Artificial Intelligence-Created Intellectual Property: Issues and Future Directions

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Moderator: Ognian (Oggie) Shentov, Ph.D.
Jones Day, New York
Outline of the Presentation

• Artificial Intelligence and Intellectual Property
• IP Issues in Cognitive Computing
• What We Can Learn From the Copyright Experience
• The Gathering Storm of Disruption
• Q/A
What is Artificial Intelligence?

- **Artificial Intelligence** (AI) deals with the ability of machines or software to process information, make decisions, and take actions to achieve a particular objective.

- **Robots** are multifunction devices with the capability to sense their current environment and act on that environment using movement.
Artificial Intelligence Applications

- AI involves an staggering array of practical applications, typically focusing on the processing of large amounts of data, information searches, personalized data delivery, computer guided motion (such as for surgical and component assembly purposes), electronic trade algorithms, financial portfolio maintenance and balancing, robotics, image and voice processing, and many others.

Specific application fields include:

- data classification,
- data modeling,
- harvest and weather condition predictions,
- consumer business communications,
- computer animation and movies

The Washington Post will use robots to write stories about the Rio Olympics

Woodward, Bernstein ... and Optimus Prime?

BY PETER KAFKA - @PKAFKA - AUG 5, 2016, 9:00A
What Artificial Intelligence Can Do

• More recently, AI machines such as IBM’s Watson and Google’s DeepMind have been used to model and simulate very complex interactive systems, such as climate, economics, diseases, predictive analytics, and natural language models.
Artificial Intelligence And Intellectual Property

With some predicting that artificial intelligence (AI) will allow a patent to be filed and granted without human intervention within the next 25 years, WIPO.

Your AI lawyer will see you now: IBM's ROSS becomes world's first artificially intelligent attorney.

Legal services by machine

Lawyers ask ROSS research questions in natural language, just like they were talking to a colleague, and the AI 'reads' through the law, gathers evidence, draws inferences and returns with a 'highly relevant', evidence-based answer.
Worldwide Issued Patents Covering “Learning” and “Neural Networks”

Chart 1: Most patents assigned globally covering the term “learning”, granted from 2011 to present

Chart 2: Most patents assigned globally covering the term “neural networks”, granted from 2011 to present

In Chart 2, we can see the top filers of patents covering “neural networks”, another term associated with AI. Qualcomm, IBM and the State Grid Corporation of China are most prolific.

Source: Thomson Innovation @ www.thomsoninnovation.com
Patents and Applications in US, China, Japan, Korea and EP Claiming AI

Issued patents (since 2003)

Top assignees: Microsoft, Rockwell, Qualcomm, IBM, Advanced Micro

Patent applications (since May 2011)

Top assignees: Li Zongcheng, Microsoft, Son Young Suk, Qualcomm, IBM
Patents and Applications in US, China, Japan, Korea and EP Directed to “Natural Language Processing”

Patents issued since May 2011

Top assignees: IBM, Microsoft, Xerox, Accenture, SAP

Applications published since May 2011

Top assignees: IBM, Microsoft, Samsung, Xerox, Apple
Patents and Applications in US, China, Japan, Korea and EP Directed to Self-Driving Vehicles

Patents issued since May 2011

Top assignees: Bosch, Toyota, Hyundai, Nissan, Deere

Applications published since May 2011

Top assignees: Ford, Toyota, Volvo, Nissan, Deere
Unresolved AI Legal Issues

Uncertainty about the legal role of AI machines:

• Traditionally, they have been considered as agents
  • deeds of the agent are attributed to the principal
  • But what if AI machines have their own rights and responsibilities?

• who decides what these rights/responsibilities are?
• what happens if AI machine commits crime?
Unresolved Legal Issues: Continuous Need for Policy Making and New Regulations

A host of legal issues recently arose from the use of self-driving cars, or robots moving around in public spaces:

The state of California has released regulations requiring that a test driver be able to take “active physical control” of the car, meaning with a steering wheel and brakes (which were missing in Google’s test vehicle).

Stanford's JackRabbit robot will explore busy spaces while trying to respect people's boundaries.
What if an AI machine misbehaves, or commits a crime?

- the use of self-driving cars, drones, and robots navigating public spaces or serving in private homes increases the risk of various torts or crimes
- Cloud-enabled robots can outsource systems and components needed for their operation. Do people have any right of privacy when near AI machine that talks to the Internet?
What AI means for Intellectual Property?

