Presenter: Peter Grimm

When I was little, I wanted to be “Maverick”, but it didn’t turn out that way

<table>
<thead>
<tr>
<th>Academic</th>
<th>Career</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degrees</strong></td>
<td><strong>[Deloitte] Cipher</strong></td>
</tr>
<tr>
<td>- U.S. Naval Academy</td>
<td></td>
</tr>
<tr>
<td>B.S. in History</td>
<td></td>
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<tr>
<td>- National Intelligence</td>
<td></td>
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<tr>
<td>University M.S. in</td>
<td>[State of Al Qaeda Iraq]</td>
</tr>
<tr>
<td>Strategic Intelligence</td>
<td></td>
</tr>
<tr>
<td>(Counterterrorism)</td>
<td></td>
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</tbody>
</table>

[Images of naval ships, military personnel, and maps of Iraq]
Gartner’s predictions about AI

By 2022, 1 in 5 workers will rely on AI to do their job

• AI is expected to replace low-level, routine work, but it will also play a role in higher-level jobs in the future

• Instead of replacing these professionals, AI will assist them, as the combination of human and machine will perform more effectively than either working alone

• AI is poised to create more jobs than it eliminates

“Once knowledge workers incorporate AI into their work processes as a virtual secretary or intern, robo-employees will become a competitive necessity.”
AI is transforming a number of industries

Most applications of AI are focused on improving efficiency, enhancing quality, and/or reducing costs in operational environments

<table>
<thead>
<tr>
<th>Industry</th>
<th>Healthcare</th>
<th>Financial Services</th>
<th>Education</th>
<th>Manufacturing</th>
<th>Transportation</th>
</tr>
</thead>
</table>
| **Key Applications** | • Collecting patient data  
   • Mining medical records  
   • AI-driven diagnostics  
   • AI-designed treatment plans  
   • AI-assisted treatments / procedures  
   • Drug discovery | • Personal finance  
   • Investment management  
   • Predicting market behavior  
   • AI-enabled chatbots  
   • Document analysis | • Automated Teaching Assistants  
   • Improving content  
   • Generating content  
   • Personal training | • Intelligent factories  
   • Supply chain management & logistics  
   • Quality assurance | • Enhanced data collection  
   • Intelligent route planning  
   • Autonomous vehicles, trains, ships |
| **Impacts**       | • Cost and time savings  
   • Better patient outcomes | • Cost and time savings  
   • Create / protect competitive advantages  
   • Improved customer service | • Cost and time savings  
   • Improved learning outcomes  
   • Increased accessibility | • Improved operational efficiency  
   • Improved quality  
   • Reduced costs | • Improved safety  
   • Improved efficiency |
The Insurance industry is already seeing the initial impacts of AI, and reliance on AI is going to increase dramatically over the next 20 years.

- **Explosion of data from connected devices**
  - Increased customer understanding leads to new product categories, more personalized pricing, and increasingly real-time service delivery

- **Increased prevalence of physical robots**
  - Drones, self-driving cars, autonomous farming equipment, and enhanced surgical robots coming in the next decade will lead to shifting risk pools, changing customer expectations, and new products and channels

- **Open source and data ecosystems**
  - Standardized data formats and frameworks will lead to highly-connected data ecosystems between multiple private and public entities across many industries

- **Advances in cognitive technologies**
  - Machines that can mimic human learning (decomposition and inference) will enable “Active” products that re-evaluate risk in real time based on consumer behavior

“…decline in accident frequency due to safer vehicles and the adoption of autonomous vehicles could shrink the U.S. personal auto insurance sector by 60% within 25 years.”

- KPMG, 2015

What does AI mean for the Intelligence Professional?

The increasing incorporation of AI-enabled technologies into the intelligence cycle will drive key changes to intelligence cycle.

**Traditional Intelligence Cycle**

- **Planning**: (PIRs/KIQs/KITs)
- **Collection**: (Public, Proprietary, Subscriptions, etc.)
- **Processing**: (Collating, Indexing, Curating, etc.)
- **Dissemination**: ("Finished" reports)
- **Analysis**

**AI-enabled Intelligence**

**Inputs**

- No longer possible – or necessary – to collate, package, and store all of the information an analyst needs
- Analysts become distanced from the data, leveraging a series of tools to collate and index data, or process data before it is presented to the analyst

**Process**

- Humans will still be required to generate hypotheses, but can then leverage machines to test them

**Outputs**

- Analysts will shift from producing “finished intelligence products” to “curating” a vast knowledge base for their customers to interrogate at their leisure

Source: Adapted from Nick Hare and Peter Coghill, “The future of the intelligence analysis task.” INTELLIGENCE AND NATIONAL SECURITY, 2016. VOL. 31, NO. 6, 858–870.
The Industrial Age intelligence professional

The skills required to be a successful intelligence analyst are changing rapidly

Traditionally, the intelligence analyst was at the center of information flow within an organization.

