



# **Making Sense of AI: An Insider's Perspective on the Practicality of AI Today**

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**Spencer Fung**

**14,000,605**

# 14,000,605

SF

**What does 14,000,605 mean?**



I'm sorry, without additional context, it's difficult to determine what 14,000,605 might refer to. It could be a numerical value, a date, or some other type of information. Can you provide more context or information about where you encountered this number?

SF

**Hints: the number appears in a movie**



Ah, I believe I know what you're referring to now. The number 14,000,605 appears in the Marvel Cinematic Universe film "**Avengers: Infinity War**." It is the **number of possible futures** that Doctor Strange foresaw during his use of the Time Stone in his battle against Thanos. Out of all those possible futures, he only saw one in which the Avengers were able to defeat Thanos and save the universe.

# Avengers: Infinity War



# How is it Possible to Survive in the Endgame?

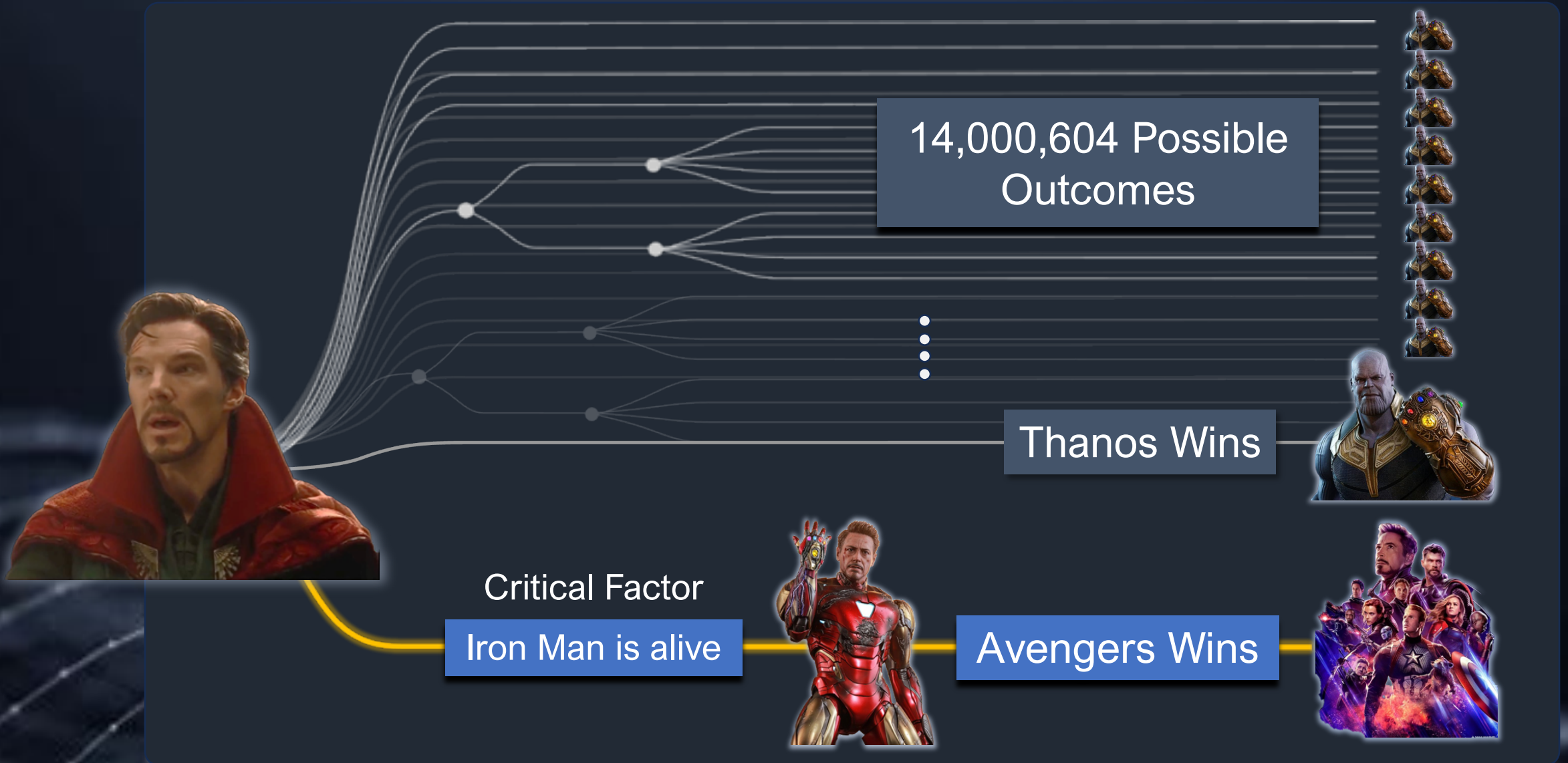


14,000,605 possible outcomes



Only 1 possible outcome to survive

# Strategy to Achieving Victory in the War







# Artificial Intelligence

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It's all about automating the  
**Problem-Solving**  
and **Decision-**  
**Making** process by  
navigating **all/part** of the  
possible outcomes