Patent law questions never before encountered:
- are inventions made by AI machines patent eligible? (by statute, in the U.S. inventions belong to the human inventors)
- could such inventions be adequately described and enabled except through AI?
- who owns such inventions: machine owner? the entity who programmed? trained/adapted? the user? AI agent itself?
- if ownership rights are distributed among several entities, who can enforce?
- how to structure a license agreement involving AI-generated work product?
- can AI attorneys commit malpractice and, if so, what to do about it?
Observations on the Current State of AI

• The AI and robotics fields are in a transformative state, with very rapid technological developments:
  • Natural language processing allows direct communication with AI machines, which can replace Teaching Assistants, Help Desks, and even legal professionals
  • AI machines already assert themselves in all aspects of life (robots, e-trade, shopping, smart phones, etc.)
• As usual, the law lags far behind, and has failed to address even basic legal issues concerning rights and obligations
• Competition is very strong and geographically diverse
• We need to get ready for a transformative change in the technology and legal landscape
IP ISSUES IN COGNITIVE COMPUTING
IP Issues in Cognitive Computing

Leonora Hoicka
Associate General Counsel, IP Law
IBM Corporation
Explosion of Data

- Data is flowing from mobile devices, social networks and every digitized and connected infrastructure.

Healthcare data from electronic medical records, test results, medical images, video, patient sensors

Utilities data from smart meters, sensors on assets, images, video, employee notes

Gov’t & education data from sensors and audio/video from buildings, roads, vehicle fleets, student testing, school records

Media data from books, journals, newspapers, etc., as well as film, audio recordings, online gaming.
Explosion of Data – over the next 2-3 years

Healthcare data will grow 99%
88% will be unstructured

Utilities data will grow 93%
84% of this data will be unstructured

Gov’t & education data will grow 94%
84% will be unstructured

Media data will grow 97%
82% will be unstructured

…unstructured data will be the majority of data reaching 44 zettabytes* by 2020.

*1 ZB = 1000^7 bytes = 10^{21} bytes = 10000000000000000000 bytes = 1000 exabytes
1 million petabytes = 1 billion terabytes = 1 trillion gigabytes.
Businesses are “dying of thirst in an ocean of data”

- 90% of the world’s data was created in the last two years.
- 80% of the world’s data today is unstructured.
- 20% is the amount of data traditional systems leverage.

- 1 in 2 business leaders don’t have access to data they need.
- 83% of CIOs cited BI and analytics as part of their visionary plan.
- 2.2X more likely that top performers use business analytics.
Ushering in a new era of “cognitive” computing . . .

Programmatic
- Search
- Deterministic
- Enterprise data
- Machine language
- Simple outputs

Cognitive
- Discovery
- Probabilistic
- Big Data
- Natural language
- Intelligent options

System Intelligence

Tabulation
- Punch cards
- Time card readers

1900 1950 2011
So what is cognitive computing?

käg-ne-tiv (adjective): of, relating to, or involving conscious mental activities (such as thinking, understanding, learning, and remembering)

- Cognitive computing and cognitive based systems accelerate, enhance and scale human expertise by:
  
  - Learning and building knowledge.
  - Understanding natural language and
  - Interacting more naturally with humans than traditional programmable systems

- Over time, cognitive systems will simulate more of how the brain actually works and help us solve the world's most complex problems by penetrating the complexity of Big Data
IBM’s cognitive system is known as Watson

1. Understands natural language and human speech

2. Generates and evaluates hypothesis for better outcomes

3. Adapts and Learns from user selections and responses

.... Bringing together transformational technologies to drive optimized outcomes
What is Watson?

A cognitive computing platform that revolutionizes the way people and computers interact.

**Natural Language Processing (NLP):**

- Watson understands natural language the way humans use it.
- Watson can be taught, and can ingest unstructured information, such as text documents.
- Increasing capabilities in image processing.
- And … Watson can understand natural language queries.

**Hypotheses generation:**

- Watson generates hypotheses and provides suggested answers questions quickly.
- Watson will answer questions in natural language, the way humans do.

**Machine Learning:**

- Watson learns from its interactions.
What is Watson?

Cognitive Analytics and Insights capability falls into 3 types:

- **Knowledge-driven analytics**: E.g., Watson on Jeopardy!

