POSGRADO EN CIENCIA E INGENIERÍA DE LA COMPUTACIÓN

Universidad Nacional Autónoma de México

Aprendizaje automático

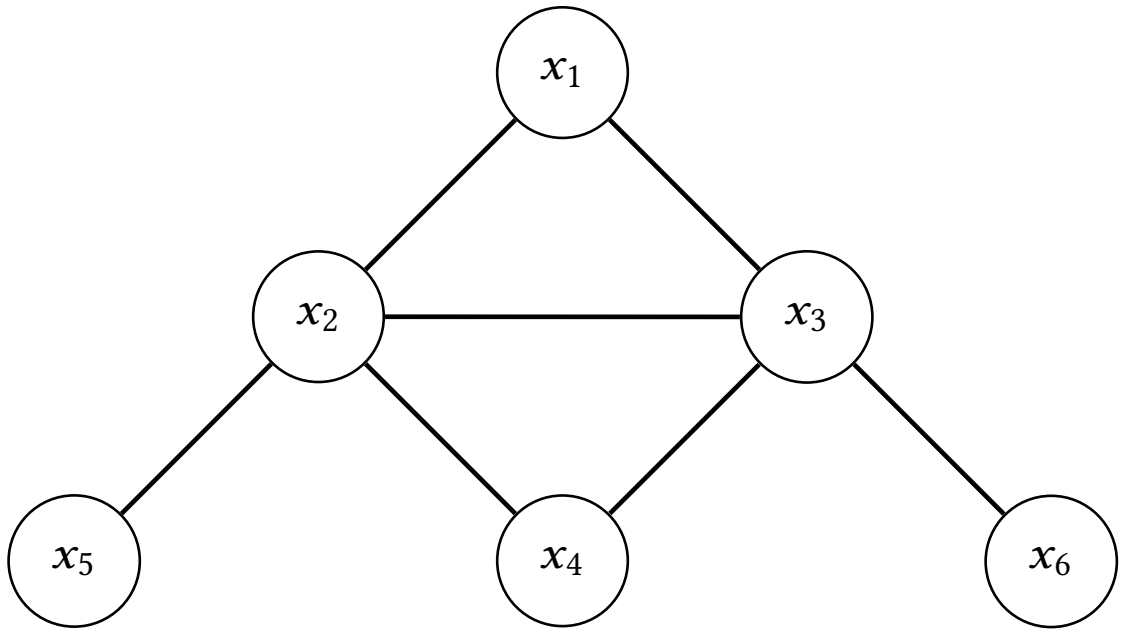
MGP: moralización.

Ayudantes: Berenice y Ricardo

Abril, 2020

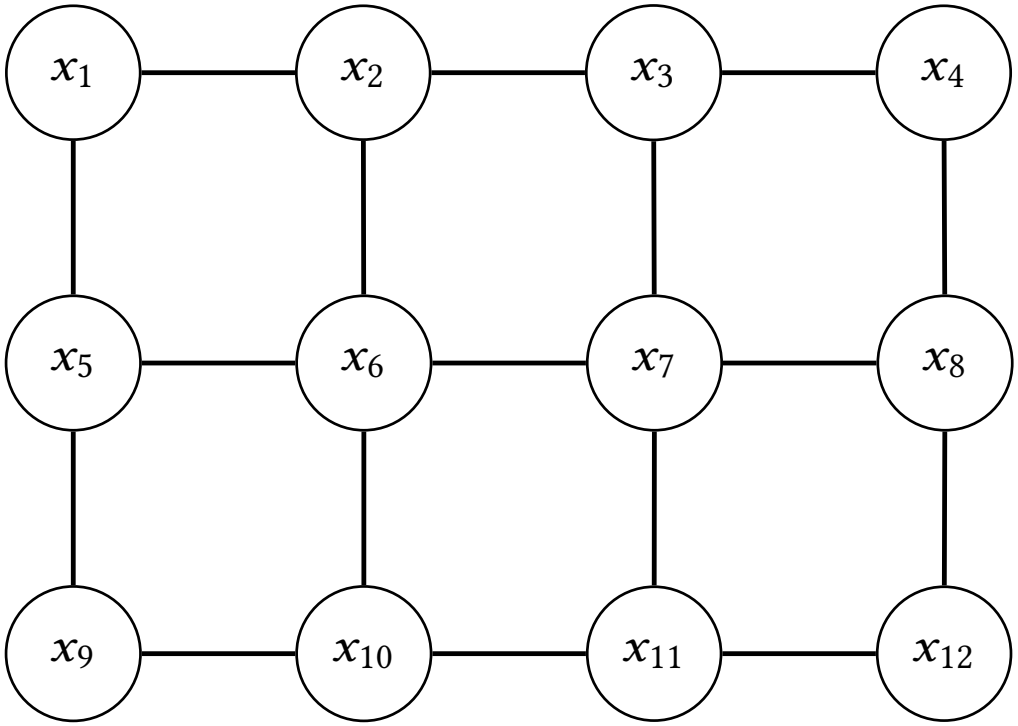
Redes de Markov (RM)

