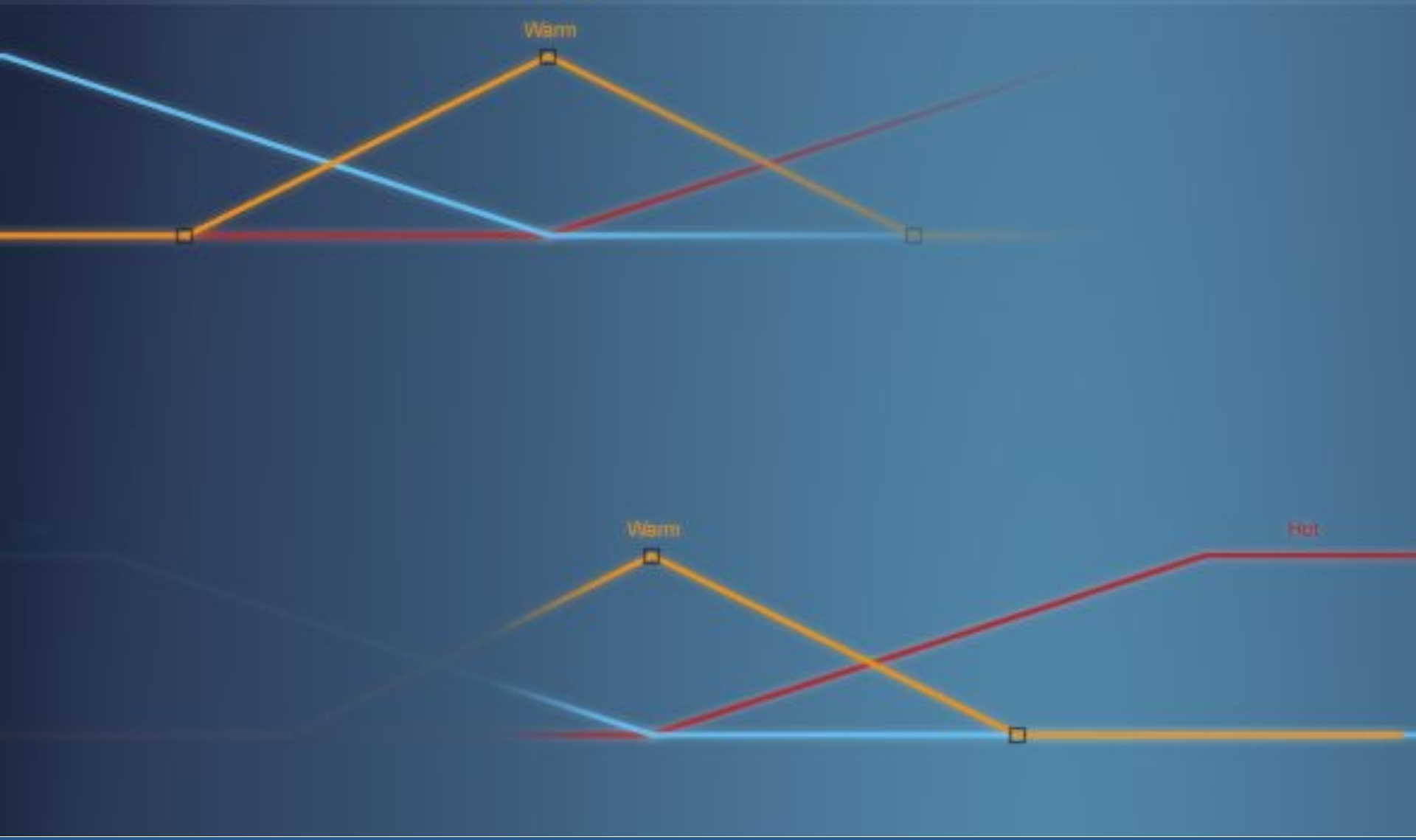

Un algoritmo basado en lógica difusa para detectar elementos de fraude en reclamaciones de seguro

Jean Felipe Oehrwald | 25.01.2017

Presentación y Documentación en GitHub

PacoAlbano

Master_Informatica_IC

Repository from the course Intelligence Computing,
Computer Science, University of Granada

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Artificial intelligence (AI)

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IBM Watson replaces 34 employees

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An insurance firm in Japan is replacing 34 claims adjusters with artificial intelligence. What does it mean for the future of work?

