INFORMATION FORAGING

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JAN 1999

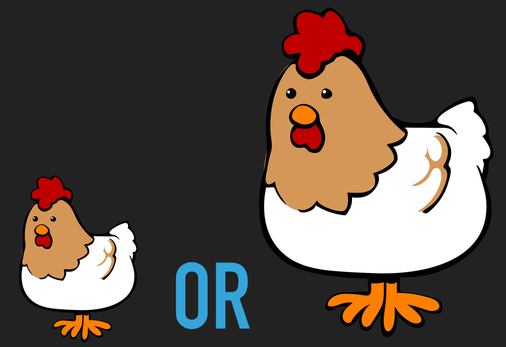
PRESENTED BY SHUANGLI

OPTIMAL FORAGING THEORY

THE ORIGIN AND INSPIRATION OF INFORMATION FORAGING THEORY

- WHAT TO EAT
- WHERE (TO FIND FOOD) TO EAT
- WHEN TO LEAVE FOR FINDING NEW FOOD

CHARNOV'S MARGINAL VALUE THEOREM



OR

INFORMATION FORAGING THEORY

JUST FLIP A WORD, THAT EASY OR MAYBE NOT

FOOD FORAGING		INFORMATION FORAGING
WHERE TO EAT WHAT TO EAT	DECIDES	WHERE TO READ WHAT TO READ
ENERGY GAINED PER UNIT TIME OR EFFORT	MAXIMIZE	VALUABLE INFORMATION GAINED PER UNIT TIME OR EFFORT
LOCATING PREY AND FOOD SOURCE	CONSTRAINT	ACCESS COST OF INFORMATION

PIROLLI & CARD REPEAT THEMSELVES, FREQUENTLY, ESPECIALLY WHEN REINFORCING THE ANALOGY TO OPTIMAL FORAGING THEORY IN THE DOMAIN OF BIOLOGY. INITIALLY, THIS WAS HELPFUL AS IT PROVIDES A GOOD FRAME OF REFERENCE (I AM FAMILIAR WITH FORAGING THEORY HAVING WORKED ON ANT FORAGING SIMULATION MODELS MANY YEARS AGO), BUT AT A CERTAIN POINT IT BECOMES TIRESOME AND SEEMS TO ADD MORE NOISE THAN SIGNAL.

Dylan Lukes

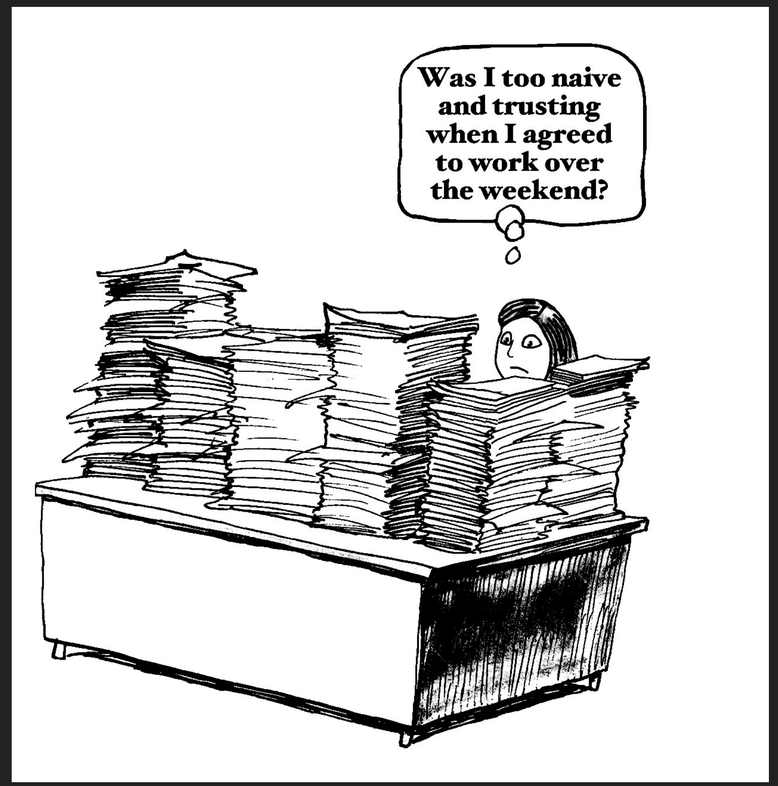
DISCUSS

- What is one thing that you can think of that makes human searching for information different from animals searching for food?
- How will this impact our optimization problem?

"THERE'S ONLY SO MUCH INFORMATION TO BE GAINED BY ONE PERSON FROM A SINGLE SOURCE BEFORE THE SOURCE IS SATURATED. HOWEVER, UNLIKE WITH ANIMAL FOOD RESOURCES, THE INFORMATION PATCH STILL HOLDS USEFULNESS FOR OTHER PEOPLE."