# Holy Grail of Programming

The user simply states the **problem**, and the computer **solves** it

Eugene C. Freuder (1997). **In Pursuit of the Holy Grail**. *Constraints*, 2, 57–61

Eugene C. Freuder (2007). **Holy Grail Redux**. *Constraint Programming Letters*, 1, 3–5

Eugene C. Freuder (2018). **Progress towards the Holy Grail**. *Constraints*, 23, 158–171

“**Constraint Programming** represents one of the closest approaches computer science has yet made to the Holy Grail of programming”

- Prof. Eugene Freuder





# Decision making is better left to Machines than Humans

We make decision in two ways:

1. **Fast thinking** – for making intuitive choice, a very fast reaction
2. **Slow thinking** – for making complex decision with comprehensive analysis

**“Machine do slow thinking all the time, but they do it fast”**

- Prof. Peter Stuckey

Source: <https://youtu.be/IN44L2BIBzg>



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# What Industrial Problems can be Solved by AI Practically?





# 1. Decision Making in a Factory

How to **assign equipment and workers** in a production line to meet the production schedule?







# Packaging Manufacturer

## ► Maximizing the productivity and machine utilization

### Applications:

-  Production
-  Scheduling



### Issues and challenges

- Mass customization
- Delay in material supply
- Many urgent orders
- Delay in delivery (Avg. 28 days)

### Solution

- A real-time AI production scheduling system is developed for assigning machines, workers to order dynamically
- The optimization model aims to minimize the production delay

### Results and benefits

- Reduce operation cost by 17%
- Reduce production delay by 23%
- Enhance production capacity utilization by 20%





## 2. Capacity and Demand Forecasting

How to **allocate raw materials** and **production capacity** optimally?

# Printing Consumables Manufacturer

## ► Improving sales prediction accuracy

### Applications:



Sales  
Prediction

### Issues and challenges

- Inaccurate sales forecasts
- Poor production planning
- Poor planning for replenishment of raw materials and other items
- Overstocking problem
- Cash flow problem

### Solution

- A machine learning model and ARIMA model is developed for sales prediction that identifies past sales patterns likely to repeat in the future

### Results and benefits

- Increase the sales prediction accuracy by 43%
- Better production and manpower planning
- Reduce wastage





### 3. Warehouse Optimization

How to **improve the efficiency** of utilizing space?



# Global Jewellery Company

## ► Optimizing the supply-chain efficiency

### Applications:



Demand  
Forecasting



Warehouse  
Optimization



Slotting  
Optimization



Order Picking  
Sequencing

### Issues and challenges

- Business volume dramatically increased due to rise of ecommerce
- Traditional logistic operations doesn't support the business growth
- Very short handling time (~2 hours) with B2C orders

### Solution

- An AI warehouse optimization system is developed
- Assign storage location for items to be stocked in the warehouse
- Generate an optimized operation lists for stock-in and pick-up operation
- Automated task assignment for better resource utilization

### Results and benefits

- **Transforming the traditional logistic operation to support the 10x turnover growth in online business**



The background image shows three men standing on a rooftop or balcony. They are all wearing matching blue short-sleeved polo shirts with orange accents on the collar and sleeves, and dark blue trousers. Each man is holding a clear plastic bottle filled with a yellow liquid. They are looking towards the camera. In the background, there are several tall, multi-story apartment buildings under a clear sky. A semi-transparent dark blue banner is overlaid across the middle of the image, containing the text.

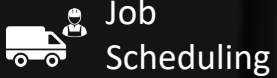
## 5. Workforce Optimization in Field Services

How to **increase the efficiency** of handling orders with the least manpower?