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- Organizaciones internacionales, expertos y consultores coinciden en que la automatización tendrá repercusiones sobre el empleo y la productividad

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By Brett Nuckles, Business News Daily Tech Editor | January 6, 2017 02:53 pm EST

18 10 5

Microsoft espera que la inteligencia artificial ayude, más no remplace a los trabajadores

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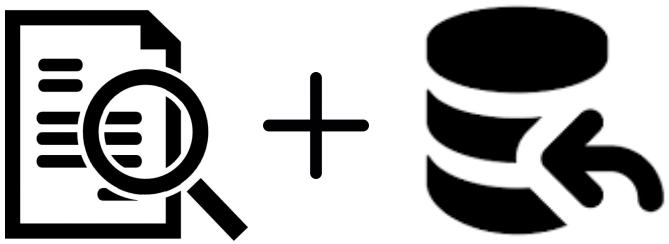
Debating Artificial Intelligence (AI)

Introducion

- Todas las compañías de seguros se enfrentan a los objetivos contradictorios de resolver las reclamaciones rápidamente
- El uso de ajustadores humanos en el proceso de liquidación de reclamaciones deja espacio para el juicio subjetivo.
- Se ha observado que existe la oportunidad de que los ajustadores de reclamaciones liquiden las reclamaciones de seguros a favor de los reclamantes simplemente por el colusión con el reclamante y sacrificando el interés monetario de los aseguradores.
- El creciente coste ha llevado a muchas empresas a desarrollar soluciones tecnológicas como sistemas expertos.

Un sistema experto basado en la lógica difusa que puede identificar y evaluar si hay elementos de fraude en la liquidación de reclamos de seguro.

El proceso de detección de fraude



Segundo Asesor

Base de Datos con mejores practicas

Revisa

Reclamación del primer asesor

$$X_1 = \frac{\sum_{i=1}^{I}\sum_{j=1}^{J(i)} W_{ij}\Delta_{ij}}{I}$$

1 = Totalmente diferente

0 = Ninguna diferencia

Índice de ambigüedad X_1 | Grado de información incompleta X_2 | Margen de evaluación utilizado en el acuerdo de reclamación X_3

e.g. $X_1 = 0.27$, $X_2 = 0.55$ and $X_3 = 0.40$

El sistema difuso experto trabaja con Tres variables:

Índice de ambigüedad (X_1)

- El índice de ambigüedad se da cuando una frase es susceptible de dos o más significados o interpretaciones.

Grado de información incompleta (X_2)

- El grado si los informaciones son completos

Margen de evaluación utilizado en el acuerdo de reclamación (X_3)

claim form

erika travel insurance

EF PROGRAM NAME

☐ High School Year ☐ Language Courses Abroad ☐ International Academy ☐ Other. Please specify

☐ Academic Year Abroad/AFS ☐ Language Travel ☐ Language learning Solutions

PERSONAL INFORMATION

First Name Last Name Date of Birth

Year Month Day

Address in home country

Street City Zip Code Country

E-mail address (only if the claims agent can contact you by e-mail) Phone number in home country (incl. area code)

Address in host country (host family or school)

Name Street Zip Code

Phone number in host country (incl. area code)

City State/Province Country

Erika Policy Number (printed on your Erika Travel Insurance Card) EF Booking Number

Start date of EF program (date of departure) End date of EF program

Year Month Day Year Month Day

What other insurance do you have?

Type of insurance Name of insurance company

BANK DETAILS (Please enter your bank details from your home country so we can reimburse you by wire transfer. Without these completed bank details, no payment can be made. If you are in the US and have more than 6 weeks left of your program, and want the refund in the US, you do not have to fill out the bank details. The refund will be sent via check to your US address.)

Account holder's name

Bank name Bank address

Account number

IBAN (You must contact your bank to get the 16-34 character IBAN number starting with the two character country code. Example: DE12 3456 7890 1234 5678 00)

SWIFT/BIC code (You must contact your bank to get the SWIFT, example: BNPAFRPCAN, or BIC number, example: CSQUH34567)

ILLNESS OR ACCIDENT CLAIM ☐ Illness ☐ Car Accident ☐ Other Accident

Date of accident or date illness began Date of first visit to the doctor or hospital

Year Month Day Year Month Day

Describe your illness or accident with as many details as possible, including where and how it occurred (add a separate paper, if needed)

Doctor currently treating you

Name Phone number

Have you seen a doctor for the same illness or condition in your home country?