Aishma

PATCH MODEL

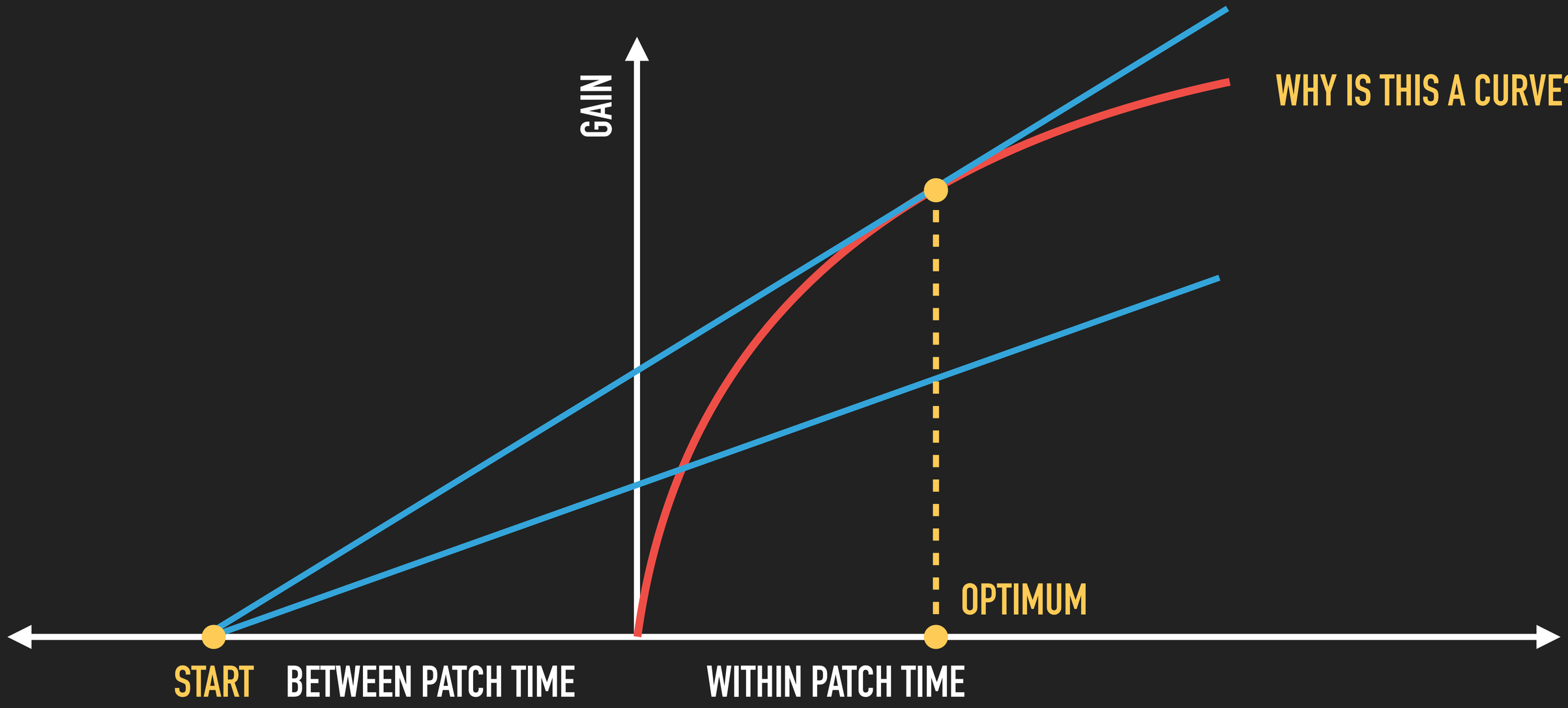


- ENERGY COMES IN PATCHES
- CERTAIN COST TO SWITCH BETWEEN PATCHES
- EACH PATCH HAS DIFFERENT PROFITABILITY FUNCTION
- A CRITICAL PROBLEM IS WHEN TO LEAVE A PATCH