- **Data-driven analytics**: E.g., pattern recognition in image and text data, modeling disease progression from medical claims data.

- **Combined data-driven and knowledge-driven analytics**: How knowledge (what publications and experts tell us) and what can be extracted from data complement each other to arrive at accurate predictive modeling.
How does Watson work?
How is IBM Watson Offered?

• Pre-packaged APIs over a cloud service (Bluemix)
  – Cloud-based subscription service - tools, methodologies, software developer kits and API(s) for ISVs to build cognitive applications for their customer set
  – Includes Watson HealthCloud - a specialized set of offerings trained in the healthcare domain

• Configured solutions using existing offerings
  – Combines up-front “services”-type engagement to configure & train Watson, with downstream production instance typically deployed as a cloud service

• Highly customized solutions
  – Often joint development
Sample Watson Solution IP Assets

IBM Watson

Customer’s App Back-end

Feedback

Partner Data Collection Apps & Devices

Insights Export

IBM Watson

Enhancements

Data Analytics

Insights Modeling & Generation

Current Content or Data

Customer’s App (Wearable, Mobile, etc.)

- Data
- Know-How
- “Insights”
- Algorithms & Models
- Application Software
- Platform / API’s
- Infrastructure
THANK YOU
Some Additional Videos

• IBM Watson: How it works:  
  https://www.youtube.com/watch?v=_Xcmh1LQB9I.

• Watson HealthCloud:  
  https://www.youtube.com/watch?v=ZPXCF5e1_HI

• Watson “Pro/Con” Generator demo & Watson HealthCloud:  
  https://youtu.be/K6SA79HzAAY
WHAT WE CAN LEARN FROM THE COPYRIGHT EXPERIENCE
Copyright and Authorship in Artificial Intelligence

Kate Spelman
Lane Powell

Intellectual Property Owners Annual Meeting
Copyrightability – Originality

Original, as the term is used in copyright, means only that the work was independently created by the author (as opposed to copied from other works), and that it possesses at least some minimal degree of creativity.”

Naruto, a Crested Macque (by and through his Next Friends … v. D.J. Slater, Blurb and Wildlife Personalities
Naruto v. Slater

From Andrew Dhuey’s Motion to Dismiss:

• “A monkey, an animal-rights organization and a primatologist walk into federal court to sue for infringement of the monkey’s claimed copyright. What seems like the setup for a punchline is really happening. It should not be happening.”

• “Monkey see, monkey sue is not good law – at least not in the Ninth Circuit.”

• “The only pertinent fact in this case is that Plaintiff is a monkey suing for copyright infringement.”
Copyrightability

• Cindy Lee Garcia provided an *acting performance* for what she was told would be a movie titled “Desert Warrior.”

• Her performance, partially dubbed over, was instead incorporated into an anti-Islamic film (*Innocence of Muslims*) uploaded on YouTube.

• Following a number of death threats, Garcia sought to have the film taken down pursuant to DMCA.
Copyrightability – Garcia v. Google, Inc.

- The Ninth Circuit initially ruled that Garcia owned an independent copyright in her creative and expressive performance.
- Overturned *en banc*
  - Garcia was unlikely to prove authorship.”
    - The “work” here is her “five-second performance” was an “original work of e audiovisual work Innocence of Muslims.
    - Garcia is not the author of Innocence of Muslims, and makes no copyright claim to the film or to the script.
    - A “work” cannot be defined based only on “some minimal level of creativity or originality” — that would result in a “Swiss cheese of copyrights.”
Copyrightability

Bikram’s Yoga College of India, L.P. v. Evolution Yoga, LLC

(9th Cir. Oct. 8, 2015)
Copyrightability

*Bikram’s Yoga College of India, L.P. v. Evolation Yoga, LLC*  
(9th Cir. Oct. 8, 2015)

- Sequence of 26 yoga poses and two breathing exercises developed by Bikram Choudhury at issue
- 1979 book, 2002 registration of “compilation of exercises” as supplemental registration
- Evolation (former Bikram trained teachers) offered similar program
- Sequence was merely an unprotectable “collection of facts and ideas” or “idea, process or system”
- Therefore could not be registered as a compilation or choreographic work
- Registration of book did not prevent use of underlying ideas or factual material
Copyrightability – “Useful Articles”

• 17 U.S.C. § 102(a)(5) includes “pictorial, graphic, and sculptural works” in list of works of authorship.