Source: Adapted from Nick Hare and Peter Coghill, "The future of the intelligence analysis task." INTELLIGENCE AND NATIONAL SECURITY, 2016. VOL. 31, NO. 6, 858–870.
The AI-enabled intelligence professional

The skills required to be a successful intelligence analyst are changing rapidly

The analyst of the future will be valued less for what they *know*, and far more for how they *think*

Source: Adapted from Nick Hare and Peter Coghill, “The future of the intelligence analysis task.” INTELLIGENCE AND NATIONAL SECURITY, 2016. VOL. 31, NO. 6, 858–870.
The AI-enabled intelligence professional

The skills required to be a successful intelligence analyst are changing rapidly

- Future analysts will be relied upon for their ability to think about and model systems, and to add structure to messy and poorly-understood problems
  - Analysts will rely less on critical thinking skills, and more on creative faculties—imagining, hypothesizing, playing, communicating
  - Analytical “graft” (reading, and remembering) largely outsourced to machines
- “Breadth” of experience will be more important than “depth” of experience
  - Analysts must quickly generate abstractions about how novel systems behave
- The future analysts’ interaction with information will be driven by salience
  - When a novel problem arises, the analyst’s task will be to bound the space of possibility, generate hypotheses to be tested, identify the best data streams to tap, and understand the appropriate tools to apply to generate the most salient insights for the intelligence customer

Source: Adapted from Nick Hare and Peter Coghill, “The future of the intelligence analysis task.” INTELLIGENCE AND NATIONAL SECURITY, 2016. VOL. 31, NO. 6, 858–870.

The analyst of the future will be valued less for what they know, and far more for how they think
Artificial vs. Human Intelligence
The Strategic Mindset

The Four Routes from Complexity to Conviction

1. Expert route
   - Workplan
   - IT Consultants

2. Analytical route
   - Data, Data, Data
   - IT Consultants
   - Lawyers, Accountants, Engineers, Academics

3. Creative route
   - Structure with Options
   - ER Doctors, Good Strategists

4. Strategic route
   - Validate with Data
   - Architects, Advertising
   - Ah-ha! The Answer!

Credit: Fred Pelard
The Strategic Mindset

The Four Routes from Complexity to Conviction

- Structure with Options
- Hypothesis testing
- Validate with Data
- Hypothesis generation

Clarity

Outputs

Inputs

Complexity

Time

% Complete

Certainty

Conviction
“By far, the greatest danger of Artificial Intelligence is that people conclude too early that they understand it.”

—Eliezer Yudkowsky, Machine Intelligence Research Institute, Berkeley
Human Intelligence vs. Artificial Intelligence

Although AI is progressing faster than ever before, there remain certain attributes of human cognition that machines cannot (yet) replicate.

Artificial Intelligence

1. Automating repetitive and time-consuming tasks
2. Ability to respond quickly and precisely to control signals, and apply great force smoothly and precisely
3. Ability to store vast amounts of information briefly, then erase it completely
4. Ability to do many different tasks simultaneously
5. Ability to reason deductively, including computational ability

Human Intelligence

1. The ability to learn from limited data and solve problems with limited computational resources
2. The ability to deal with uncertainty by improvising and using flexible procedures
3. A highly efficient visual processing system and the ability to extract semantic information from visual scenes
4. The ability to acquire knowledge from the outside world and build internal models accordingly
5. Ability to reason inductively and exercise judgment

AI cannot (yet) replicate the human mind
How the lack of data, a rapidly evolving knowledge base, and the continuous need for human "teachers" have hindered one of the most famous AI initiatives

“In health care, AI promises to help doctors diagnose and treat diseases as well as help people track their own wellness and monitor chronic conditions. Watson's struggles suggest that revolution remains some way off.”

“More than a dozen IBM partners and clients have halted or shrunk Watson's oncology-related projects.”

“In many cases, the tools didn't add much value. In some cases, Watson wasn't accurate.”

“No published research shows Watson improving patient outcomes.”

“Watson can be tripped up by a lack of data in rare or recurring cancers, and treatments are evolving faster than Watson's human trainers can update the system.”

"The discomfort that I have--and that others have had with using it--has been the sense that you never know what you're really going to get...and how much faith you can put in those results,"

Source: Wall Street Journal, “IBM Has a Watson Dilemma: Big Blue promised its AI platform would be a big step forward in treating cancer. But after pouring billions into the project, the diagnosis is gloomy.” By Daniela Hernandez and Ted Greenwald, Aug. 11, 2018
AI and Big Data in the National Security World

As National Security leaders search for an automated replacement for intelligence analysts, they must remember this...

UNLESS YOU LEARN HOW TO DO THIS FIRST...
The Four Kinds of Logic

There are four kinds of logic humans can employ to reason through a problem. Not all are equally suited for strategic thinking...

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<td><strong>Identifies likely answers, but allows for alternative explanations</strong></td>
<td><strong>What conditions have to be met for a hypothesis to be correct?</strong></td>
<td><strong>The “Educated Guess”, based on limited or incomplete observation</strong></td>
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<td>Two or more observations that logically lead to a single “correct” conclusion.</td>
<td>A series of observations that lead to a likely explanation, but not with certainty.</td>
<td>We take an inference and work backward to the expected observations.</td>
<td>Jump to the “most likely” explanation based on experience or intuition.</td>
</tr>
<tr>
<td>• A = 1</td>
<td>• I have seen many swans.</td>
<td>• What conditions would have to be met for our hypothesis to be correct?</td>
<td>• The floor is covered in torn up papers.</td>
</tr>
<tr>
<td>• B = 2</td>
<td>• Every swan I have ever seen is white.</td>
<td>• If every swan is white, what else has to be true?</td>
<td>• My dog was in this room alone all day.</td>
</tr>
<tr>
<td>• Therefore, A + B = 3</td>
<td>• Therefore, all swans are probably white.</td>
<td>• How would we test?</td>
<td>• My dog probably ripped up all the papers.</td>
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The Four Kinds of Logic

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Basic Computers

- Calculator
- Machine Learning
- Deep Learning

Artificial Intelligence

Can machines do this?