PATCH MODEL

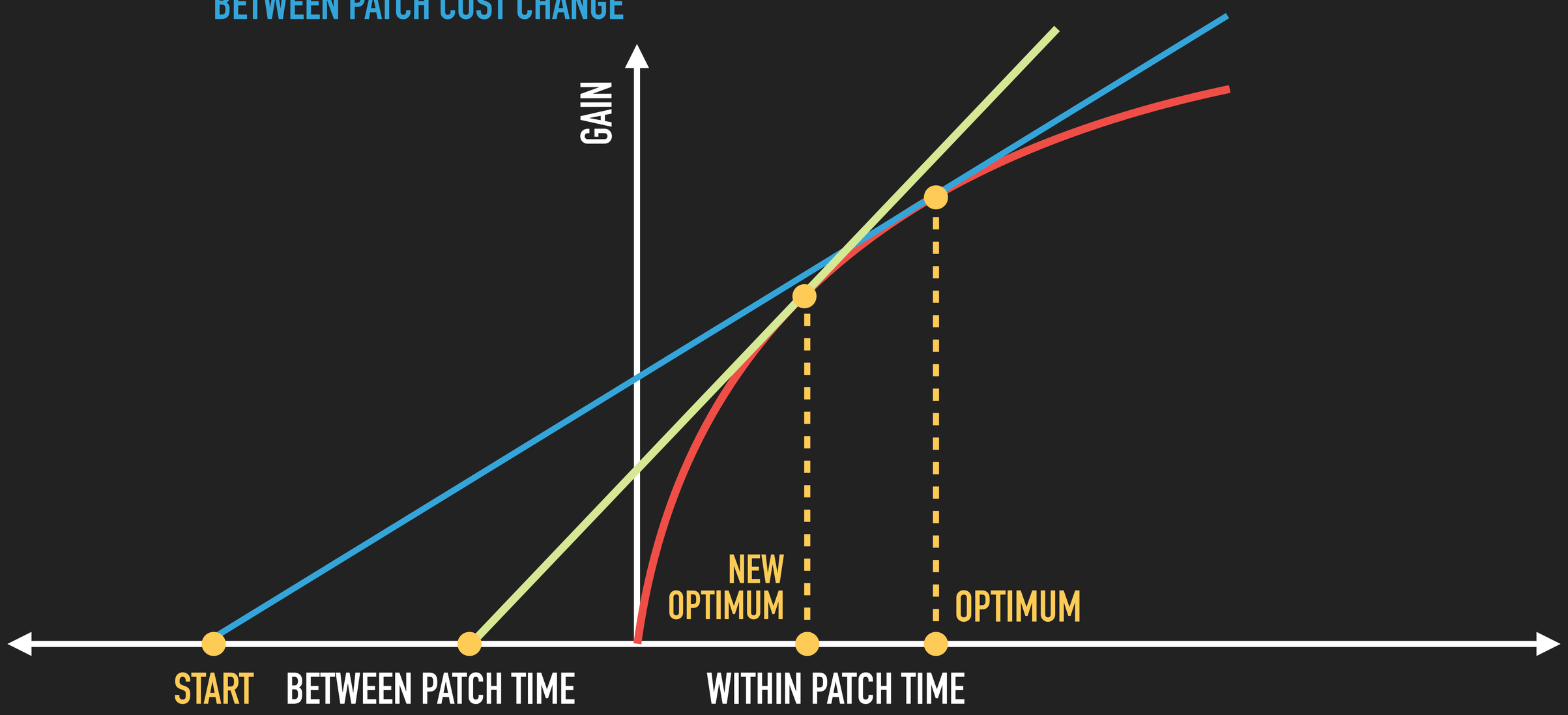
- MINIMIZE BETWEEN PATCH FORAGING COST
- MAXIMIZE WITHIN PATCH FORAGING RESULTS

CHARNOV'S MARGINAL VALUE THEOREM



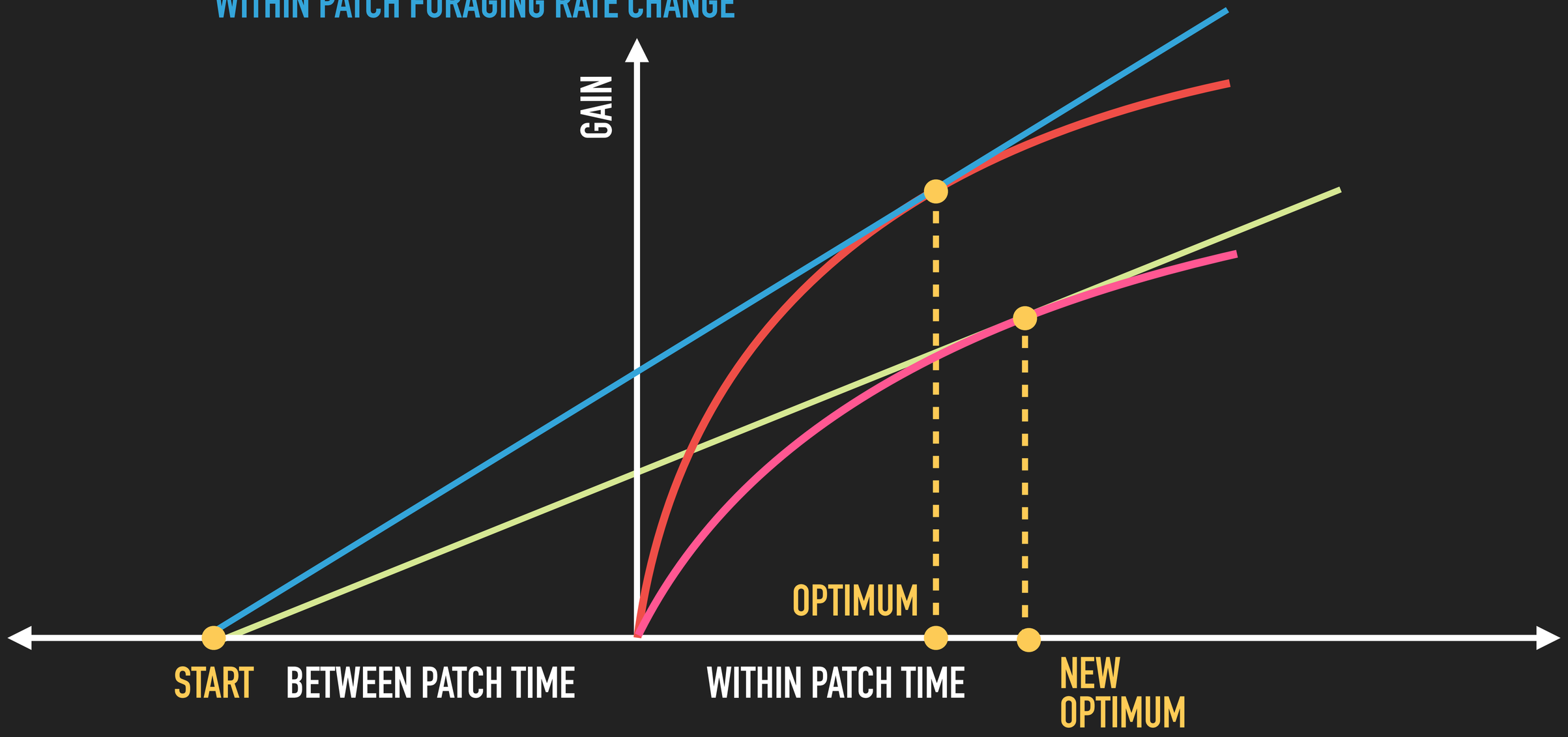
CHARNOV'S MARGINAL VALUE THEOREM

BETWEEN PATCH COST CHANGE



CHARNOV'S MARGINAL VALUE THEOREM

WITHIN PATCH FORAGING RATE CHANGE



CHARNOV'S MARGINAL VALUE THEOREM

- Charnov's Marginal Value Theorem states that the rate-maximizing time to spend in patch, t*, occurs when the slope of the within-patch gain function is equal to the average rate of gain, which is the slope of the tangent line.
- The average rate of gain increases with decreases in between-patch time costs.
- Improvements in the gain function also increase the average rate of gain.