- Gráfica no dirigida que expresa una distribución de probabilidad conjunta.



$$P(x_1, x_2, x_3, x_4, x_5, x_6) = \frac{1}{Z}\psi(x_1, x_2, x_3)\psi(x_2, x_3, x_4)\psi(x_2, x_5)\psi(x_3, x_6)$$

Independencia en redes de Markov



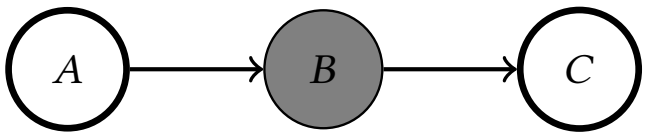
$$x_1 \perp\!\!\!\perp x_3 \mid x_2, x_5$$

$$x_1 \perp\!\!\!\perp x_7 \mid x_3, x_6, x_{10}$$

$$x_9 \perp\!\!\!\perp x_{12} \mid x_2, x_7, x_{10}$$

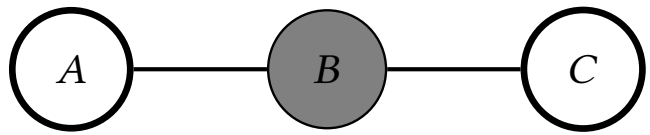
RB a RM: cadena causal

Red bayesiana



$A \perp\!\!\!\perp C \mid B$

Red de Markov

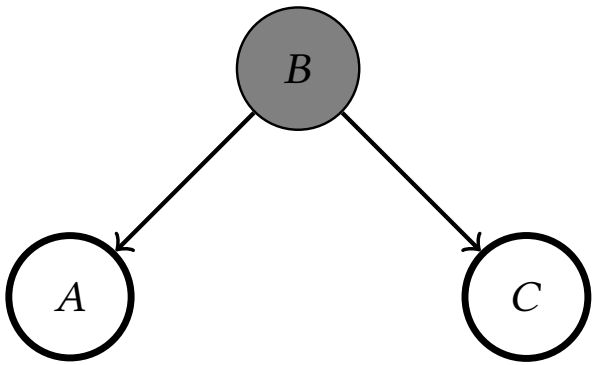


$A \perp\!\!\!\perp C \mid B$

RB a RM: causa común

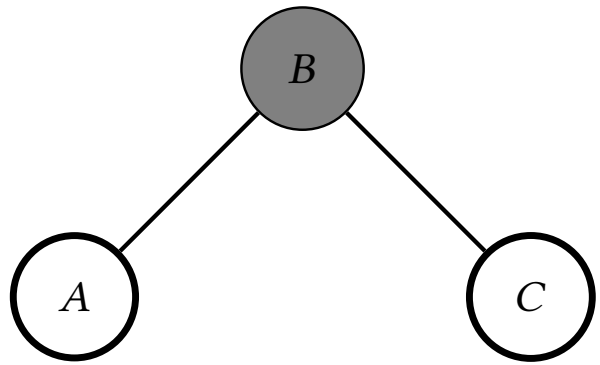
Red bayesiana

Causa común



$A \perp\!\!\!\perp C \mid B$