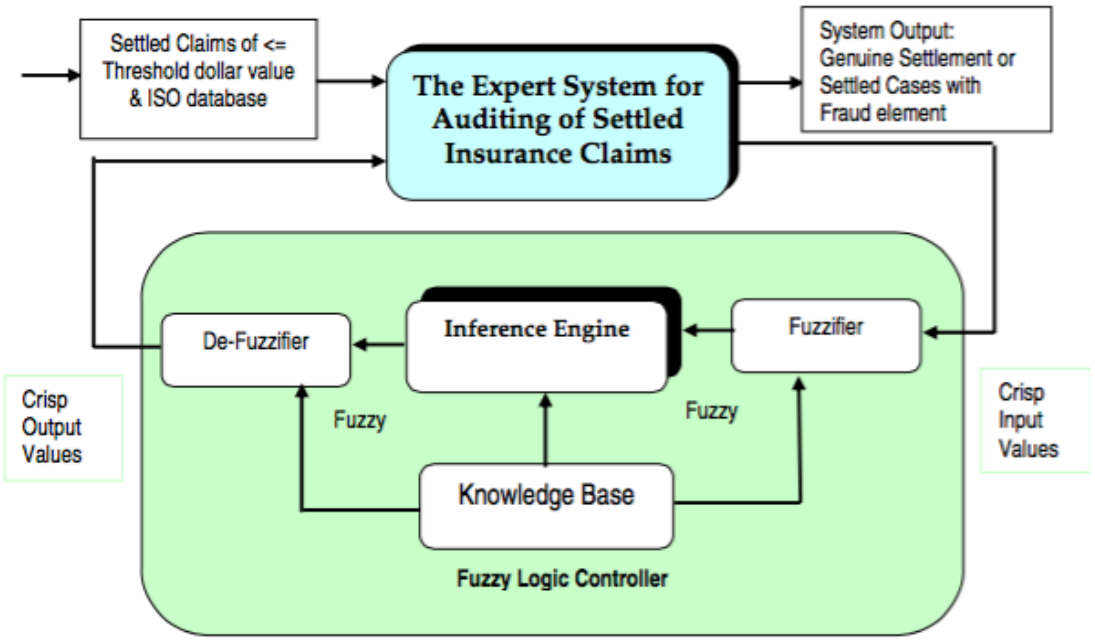
☐ Yes ☐ No If yes, when? Doctor's name Phone number

COSTS FOR TREATMENT (Attach original bills, receipts and reports with diagnosis)

Type of cost (doctor's visit, medicine etc.)	Amount and currency	Who paid the bill? *

