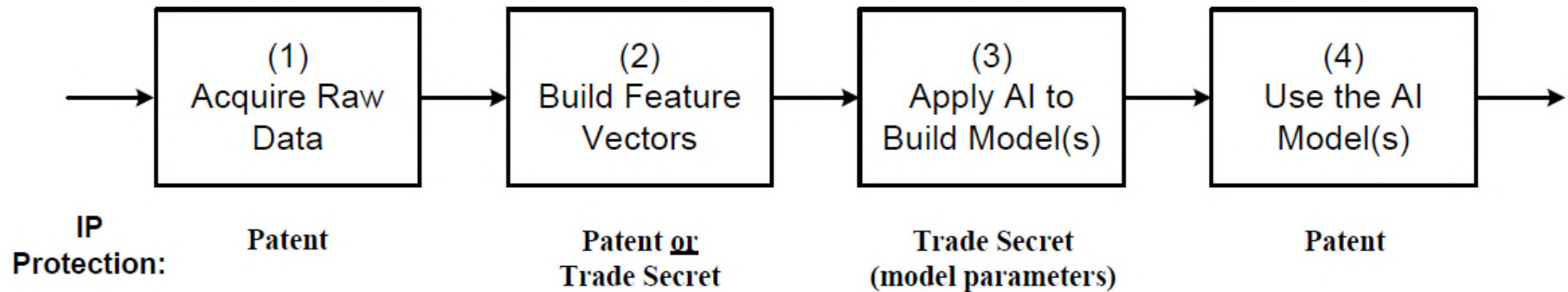In the Post-*Alice* world, Examiners routinely reject patent claims under 35 U.S.C. § 101 as not patent-eligible.

Some Examiners reject claims as "Abstract Ideas" even when the claims recite novel, non-obvious, technical inventions.
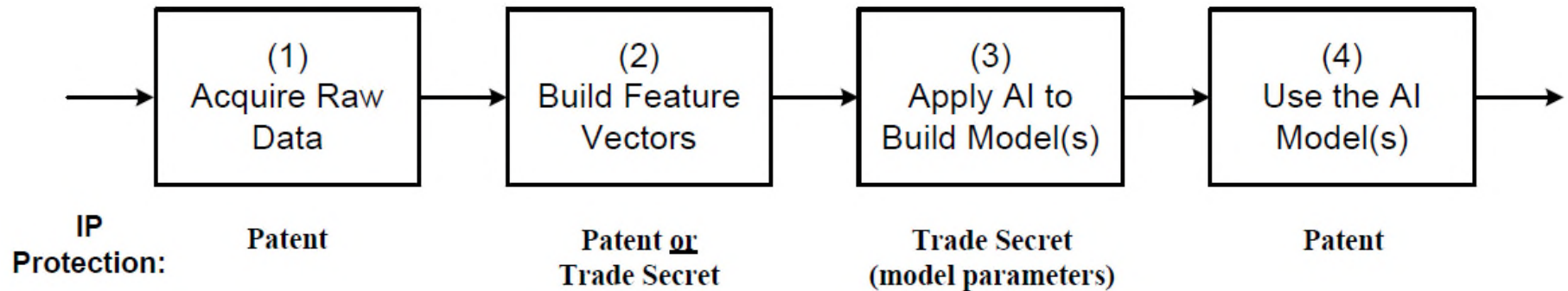
Look for <u>technical</u> details and features that are not routine, conventional, or well-known.

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Protection Based on Where the Novelty Occurs

	(1) Acquire Raw Data	(2) Build Feature Vectors	(3) Apply AI to Build Model(s)	(4) Use the AI Model(s)
IP Protection:	Patent	Patent or Trade Secret	Trade Secret (model parameters)	Patent

- If the specific raw data elements are novel, it is difficult to keep secret.

- If the construction of calculated features is novel, it could be kept secret.

