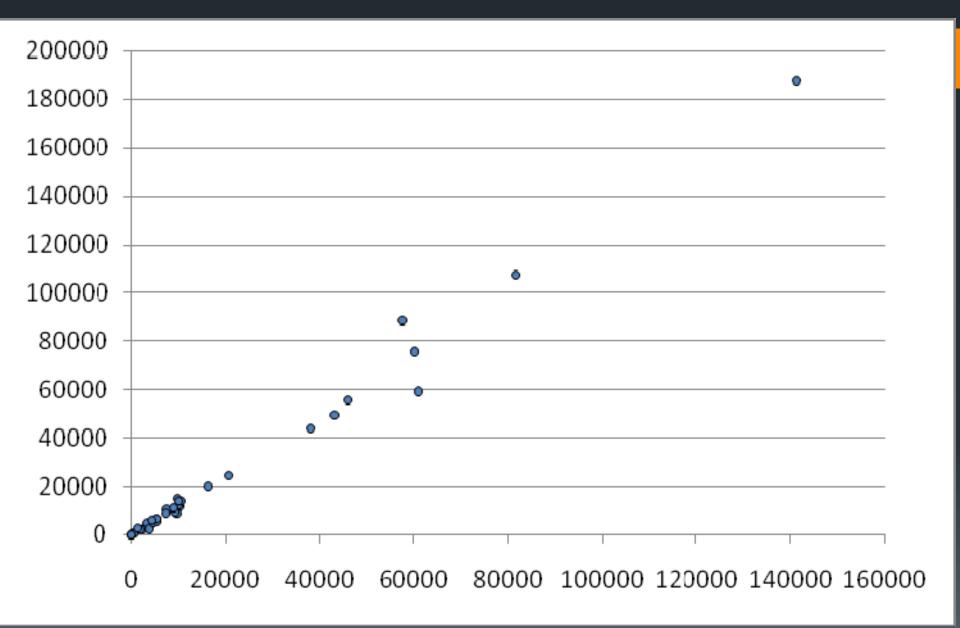# WATCH YOUR MIND! IT'S STATISTICS

WITH FOLLOWING REVEAL

WHAT IS STATISTICS?

THAT'S AN ART TO MAKE REASONABLE CONCLUSIONS USING SMALL SAMPLES OF DATA
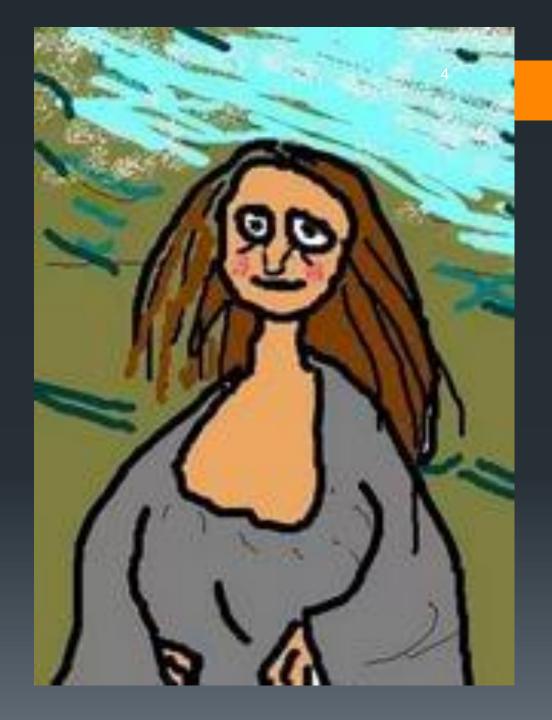
Y.TYURIN

WHAT IS STATISTICAL DATA?

ANYTHING YOU USE FOR EXTRACTING INFORMATION FROM

PICTURING IS A GREAT DEAL EXITING OCCUPATION,

IF ONLY YOU LIKE PENCILS. EVEN IF YOU DON'T KNOW GEOMETRY

BUT IF YOU LEARN A BIT MORE THAN JUST USING PENCILS…

FOR EXAMPLE ABOUT PERSPECTIVE OR SCALAR PRODUCT

5

LET'S CHECK YOUR IQ

Q1

ROBIN ⟷ BOBIN

HUMPTY ⟷ ????

Q2

STATISTICS ⟷ **PROB. THEORY**

???????? ⟷ **GEOMETRY**

HOW DOES IT WORK?

COMPARE DETERMINISTIC AND PROBABILISTIC WAYS

DETERMINISTIC WAY OF THINKING

GIVEN THAT 0<1 (TRUE),
PROVE: **1<2**.

FROM THE OTHER:
ASSUME (HYPOTHESIS) THAT **1 ≥ 2**.
IF SO THEN SUBTRACT 1 FROM BOTH PARTS:
0 ≥ 1.