# Broadband Company

## ► Optimize the field service operations

### Applications:



### Issues and challenges

- High level of OT and outsourcing costs
- Unable to match staff skill with the service order requirements
- Management is invisible to the job assignment

### Solution

- An AI system is developed for the daily job assignment.
- The system considers employee skills, availability, job proximity, and SLAs to assign the right employee to each work order.
- It also provides suggestions on daily job order sequence

### Results and benefits

- Automated Job Scheduling
- Re-scheduling upon disruption
- Reduce OT by 15%
- Reduce outsource cost by 18%
- Improve Job Satisfaction



## 7. Email to Job Instructions in Ports Operations


How to **automate the communications** with container ship, and **extract information** for formulating job instruction?

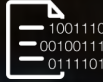


# Global Container Ports

## ► Reducing significant time in processing job instruction email

### Applications:

 Text  
Classification

 Entity  
Extraction

### Issues and challenges

- Time-consuming and manual work to process over thousands unstructured job instructions in emails per day
- Human error

### Solution

- Developed an AI/NLP systems for instruction automation via email classification and key entity extraction techniques
- Email classification: classify emails into different categories
- Key entity extraction: recognize the required information such as containers, vessels, voyages, etc., in the emails according to the job instruction

### Results and benefits

- Significantly reduce manpower in processing email
- Free up human resources to work on higher value tasks
- Achieving >95% accuracy





## 8. Analyzing Legal Documents

How to automate **classification, extraction,** and **summarization** of legal documents?

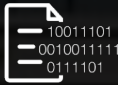
# Global Credit Rating Company

## ► Reducing significant time in content extraction

### Applications:



Text  
Classification



Entity  
Extraction



### Issues and challenges

- Time consuming in gathering massive litigation data from websites and extracting relevant information
- Human error
- Human resource bottleneck

### Solution

- Developed an AI text mining system
- The system uses Natural Language Processing (NLP) and Machine Learning (ML) technology to extract useful text information from those non-structural and free style documents

### Results and benefits

- Process >1,000,000 documents per day
- Achieve >95% accuracy



An aerial photograph of a city construction site. In the foreground, a large building is under construction, covered in blue safety netting. To the left, several completed high-rise apartment buildings stand. In the background, green hills are visible under a blue sky with some clouds. A road and a railway track run along the bottom right of the frame.

## 9. Quality Assurance in Construction

How to **discover issues** from tremendous amount of inspection reports **automatically**?

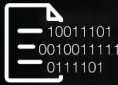
# Hong Kong Property Developer

➤ Discover problems from a tremendous amount of document

## Applications:



Text  
Classification



Entity  
Extraction



AI Recommendation  
System

## Issues and challenges

- To process **over 1,500 “Request for Inspection and Survey Checks (RISC) form”** per month for each construction site.
- Checking and verification only by **manual sampling**
- **Incorrect endorsement** happens from time to time resulting in high cost to rectify

## Solution

- Developed an **AI Pre-approval and cross-checking system** to automate the process
  - By employing **sentiment analysis** Identify quality issues captured in the RISC forms, and recommends outcome
  - Counter-check if a RISC form has been endorsed incorrectly and allow user to retain the model to increase the accuracy

## Results and benefits

- **Significantly improve the quality of processing RISC forms**
- **Identify potential problems form RISC forms**
- **Achieving > 95% accuracy**