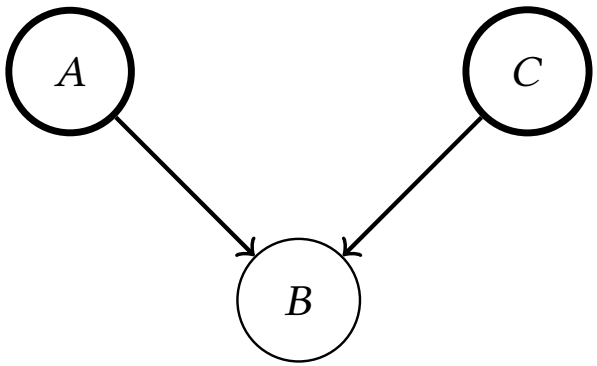
Red de Markov



$A \perp\!\!\!\perp C \mid B$

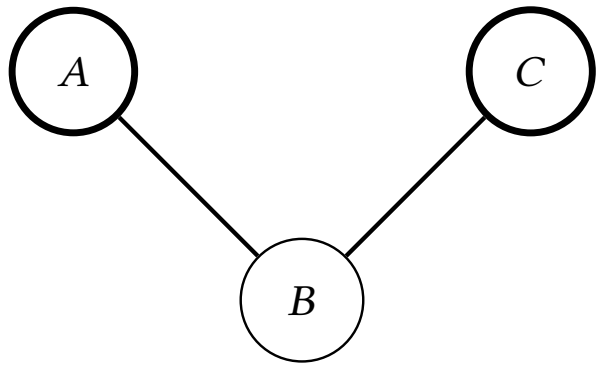
RB a RM: efecto común

Red bayesiana



$A \perp\!\!\!\perp C \mid \varnothing$

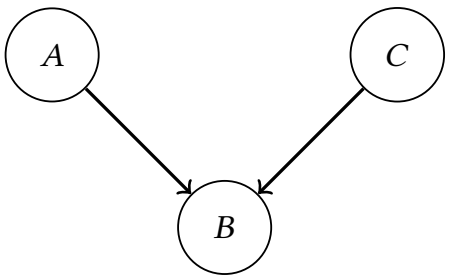
Red de Markov

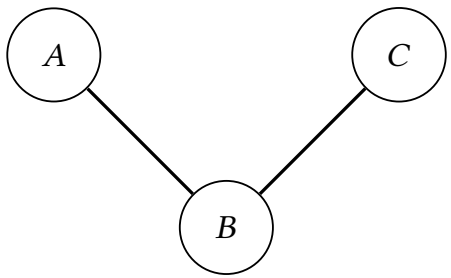


$A \not\perp\!\!\!\perp C \mid \varnothing$

RB a RM: moralización

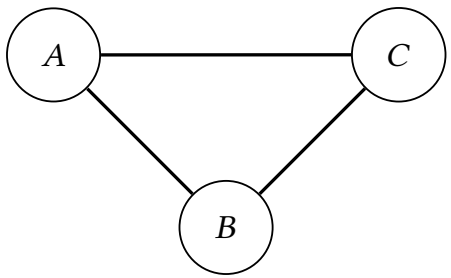
Red bayesiana





Conversión
incorrecta

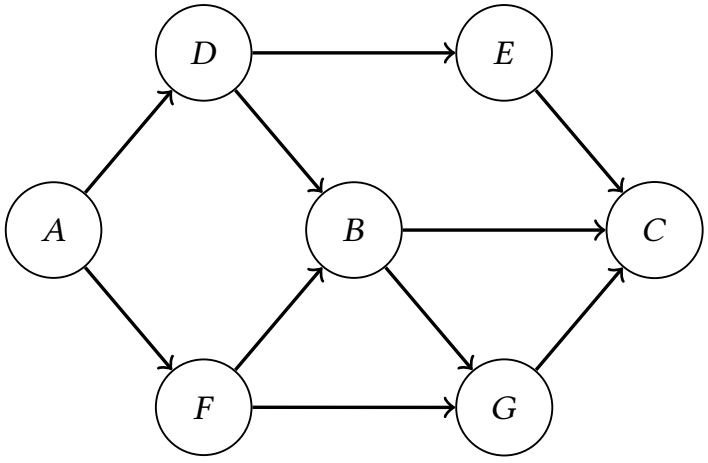
Red de Markov



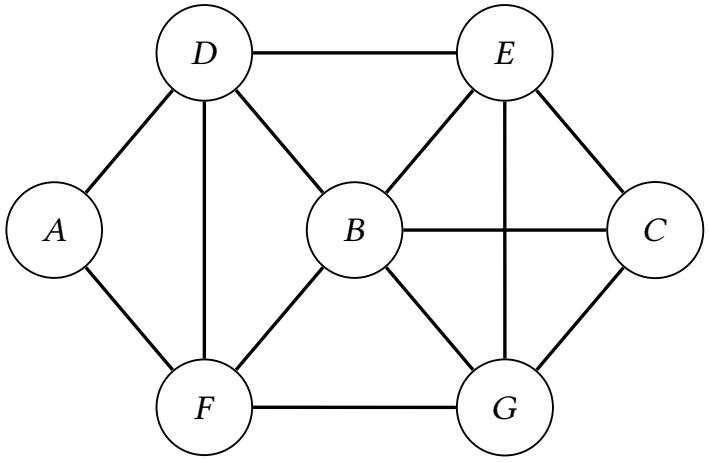
Moralización

- Si en una RB dos vertices A y B son padres de C entonces estos se conectan.

Ejemplo: RB a RM



Red bayesiana



Red de markov

¿Qué independencias condicionales se pierden?