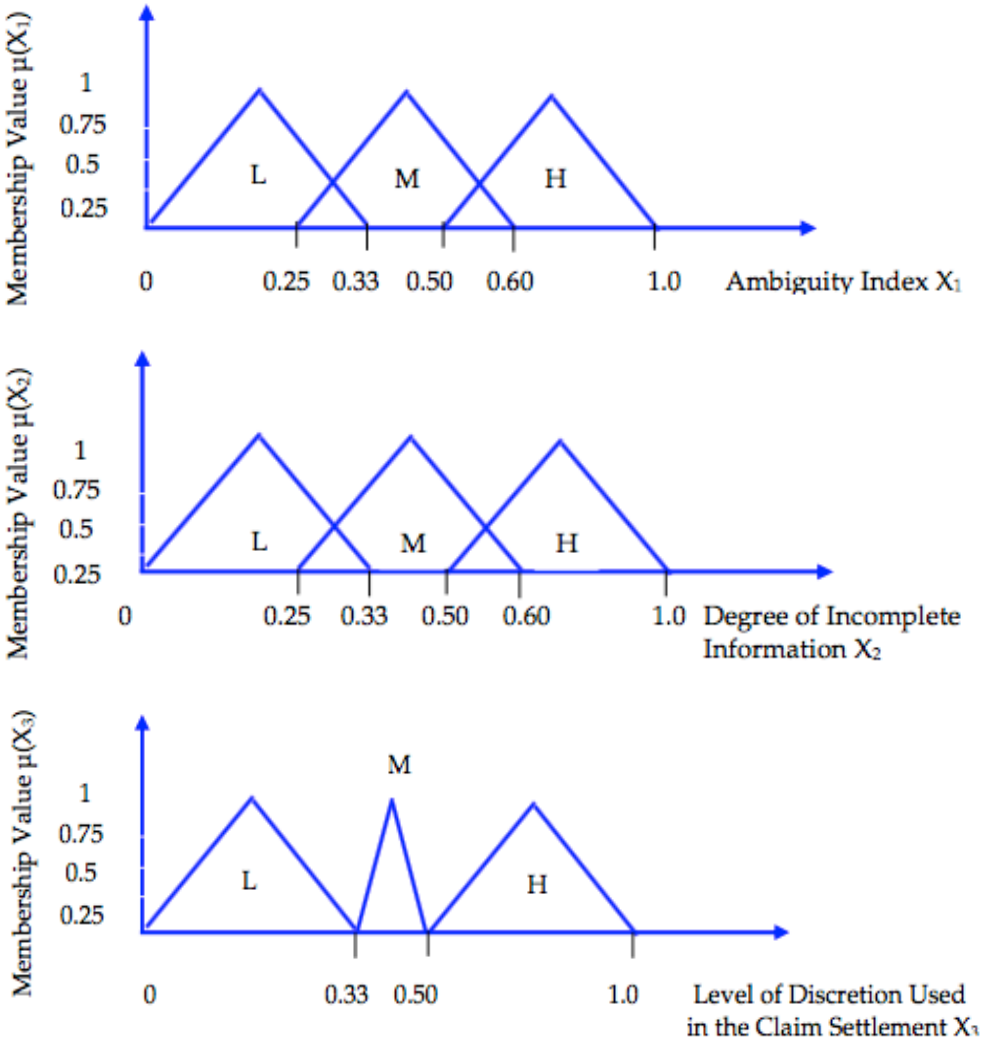
*) Payment will be made to your doctor or hospital, unless paid receipts are attached to the claim form.

Sistema difuso experto para detección de fraude



1. Convertir cada variable en números difusos
2. Mecanismo de inferencia que que trabaja con un base te reglas y que contiene FUZZY-IF-THEN reglas
3. Defuzzificacion con el método de centroide.
4. Output: Reclamación es verdadero o contiene elementos te fraude.

FUZZIFICAR



1. $X_1 = 0.27$, $X_2 = 0.55$, $X_3 = 0.40$

2. Memebership Function:
   Determine el grado de pertenencia de un valor en un conjunto difuso.

3. IF-THEN-RULES: Cada sistema experto basado en lógica difusa utiliza Fuzzy-IF-THEN reglas.

4. Output: Acuerdo verdadero (GENUINE SETTLEMENT) o Acuerdo con elemento de fraudes (ELEMENT OF SUSPECT)

Se aplican las siguientes reglas Basado en el valor de la membership function.

Regla 5:

- IF X_1 es BAJO y X_2 es MEDIO y X_3 es MEDIO THEN
  - *Y* es acuerdo verdadero (GENUINE SETTLEMENT)

Regla 8:

- IF X_1 es BAJO y X_2 es ALTO y X_3 es MEDIO THEN
  - *Y* es acuerdo con elemento de fraudes (SETTLEMENT WITH ELEMENT OF FRAUD)

Regla 14:

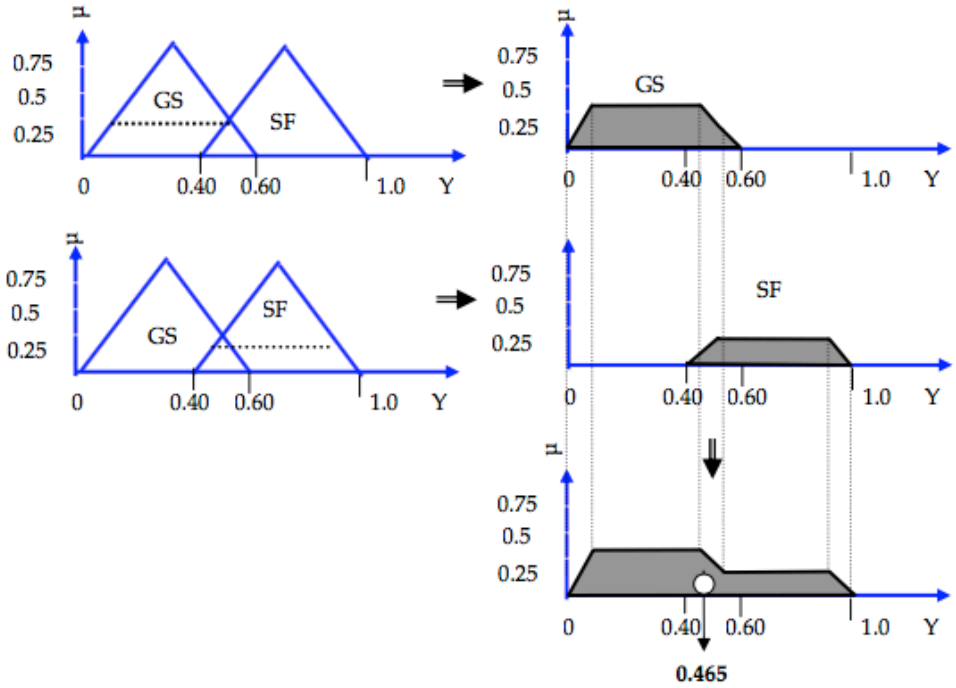
- IF X_1 es MEDIO and X_2 es MEDIO y X_3 es MEDIO THEN
  - *Y* es acuerdo verdadero GENUINE SETTLEMENT (GS).

Regla 17:

- IF X_1 es MEDIO y X_2 es ALTO y X_3 es MEDIO THEN
  - *Y* es acuerdo con elemento de fraudes (SETTLEMENT WITH ELEMENT OF FRAUD).

Rule No.	INPUTS			OUTPUT
	X_1	X_2	X_3	Y
1	Low	Low	Low	Genuine Settlement (GS)
2	Low	Low	Medium	Genuine Settlement (GS)
3	Low	Low	High	Settlement with Fraud Element (SF)
4	Low	Medium	Low	Genuine Settlement (GS)
5	Low	Medium	Medium	Genuine Settlement (GS)
6	Low	Medium	High	Settlement with Fraud Element (SF)
7	Low	High	Low	Genuine Settlement (GS)
8	Low	High	Medium	Settlement with Fraud Element (SF)
9	Low	High	High	Settlement with Fraud Element (SF)
10	Medium	Low	Low	Genuine Settlement (GS)
11	Medium	Low	Medium	Genuine Settlement (GS)
12	Medium	Low	High	Settlement with Fraud Element (SF)
13	Medium	Medium	Low	Genuine Settlement (GS)
14	Medium	Medium	Medium	Genuine Settlement (GS)
15	Medium	Medium	High	Settlement with Fraud Element (SF)
16	Medium	High	Low	Genuine Settlement (GS)
17	Medium	High	Medium	Settlement with Fraud Element (SF)
18	Medium	High	High	Settlement with Fraud Element (SF)
19	High	Low	Low	Genuine Settlement (GS)
20	High	Low	Medium	Genuine Settlement (GS)
21	High	Low	High	Settlement with Fraud Element (SF)
22	High	Medium	Low	Genuine Settlement (GS)
23	High	Medium	Medium	Settlement with Fraud Element (SF)
24	High	Medium	High	Settlement with Fraud Element (SF)
25	High	High	Low	Genuine Settlement (GS)
26	High	High	Medium	Settlement with Fraud Element (SF)
27	High	High	High	Settlement with Fraud Element (SF)

DEFUZZIFICAR



1. "Raíz suma cuadrados" método para combinar los efectos de todas las normas aplicables.
2. Se usa el "**fuzzy centroid algorithm**" para defuzzification. Basado el el **método de centroide** (Center of Area Method)
3. Combinando los resultados del proceso de inferencia y luego calculando el centroide difuso del área.
4. Finalmente, esta área se divide por la suma de las intensidades de la función de miembro ponderado y el resultado se toma como la salida.
5. Para nuestro ejemplo: **Reclamación es verdadero** (Genuine Settlement)