Demand  
Forecasting



Staff  
Rostering



Job  
Assignment



Work Plan  
Optimization



Predictive  
Analytics

BUSINESS CASE

# AN END-TO-END AI SOLUTION

For Transforming Maintenance Operations



**Bloomberg**

APAC **CIO** Outlook 25 MOST RECOMMENDED  
**ARTIFICIAL INTELLIGENCE**  
COMPANIES - 2017







## The Major Challenge: Labor Shortage



# The Problem

## Very Complex Operational Problem!

**1,500+**

buses



**15+**

components

To be maintained



**45**

locations

for parking



**3**

hours

time window





**Demand  
Forecasting**



**Staff  
Rostering**



**Job  
Assignment**

## The Integrated AI Solution



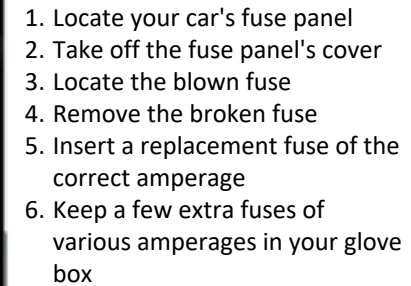
**Work Plan  
Optimization**




**Predictive  
Analytics**



# Where to go?





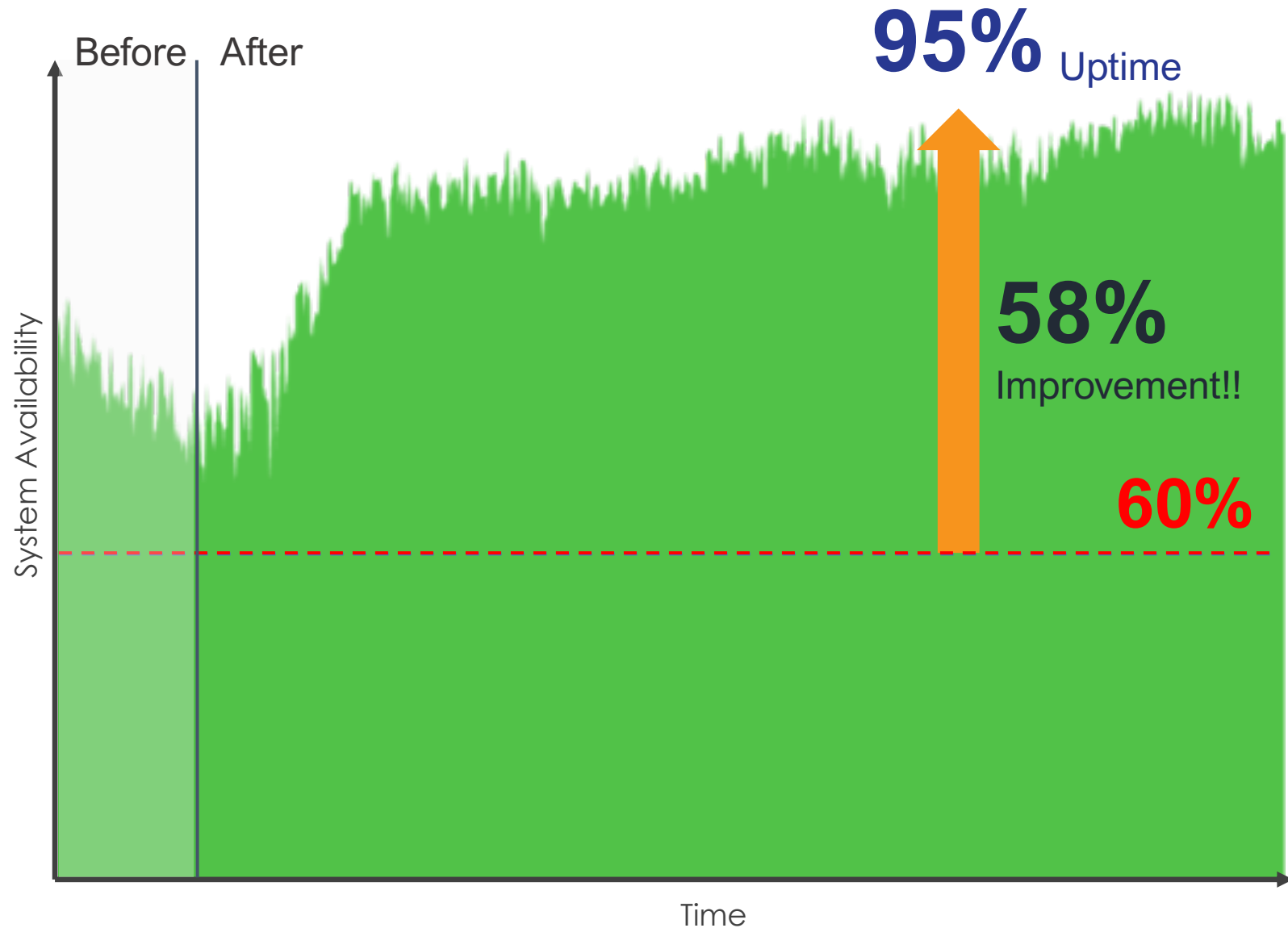
**Blue-collar industries are facing  
a massive **skills shortage****

SOURCE: <https://youtu.be/R3M2TIMSg9E>



# Improvement after 4 months adoption

1,500  
Buses




**Do More With Less**

**Overall Cost Reduction**

**45%** 

**Fixed more systems**

**35%** 

**Efficiency**

**Higher Uptime**

**58%** 

**Stability**



# Key Takeaway

## People

**Upskilling** and creating **new career paths** to improve employer value proposition

## Performance

Improving the company **profitability** and **operational efficiency**

## Process

Making the business process **simple** and **efficient**

Combining **Human** Intelligence &  
**Machine** Intelligence  
is the **KEY** to **success!**

**WE OPTIMIZE  
YOUR BUSINESS  
WITH AI!**

**Thank you**

Spencer Fung  
sfung@optix.com.hk