DISCUSS

- What How modern technologies/inventions affect the patch model? (Obviously we do not usually have to deal with piles of physical documents now)
- How online search engines facilitates/impair people's ability to demonstrate IFT?

INFORMATION DIET AND SCENT FOLLOWING

FORAGER

SPECIALIZED

SPEND ALL TIME LOOKING FOR THE PATCH WITH HIGHEST VALUE

GENERALIZED

SPEND ALL TIME PROCESSING PATCH WITH LOW QUALITY INFORMATION

INFORMATION DIET AND SCENT FOLLOWING

PRINCIPLE :
ADD A PATCH TYPE ONLY IF IT IS MORE PROFITABLE THAN THE AVERAGE RATE OF GAIN OF THE PATCHES IN YOUR DIET

SCENT FOLLOWING

NAVIGATION THROUGH SPACE REQUIRES _____ ?

INFORMATION SCENT IS THE IMPERFECT PERCEPTION OF THE VALUE COST & ACCESS PATH OF INFORMATION SOURCES OBTAINED FROM PROXIMAL CUES

DISCUSS

- What serves as “scent” when you do an online search?
- Is “scent” still important nowadays? Do technologies like search engine and smart digest diminish the importance of “scent following”?

FIELD STUDY WHY?

KNOWLEDGE CRYSTALLIZATION TASKS

GATHERS INFORMATION FOR SOME PURPOSE, MAKES SENSE OF IT, THEN PACKAGES IT INTO SOME FORM FOR COMMUNICATION OR ACTION

BUSINESS INTELLIGENCE NEWSLETTER

STRATEGIC MANAGEMENT ANALYSIS

BUSINESS INTELLIGENCE NEWSLETTER

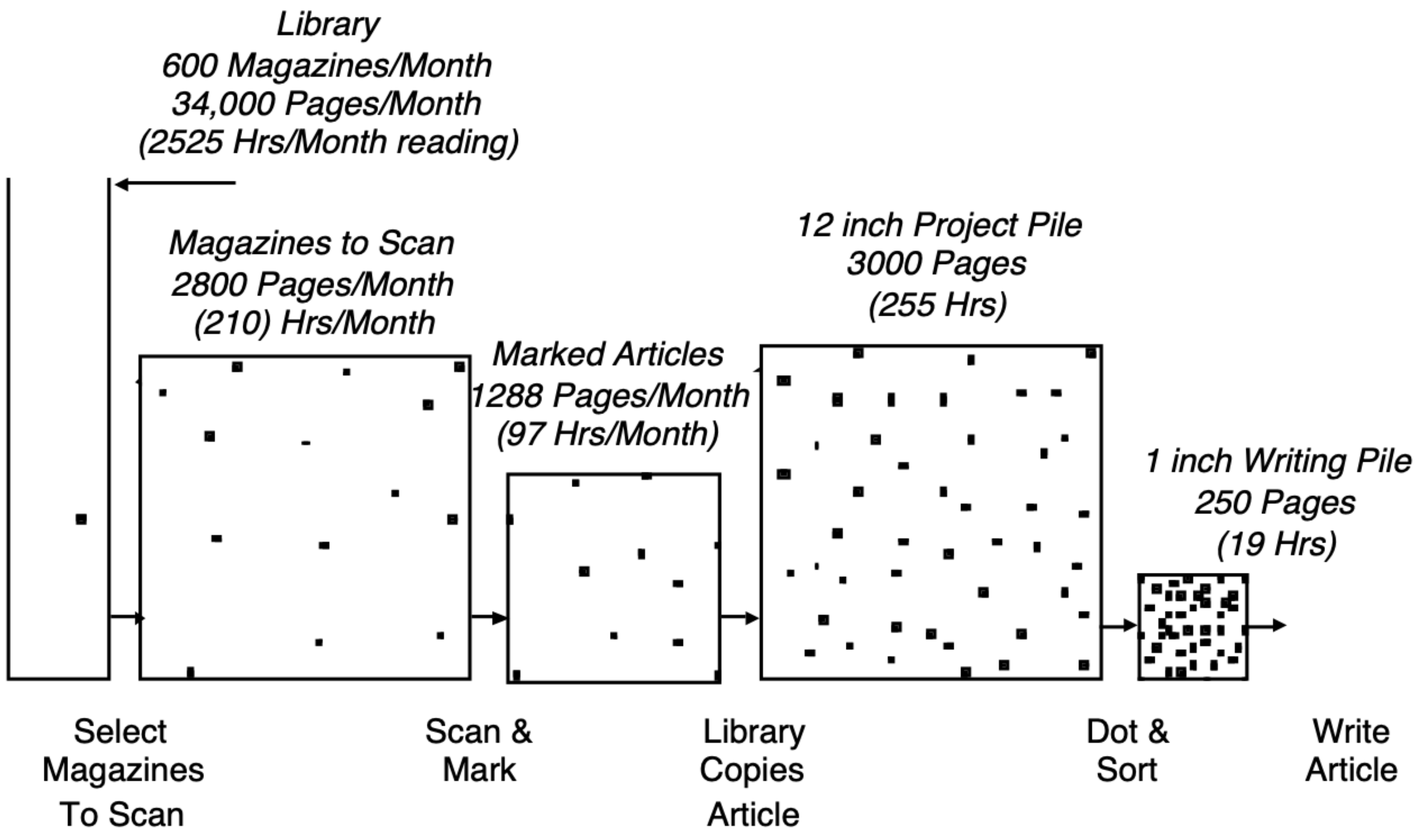


Figure 1. Condensed information flow for Business Intelligence Newsletter example. Width indicates time investment in activities, height indicates total documents, dark fill indicates relevant documents, and white fill indicates irrelevant documents.