- If the use of the AI models (e.g., a user interface) is novel, it is typically visible and generally unable to be kept secret.
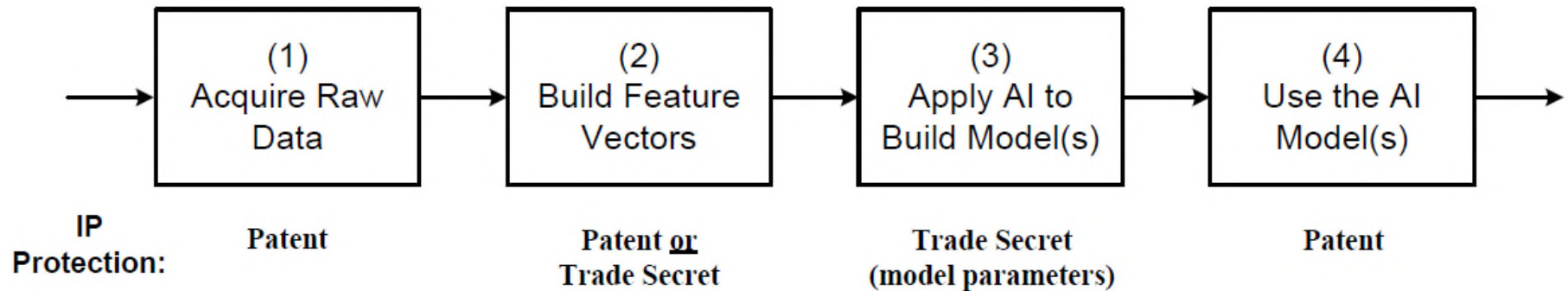
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Protection Based on Where the Novelty Occurs

	(1) Acquire Raw Data	(2) Build Feature Vectors	(3) Apply AI to Build Model(s)	(4) Use the AI Model(s)
IP Protection:	Patent	Patent or Trade Secret	Trade Secret (model parameters)	Patent

- Example 1: A company uses AI to develop a new way to diagnose coronavirus infection using a set of data elements, including blood pressure, temperature, and a few blood characteristics. Also included is one unexpected data element. The company prepares a software application that is widely distributed.
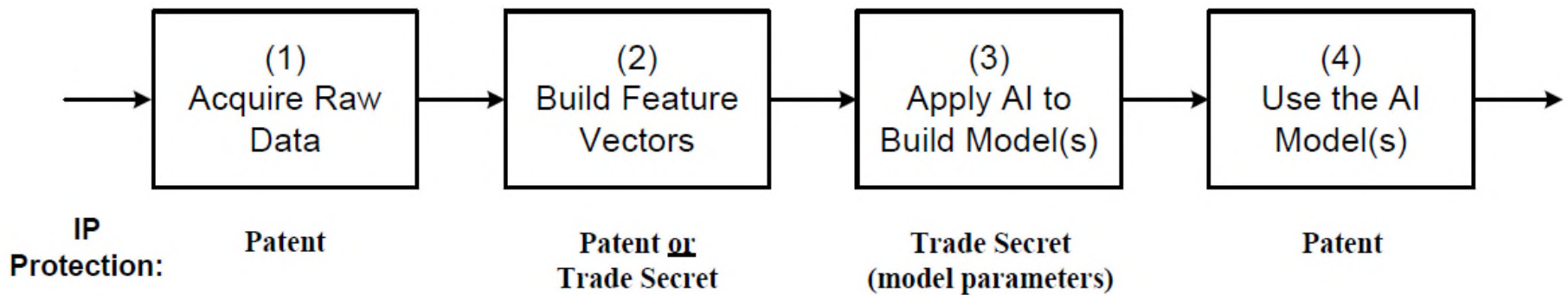
Patent, Trade Secret, or Neither?

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Protection Based on Where the Novelty Occurs

(1) Acquire Raw Data	(2) Build Feature Vectors	(3) Apply AI to Build Model(s)	(4) Use the AI Model(s)
Patent	Patent or Trade Secret	Trade Secret (model parameters)	Patent

IP Protection:

- Example 2: A company uses AI to develop a new way to implement cybersecurity. The new technique uses known raw data elements, but performs some novel calculations to build features that have not been previously used. The results of the AI analysis are presented in a user interface on the device where the application is running.

Patent, Trade Secret, or Neither?

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| (1) Acquire Raw Data | (2) Build Feature Vectors | (3) Apply AI to Build Model(s) | (4) Use the AI Model(s) |

IP Protection: Patent   Patent or Trade Secret   Trade Secret (model parameters)   Patent

- Example 3: Same as Example 2, except that the collected raw data elements are transmitted to the cloud where the novel calculations to build the features are performed. The AI model(s) are applied, and the results of the analysis are sent back to the device where the application collected the raw data (or sent to another device, such as an administrator).

Patent, Trade Secret, or Neither?