THAT'S IMPOSSIBLE. CONTRADICTION.
THE ASSUMPTION IS REJECTED **FOR SURE**

STATISTICS IS LIFE.
LIFE IS NOT MUCH DETERMINISTIC

BRITISH SCIENTISTS HAVE JUST DISCOVERED

EVERYTHING IS POSSIBLE BUT A SIGNIFICANT PART OF EVERYTHING IS UNBELIEVABLE

Morinaga HI-CHEW
Grape & Green Apple
Ingredients:
Grape: Glucose syrup,Sugar,
Hydrogenated Palm Oil, Gelatin,
Concentrated Grape juice,
Acid, Grape flavor (Artificial),
Emulsifiers (Soy lecitin E322),
Natural color

Green Apple: Glucose syrup,
Sugar, Hydrogenated Palm Oil,
Gelatin, Apple jam, Concentrated
Apple juice, Acid, Apple flavor
(Artificial), Emulsifiers (Soy lecitin
E322), Natural color

Manufacturer:
Morinaga (Zhejiang) Co.,Ltd.,
Zhejiang, China

Importer/distributor:
Sino-Pacific Trading
(Thailand) Co.,Ltd.,
122/2-3 Nonsi road,
Chongnonsi, Yannawa,
Bangkok 10120
Tel: 02-681-5081
Net weight: 100g.

Under License of
MORINAGA & CO.,LTD.,JAPAN

4 902888 223211

Best Before (วัน/เดือน/ปี) :

21.12.2017/C1

ハイチュウ™

GRAPE   GREEN APPLE

f HI-CHEW THAILAND

โมรินากะ ไฮ-ชิว เกรฟ แอนด์ กรีนแอปเปิ้ล
(ลูกอมเคี้ยวหนึบ รสองุ่นและแอปเปิ้ลเขียว)
MORINAGA HI-CHEW GRAPE & GREEN APPLE
ส่วนประกอบที่สำคัญโดยประมาณ : กลูโคสไซรัป 47%,
น้ำตาล 40%, น้ำมันปาล์มผ่านกรรมวิธี 9%
น้ำองุ่นเข้มข้น 0.25%, น้ำแอปเปิ้ลเข้มข้น 0.25%,
แยมแอปเปิ้ล 0.3%, (อิมัลซิไฟเออร์ (INS 472c, INS 322),
สารทำให้คงตัว (เจลาตินชนิดรับประทานได้) สารควบคุม
ความเป็นกรด (INS 296, INS 330)) แต่งกลิ่นองุ่นสังเคราะห์
ข้อมูลสำหรับผู้แพ้อาหาร : เลซิตินจากถั่วเหลือง
ผู้ผลิต : โมรินากะ (เจ้อเจียง) คัมพานี ลิมิเต็ด เมืองเจ้อเจียง
ประเทศสาธารณรัฐประชาชนจีน
ผู้นำเข้าและจัดจำหน่าย : บริษัท ซิโน-แปซิฟิค เทรดดิ้ง
(ไทยแลนด์) จำกัด 122/2-3 ถ.นนทรี แขวงช่องนนทรี
เขตยานนาวา กรุงเทพฯ 10120 โทร. 02-681-5081

10-3-11523-1-5061   น้ำหนักสุทธิ 100 กรัม

GRAPE GUMMY

xio ®

น้ำหนักสุทธิ 100 กรัม

PRODUCT NAME: GRAPE GUMMY
NAMA PRODUK: GUMMY ANGGUR
INGREDIENTS: GLUCOSE, SUGAR, GELATINE,
CONCENTRATED FRUIT JUICE, SORBITOL,
CITRIC ACID & COLOURING (ALLURA RED E129, FD&T.
RED NO 40), ULLOUANI BLUE F133, FD&C BLUE NO 1),
RAMUAN: GLUKOSA, GULA, GELATIN, PEKAT JUS BUAH,
BUAHAN PEKAT, SORBITOL, ASID SITRIK & PEWARNA
PEWARNA BAHAN PERISA & KONDISIONER MAKANAN
YANG DIBENARKAN.
NET WEIGHT / BERAT BERSIH :
MADE IN MALAYSIA / BUATAN MALAYSIA
MANUFACTURED BY:
COCON FOOD INDUSTRIES SDN. BHD
NO. 3, LORONG AYAM DIDIK TAMAN RIAJAYA,
08000 SUNGAI PETANI, KEDAH, MALAYSIA.
TEL: 604-4412231, FAX: 604-4412235
BEST BEFORE :
BAIK SEBELUM :

09.01.2019

Nutrition Facts
Serving Size: 3.52oz (100g)

Amount per serving	
Calories 355	

	% Daily Value*
Total Fat 0g	
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 60mg	0%
Total Carbohydrate 88g	3%
Dietary Fiber 0g	29%
Sugars 78g	
Protein 1g	

Vitamin A 0%	Vitamin C 0%
Calcium 0%	Iron 0%

*Percent Daily Values are based on a 2,000 calories diet.
Your daily values may be higher or lower depending on
your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9   Carbohydrate 4   Protein 4

GIVEN: LIKELY EVENTS HAVE Pr ≥ 0,05 (MAY BE TRUE)

CHECK THE HYPOTESIS:

AT LEAST HALF OF CANDIES IN THE 2ND BAG ARE GREEN

IF SO THEN

Pr(PURPLE)<???