PHYSICAL LAYOUT OF THE WORKSPACE

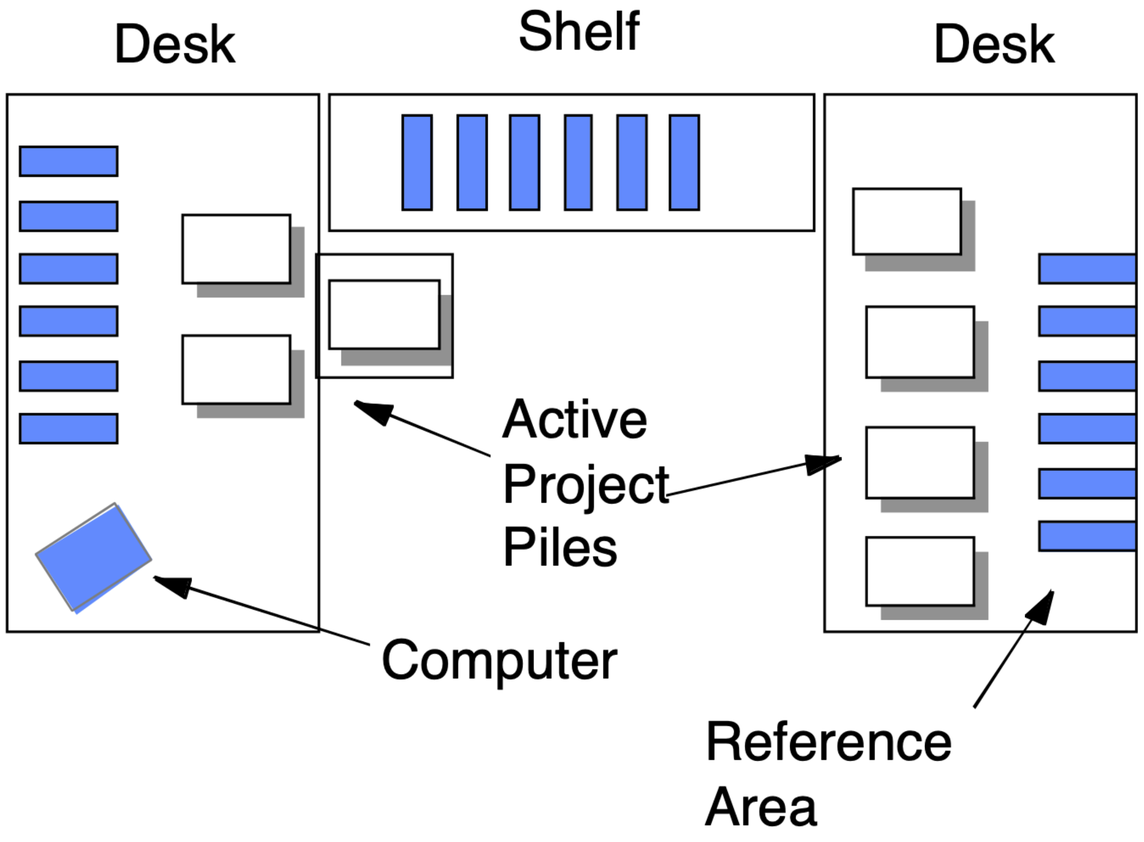
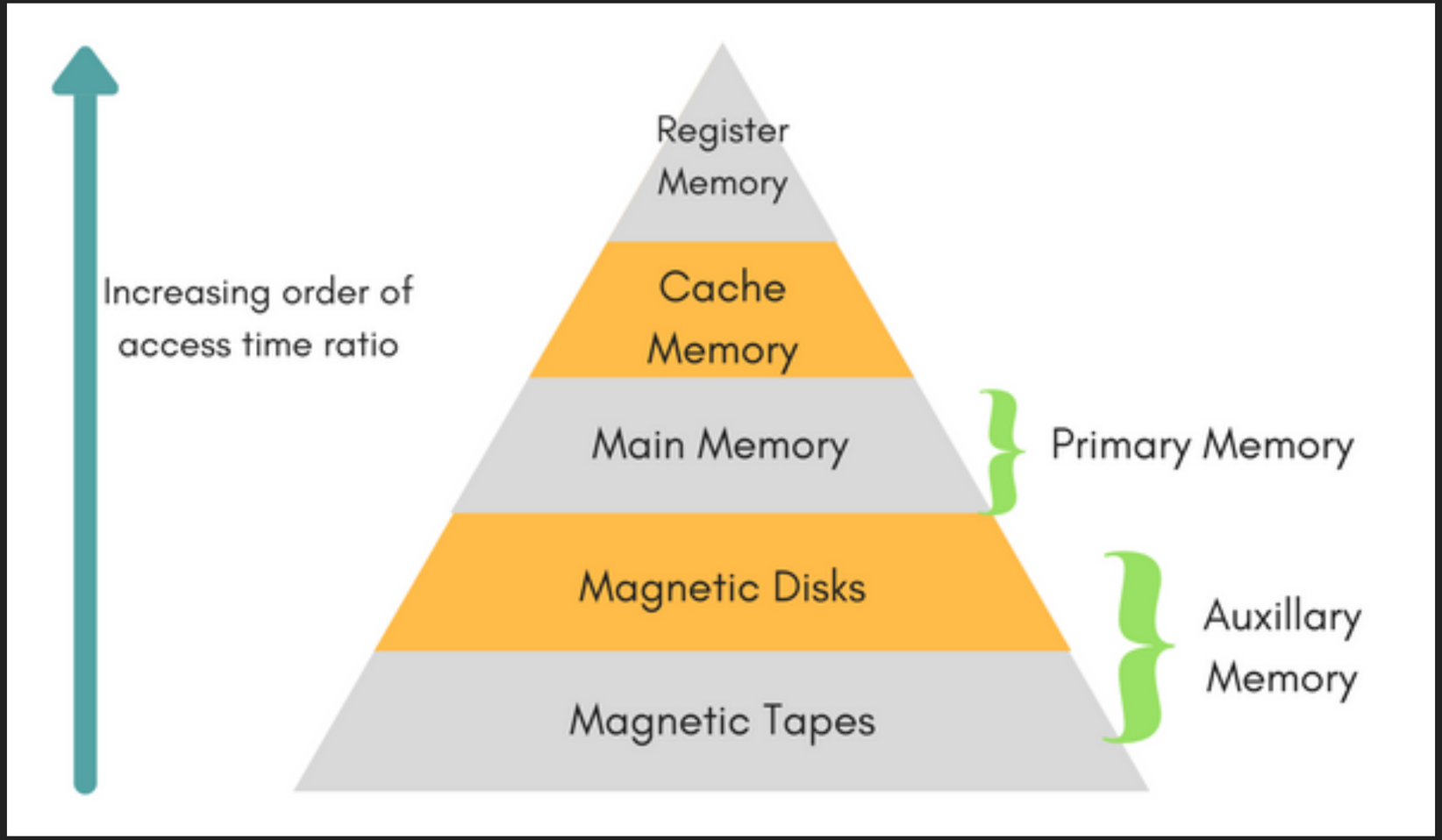