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Protection Based on Where the Novelty Occurs

(1) Acquire Raw Data	(2) Build Feature Vectors	(3) Apply AI to Build Model(s)	(4) Use the AI Model(s)
Patent	Patent or Trade Secret	Trade Secret (model parameters)	Patent

IP Protection:
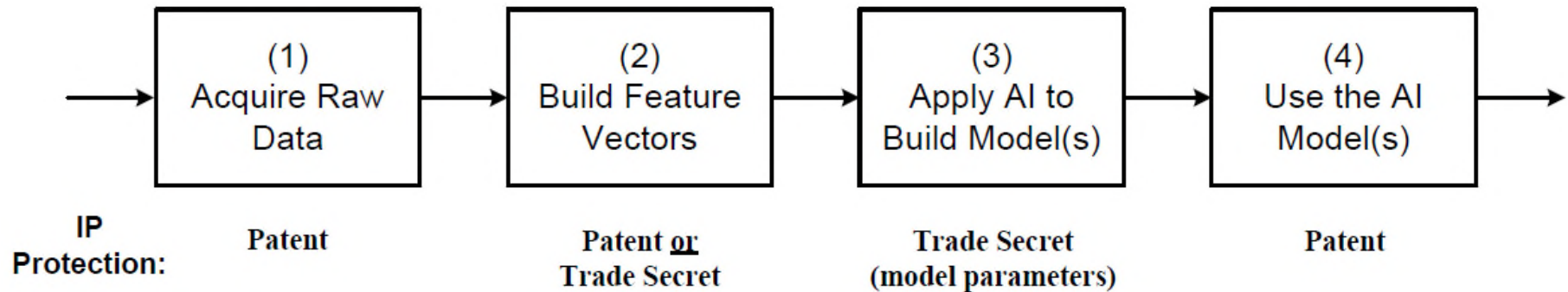
- Example 4: A company uses an AI platform to optimize industrial production. The input consists of lots of data about the machines in use, throughput rates at each of the machines, and testing results. The output consists of an optimized plan for layout of the machinery, utilization, and testing.

Patent, Trade Secret, or Neither?

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Detecting Infringement or Misappropriation

- When a patent protects the novel raw data elements:

  – Detecting infringement is typically
   straightforward because the inputs used by infringers are visible.
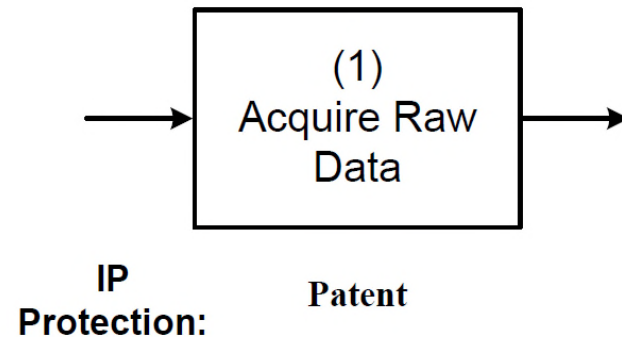
Detecting Infringement or Misappropriation

- When patent or trade secret protection covers some "creative" features calculated from the raw data:

  - It may be difficult to establish infringement or trade secret misappropriation because calculations may be hidden. This is particularly true if the calculations are performed "in the cloud" or other location not directly accessible.

 - Indirect evidence may be necessary to form the basis for a legal complaint.

(2)
Build Feature
Vectors

IP
Protection:

Patent <u>or</u>
Trade Secret
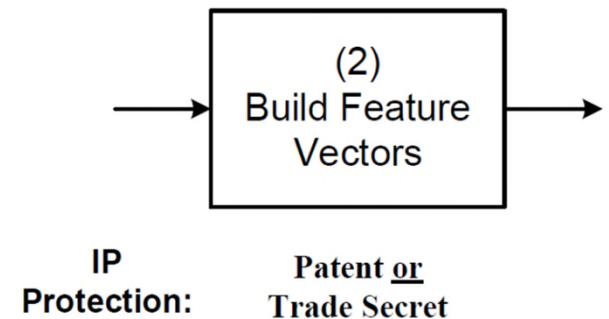
Detecting Infringement or Misappropriation

- When trade secret protection covers the constructed AI model (e.g., weights for nodes in a neural network):

  – A trained AI model is valuable, so it can be kept as a trade secret. A competitor is likely keeping their AI models secret too, so proof of misappropriation will generally require discovery.

  – Indirect evidence may be necessary to form the basis for a legal complaint.