Referencias

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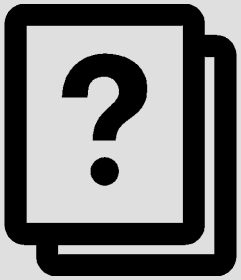
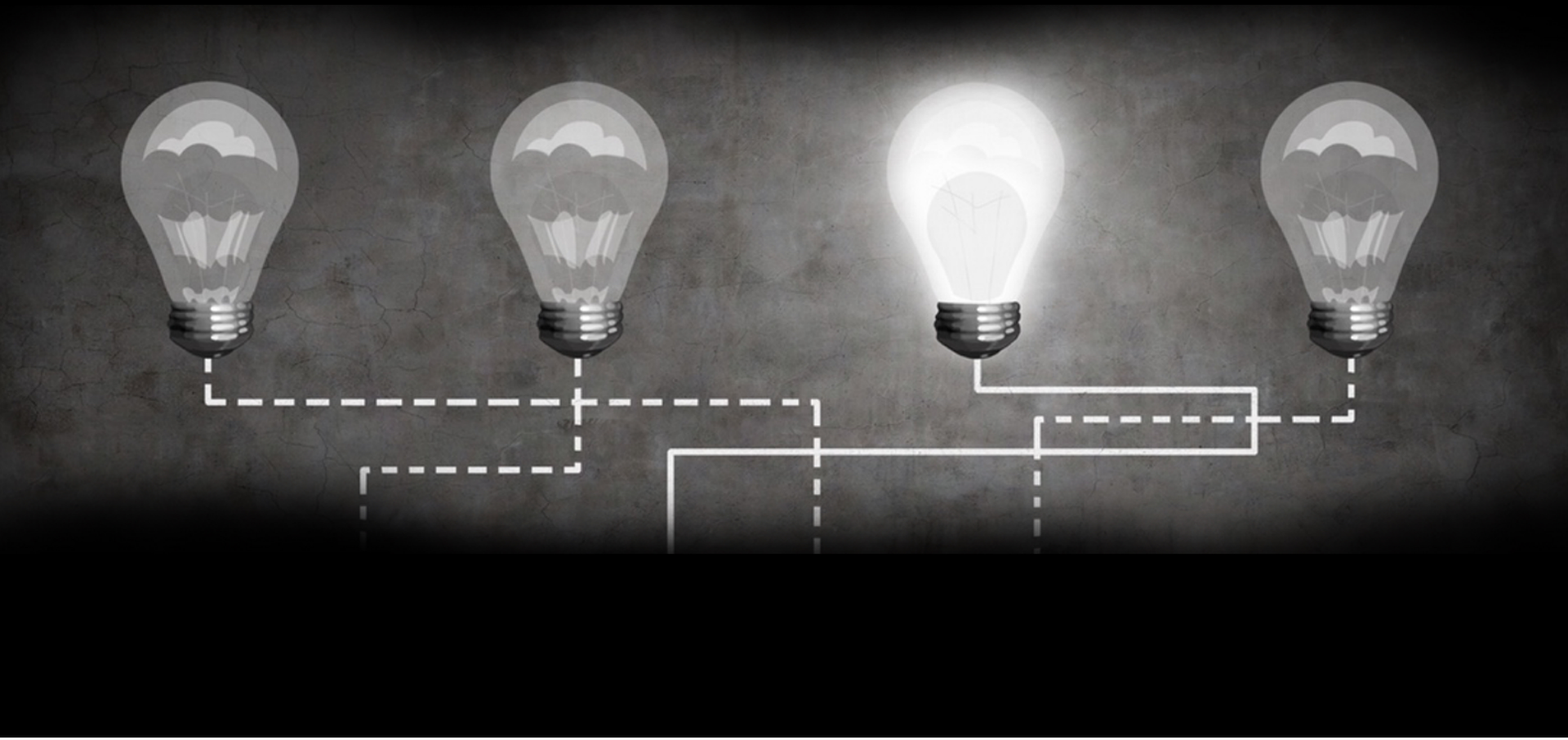
Pregunta de Debate



¿Reemplazaran las maquinas de inteligencia artificial el grueso te los trabajadores?



Gracias por su atención!

Jean Felipe Oehrwald