Figure 2. Schematic layout of the Business Intelligence office.

DOCUMENTS AND RESOURCES WERE ARRANGED SUCH THAT THOSE WITH HIGHER FREQUENCY OF ACCESS ARE PLACED IN AREAS THAT HAS LOWER COST OF ACCESS

MEMORY HIERARCHY IN COMPUTER ARCHITECTURE

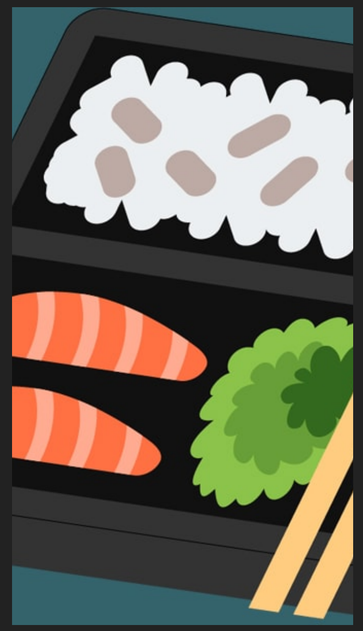


IN ORDER TO COUNTERACT THIS, THE POINT THAT MODERN TECHNOLOGY IS PROPELLING AND REWARDING THE FAST ACCUMULATION OF INFORMATION WHILE NOT FOSTERING ANALYTIC SKILLS MUST BE TAKEN INTO FURTHER CONSIDERATION. IT IS UNCLEAR WHETHER THE SPEED OF INFORMATION ACQUISITION IS OF ULTIMATE BENEFIT OR DETRIMENT, BUT THIS PAPER IS ADMIRABLE IN THAT IT DEMONSTRATES THE CORE HUMAN BEHAVIOR OF INFORMATION COLLECTION DURING THE PROCESS OF TASK SOLUTION.ION BASED UPON SPEED OF INFORMATION FORAGING.

Maxwell Bland

DISCUSS

- Will information foraging theory still hold in the future? Or will it go down in flames as technology taking over and speeding up the searching process?
- How will this affect our inherent ability to follow “information scent” and demonstrate IFT?
- What are the aspects that technology cannot solve?