• Useful Articles protected “only if, and only to the extent that, such design incorporates pictorial, graphic, or sculptural features that can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article.” 17 U.S.C. § 101.
Copyrightability

**Varsity Brands v. Star Athletica,**
No. 10 Civ. 2508, 2014 WL 819422 (6th Cir, August 19th, 2015)

- Varsity creates design drawings of cheerleading uniforms.
- Varsity argued that Star Athletica copied the designs and placed them onto uniforms for photographs in its retail catalog.
- Question for court: Conceptual separability of design from utilitarian functions
- Court identified 9 possible approaches
Copyrightability

*Oracle America v. Google* (Fed. Cir. 2014)

- Evaluated the issue of whether Java API packages are entitled to protection under Copyright Act
  - Expressive? (Or have idea/expression merged?)
  - Unprotected short phrases?
  - Method of operation?
  - Is interoperability a consideration in determining copyrightability?
Copyrightability

*Oracle America v. Google* (Fed. Cir. 2014)

- Federal Circuit held:
  - Code, structure, sequence, and organization of Oracle’s Java packages entitled to copyright protection
  - Copyrightability versus interoperability
  - Abstraction, filtration, comparison
  - Remand for fair use determination
## Oracle v. Google: Holding re Copyrightability

<table>
<thead>
<tr>
<th>Components of the Work</th>
<th>District Court</th>
<th>Federal Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure, sequence and organization (SSO) of 37 API packages</td>
<td>Jury: Infringed Court: Not copyrightable</td>
<td>Copyrightable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No functionality bar</td>
</tr>
<tr>
<td>Declaring code of 37 API packages</td>
<td>Jury: Infringed Court: Not copyrightable</td>
<td>Copyrightable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Merger doctrine inapplicable</td>
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<tr>
<td></td>
<td></td>
<td>• <em>Scenes a faire</em> doctrine inapplicable</td>
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<tr>
<td></td>
<td></td>
<td>• Short phrases doctrine inapplicable</td>
</tr>
<tr>
<td>Implementing code</td>
<td>Infringed</td>
<td>Infringed</td>
</tr>
<tr>
<td>• RangeCheck function</td>
<td></td>
<td>• Not <em>de minimus</em></td>
</tr>
<tr>
<td>• Eight security files</td>
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Copyrightability – Current Status

*Oracle America v. Google, 750 F.3d 1339 (Fed. Cir. 2014)*

- Supreme Court denied certiorari June 29, 2015; remand trial concluded 2016
  - Jury trial happened in May of 2016, ‘Fair Use’ found;
  - 7/20 – Wed - Oracle wants new trial; and Google seeks sanctions against Annette Hurst personally
  - Future: appeal/ retrial?
## Copyrights Arising in Post-Alice Patent World

<table>
<thead>
<tr>
<th>Most Recent Statistics on the Percentage of Patents Found Invalid Since Alice</th>
<th>Total</th>
<th>Total Invalid under §101</th>
<th>% Invalid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal Court Decisions</strong></td>
<td>248</td>
<td>175</td>
<td>70.6%</td>
</tr>
<tr>
<td><strong>Federal Circuit</strong></td>
<td>31</td>
<td>30</td>
<td>96.8%</td>
</tr>
<tr>
<td><strong>District Courts</strong></td>
<td>217</td>
<td>145</td>
<td>66.8%</td>
</tr>
<tr>
<td><strong>Patents</strong></td>
<td>488</td>
<td>165</td>
<td>33.8%</td>
</tr>
<tr>
<td><strong>Motions on Pleadings</strong></td>
<td>120</td>
<td>87</td>
<td>72.5%</td>
</tr>
<tr>
<td><strong>PTAB CBM Institutions</strong></td>
<td>113</td>
<td>95</td>
<td>84.1%</td>
</tr>
<tr>
<td><strong>PTAB CBM Final</strong></td>
<td>50</td>
<td>49</td>
<td>98%</td>
</tr>
</tbody>
</table>
Synopsys v. ATopTech (March 10, 2016  N.D. CA)

- Technology = Static timing analysis (STA)
  - Simulation method of computing the expected timing of a digital circuit without requiring a simulation of the full circuit
- Plaintiff had patents but did not assert; relied exclusively on copyright
- Jury award of >$30 million for copyright infringement
Questions?