(3)
Apply AI to
Build Model(s)

IP
Protection: Trade Secret
(model parameters)

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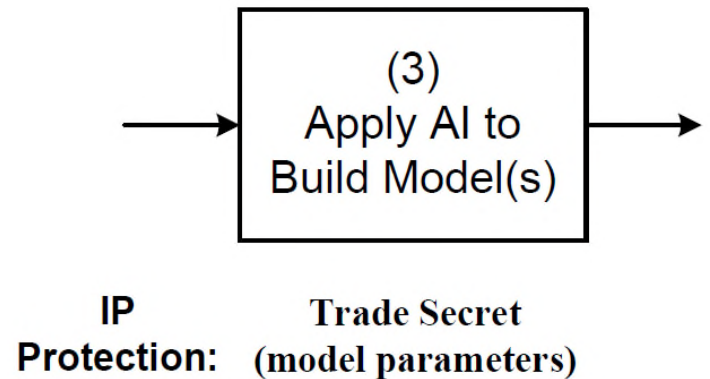
Detecting Infringement or Misappropriation

- When a patent covers use of AI output:

    - The usage of AI output is generally visible, so it is usually not difficult to establish infringement

(4)
Use the AI
Model(s)

IP
Protection: Patent
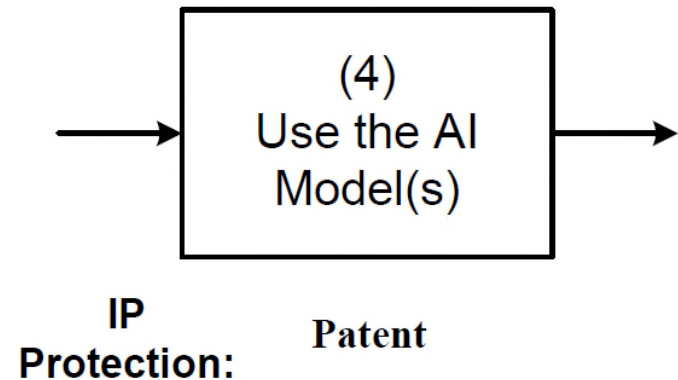
Limits on Trade Secret Protection of "Black Boxes"

You may be able to protect AI model parameters as a trade secret, but …

Constructing feature vector elements and operating the AI externally in a black box may not be enough to protect the secrets.

Given enough inputs/output, testing may reveal what is occurring inside the black box.

Once the functionality inside the black box is revealed, trade secret protection is lost.

Early physicists did not know the interior structure of atoms. But they determined atoms' structure by blasting them with high speed particles and observing the results.

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Worst Case Scenarios for Trade Secret Protection

1. A competitor figures out the trade secret using reverse engineering and/or black box testing.

2. A competitor independently develops the same invention and files a patent application.

3. A competitor figures out the trade secret by reverse engineering and/or black box testing and improves on it. The competitor files a patent application on the improved system.

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Other Considerations: Cost

Patent protection

- Greater up-front investment
- Additional costs to address complexity and rejections based on patent-eligible subject matter

Trade secret protection

- Costs remain largely consistent
- Additional costs to prevent reverse engineering

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Other Considerations: Legal Remedies

Patent infringement

- Potential remedies include injunctions, damages, and attorneys' fees.

Trade secret misappropriation

- Potential remedies include injunctions, seizure orders, monetary damages, costs, and attorneys' fees.

- Seizure order may be particularly valuable by enabling an owner to recover the trade secrets and prevent additional harm, which is often difficult to quantify.

A Potential Hybrid Approach

- **What if the "correct" choice between patents and trade secrets is unclear?**

  1. If the inventor seeks protection in the United States only, prepare and file a patent application, including a <u>non-publication request</u>.

  2. Continue to protect the invention as a secret.

  3. At some point in the future (e.g., when the patent application is allowed at ~ 2-3 years), decide whether to continue with patent or trade secret protection based on more information.

Coming soon ...

- Two articles on the topic of "Patents v. Trade Secrets in the AI Era" will be available shortly.

- Contact us to get a link to the articles or check on the Morgan Lewis website.

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Patents, Trade Secrets, or Data Protection

- Phrasing the question as "Patents vs. Trade Secrets" assumes that the greatest value is the AI process. That is not always true.

- A system that uses AI may not be patentable. It may be obvious what type of data to use, how to apply the AI, and how to use the output of the AI.

- As a practical matter, it may be impossible to protect a system as a trade secret. If usage of the system allows users to see the inputs and outputs, the system is not very secret.

- In some cases, the best protection is to keep the <u>training data</u> as a Trade Secret.

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Protection of Data

- Protecting your training data is particularly important when there is substantial work in the first box of the framework. It may take a lot of time and effort to collect and/or classify the raw data.

- The training data is used to build the AI models, so the training data itself is not publicly visible during subsequent usage.

- Protecting data is possible regardless of patentability and regardless of whether it is feasible to protect the process as a trade secret.

- One downside risk is reverse engineering the AI models using enough "black box" testing. However, even if the AI models can be reverse engineered, it does not reveal the original training data. In many cases, the data owner can reuse the training data (e.g., with more data) to rebuild new AI models.

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