BENTO BROWSER

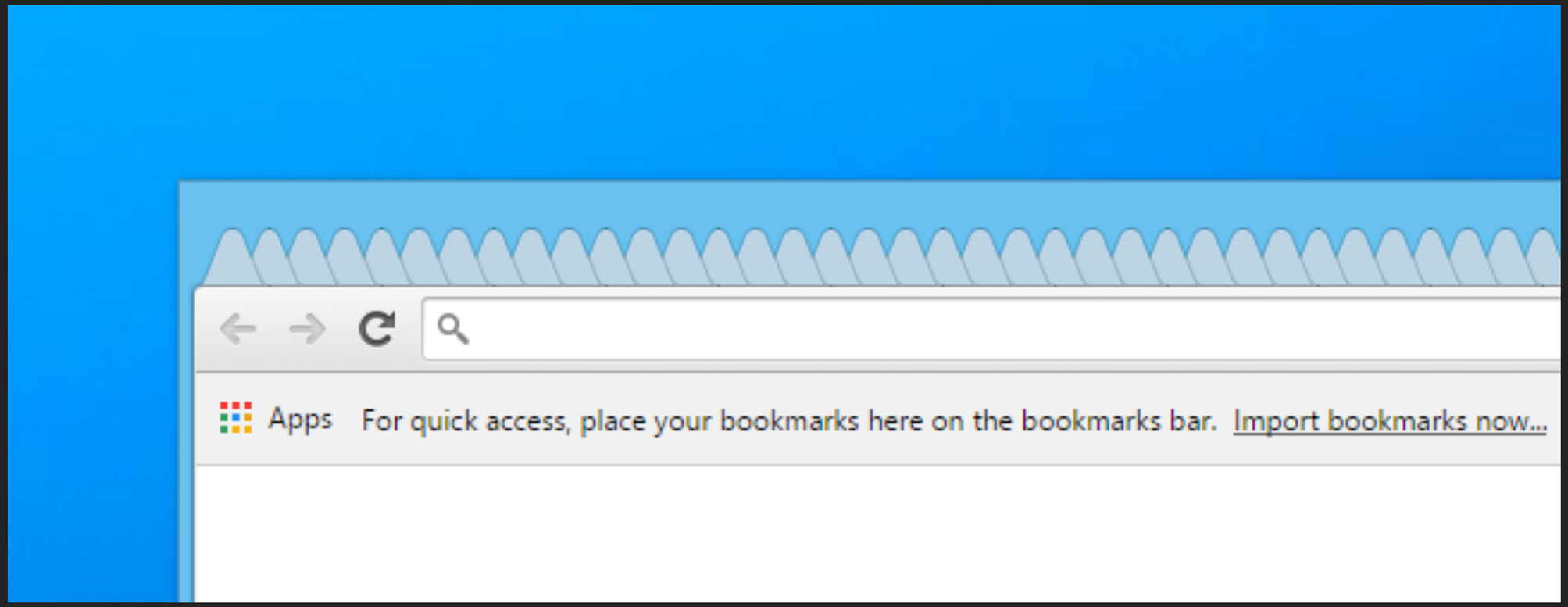
NATHAN HANN, JOSEPH CHEE CHANG, ANIKET KITTUR

JAN 2018 – 19 YEARS AFTER PREVIOUS PAPER

PRESENTED BY SHUANGLI

AIMED TO SOLVE MOBILE SENSE-MAKING PROBLEM

COMPLEX SEARCHES THAT SERVE TO SOLVE A CERTAIN PROBLEM LIKE PLANING A TRIP TO ALASKA



DEMO

DISCUSS

- How current tab based browsers impair people's demonstration of IFT? Can you propose a solution? (recall: patch model, scent etc.)
- Though what ways did bento solve these problem (or not)?