FROM THE SAMPLE:

Pr(5 PURPLE IN ROW)<???

THAT'S UNLIKELY!

THE HYPOTHESIS'S REJECTED **PRACTICALLY FOR SURE (ON THE CHOSEN LEVEL).**

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IF SO THEN

Pr(PURPLE)<0.5

FROM THE SAMPLE:

Pr(5 PURPLE IN ROW)<0.5^5 =1/32<0.05

THAT'S UNLIKELY!

THE HYPOTHESIS'S REJECTED **PRACTICALLY FOR SURE (ON THE CHOSEN LEVEL).**

LET'S COMPARE

DETERMINISTIC	PROBABILISTIC
AN ASSUMPTION	A HYPOTHESIS
LOOKING FOR A CONTRADICTION WITH THE ASSUMPTION	LOOKING FOR A UNLIKELY EVENT WITH THE HYPOTHESIS
IF FOUND: THE ASSUMPTION IS WRONG FOR SURE	IF : THE HYPOTHESIS REJECTED ON THE CHOSEN LEVEL (AFFORDABLE PROBABILITY)
IF NOT FOUND: ?????????	IF NOT: ????????

LET'S COMPARE

DETERMINISTICD	PROBABILISTIC
AN ASSUMPTION	A HYPOTHESIS
LOOKING FOR A CONTRADICTION WITH THE ASSUMPTION	LOOKING FOR A UNLIKELY EVENT WITH THE HYPOTHESIS
IF FOUND: THE ASSUMPTION IS WRONG FOR SURE	IF : THE HYPOTHESIS REJECTED ON THE CHOSEN LEVEL (AFFORDABLE PROBABILITY)
IF NOT: **THE ASSUMPTION CAN'T BE REJECTED (DOESN'T MEEN IT'S TRUTH)**	IF NOT: **????????**

LET'S COMPARE

DETERMINISTIC	PROBABILISTIC
AN ASSUMPTION	A HYPOTHESIS
LOOKING FOR A CONTRADICTION WITH THE ASSUMPTION	LOOKING FOR A UNLIKELY EVENT WITH THE HYPOTHESIS
IF FOUND: THE ASSUMPTION IS WRONG FOR SURE	IF : THE HYPOTHESIS REJECTED ON THE CHOSEN LEVEL (AFFORDABLE PROBABILITY)
IF NOT: **THE ASSUMPTION CAN'T BE REJECTED**	IF NOT: **THE HYPOTHESIS CAN'T BE REJECTED ON THE CHOSEN LEVEL**

一次エネルギー総供給 と CO2排出量

$\hat{R}$= 0,8

PROBABILISTIC WAY OF THINKING

GIVEN: LIKELY EVENTS HAVE Pr ≥ 0,05

CHECK THE HYPOTESIS:

ENERGY SUPPLY AND CO_2 EMISSION ARE INDEPENDENT VALUES

IF SO THEN $R = 0$

FROM THE SAMPLE: $\hat{R} = 0,8$

$$Pr(|\hat{R}| \geq 0,8) < 0,05$$

THE HYPOTHESIS'S REJECTED

TYPES OF STATISTICS

DATA REPRESENTATION

DESCRIPTIVE STATISTICS

MATH STATISTICS (VERIFICATION, MODELLING) – NEEDS PROB.THEORY

JUST SO STATISTICS (AS A SORT OF ENTERTAINMENT)

TYPES OF STATISTICS

DATA REPRESENTATION

DESCRIPTIVE STATISTICS

SEARCHING AND POSING HYPOTHESES

DO NOT MIX, PLEASE

MATH STATISTICS USING PT (VERIFICATION, MODELLING)

JUST SO "STATISTICS" (AS AN ENTERTAINMENT OR CHEATING)

MAKING HYPOTHESES
INTERESTING, EXITING, EDUCATIONAL, DEVELOPING

VERIFYING HYPOTHESES
IMPOSSIBLE UNTIL WE USE PR.THEORY

MAKING CONCLUSIONS FOR SURE
HARMFUL, DISTRACTING, CREATING FALSE IMAGINATIONS

SO, LET US:

- **ENJOY STATISTICS WITHOUN PRETENDING WE APPLY 'A SCIENTIFIC METHODS'**

- **KEEP AND DEVELOP CRITICAL REASONING**

- **UNDERSTAND THE NATURAL BOUNDARIES OF OUR RESEARCHS WITH STUDENTS**

- **LEARN ABOUT PROBABILITIES TO EXPAND OUR CAPABILITIES IN INVESTIGATING THE WORLD**

THANK YOU, FRIENDS

SCHOOL PROBABILITY LAB:
http://ptlab.mccme.ru