SOLUTION

MUTABLE MOBILE SENSE MAKING WORKSPACE

INSPIRED BY MOBILE MAIL INBOX

2 MAJOR INTERFACES

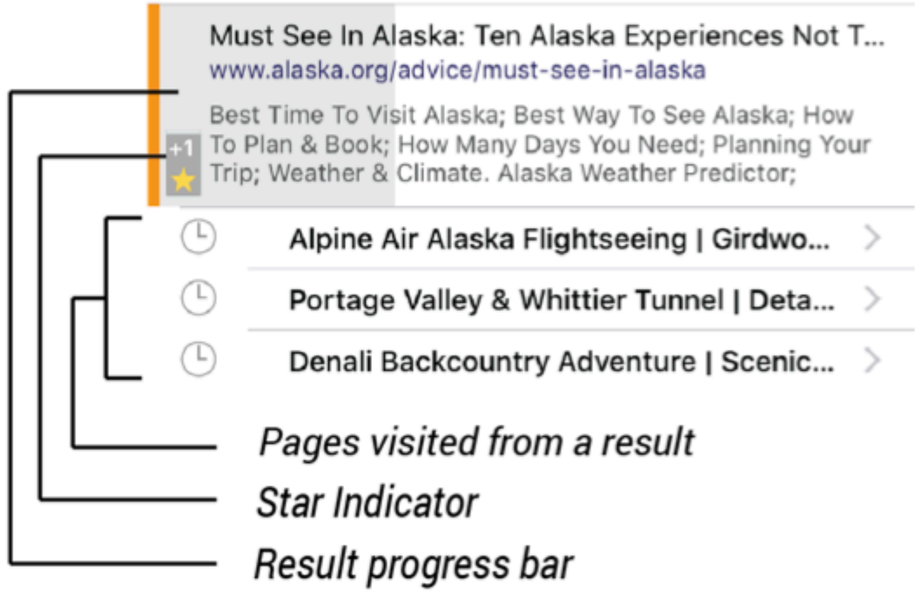


Figure 2. The different manipulations that can be applied to a search result

TRIAGE INTERFACE

PROGRESS VIEW | STAR A PAGE | PAGES VISITED FROM A STARTING PAGE

TASK MANAGEMENT INTERFACE

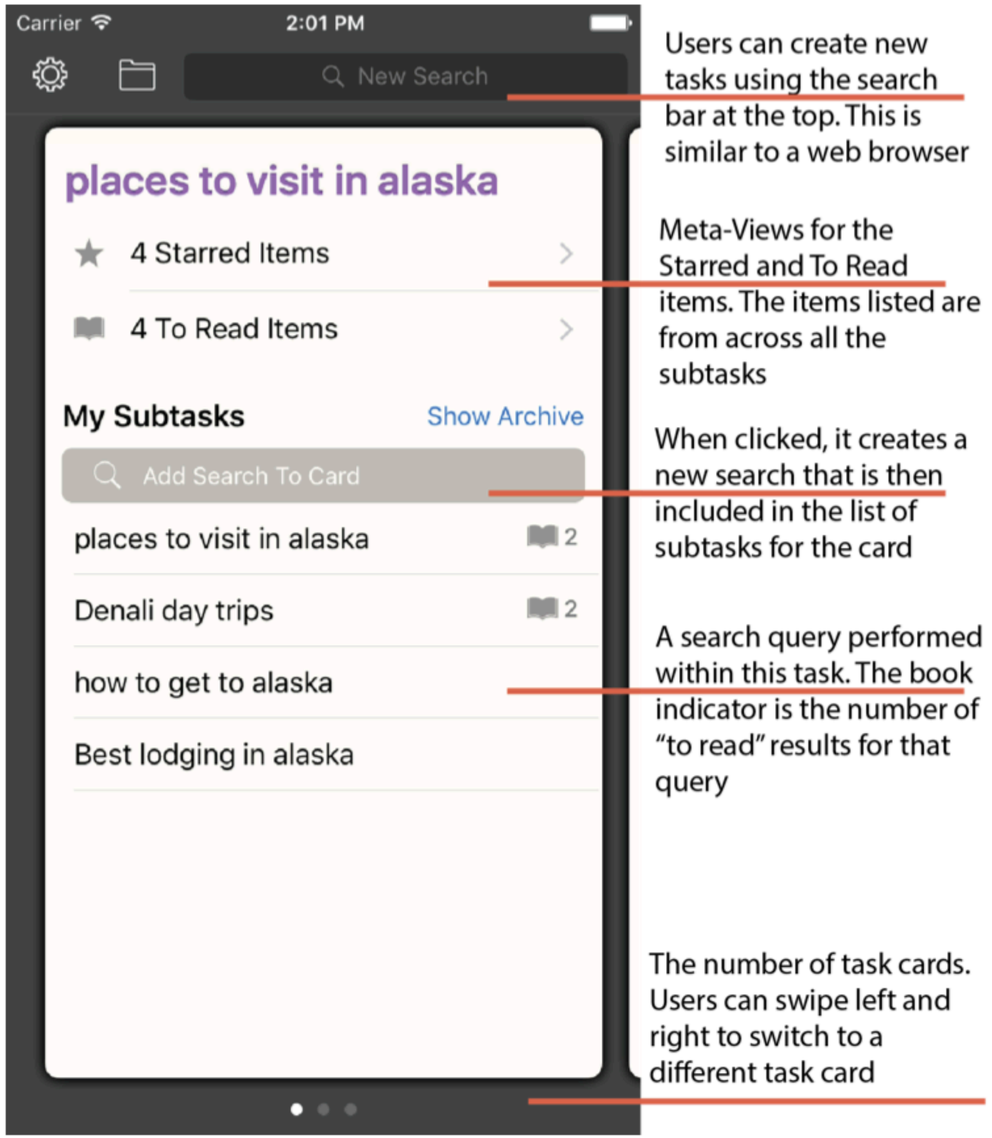


Figure 3. The task screen for the task "Places to go to Alaska"

CREATE TASK | META VIEW OF IMPORTANT PAGES | TASK CARDS THAT CONTAINS MULTIPLE QUERIES

USER STUDY IN A SIMPLE GLANCE

Question	Study 1 Mean	Study 1 CI	Study 2 Mean	Study 2 CI	Study 3 Mean	Study 3 CI
Which tool did you like better	3.15	[2.45, 3.85]	3.125	[2.18, 4.06]	3.01	[1.94, 3.89]
Which one was easier to create new searches in?	3.4	[2.82, 3.98]	3.126	[1.99, 4.26]	3.38	[2.76, 3.99]
If you wanted to keep searching later, which tool would be better for picking up where you left off?	4.15*	[3.66, 4.64]	4.25*	[3.38, 5.12]	4.44*	[4.05, 4.83]
Which tool makes you feel more at peace?	2.9	[2.16, 3.64]	2.63	[2.01, 3.25]	2.69	[2.05, 3.32]
Which tool makes your information more organized?	4.25*	[3.91, 4.59]	4.13*	[3.43, 4.82]	4.25*	[3.89, 4.61]
I felt more effective using:	3.2	[2.56, 3.84]	3.125	[2.18, 4.06]	3.01	[1.94, 3.89]
It was easier to refind information with:	3.47	[2.96, 3.99]	4.13*	[3.30, 4.95]	3.31	[2.65, 3.98]
I felt more confident that I didn't miss any important sources of information with:	3.0	[2.39, 3.61]	3.38	[1.96, 4.78]	2.53	[1.89, 3.31]
* Significantly different based on 95% Confidence Interval						

Table 1. The direct comparison questions were asked on a 5-point likert scale. A higher score indicates preference for Bento Browser, while a lower score indicates preference for the Safari browser. A score of 3 indicated no preference for one over the other. This table covers Studies 1, 2, and 3.

GOOD CHART ? | BAD CHART ?

DISCUSS

- What is one good feature of bento browser that can be adapted to other applications/area?
- What is one thing you want to change about it?

IN THIS SENSE, I WOULD ALSO LIKE TO PROPOSE THAT DESIGN SHOULD NOT JUST BE ORIENTED AROUND THE INFORMATION FORAGING PERSPECTIVE OR TASK COMPLETION, BUT ALSO THE COMPREHENSION, AND PERHAPS, A PERSPECTIVE ORIENTED TOWARDS PREVENTING AUTO-OPTIMIZATION BASED UPON SPEED OF INFORMATION FORAGING.

Maxwell Bland

DISCUSS

- If the bento browser wants to improve not only the “foraging” part of the sense-making task but also some other aspects:
- What would be these aspects?
- What solutions will you propose?