

Recommender Systems and Beyond in Web Information Systems

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What do we do?

Social Web Data Science

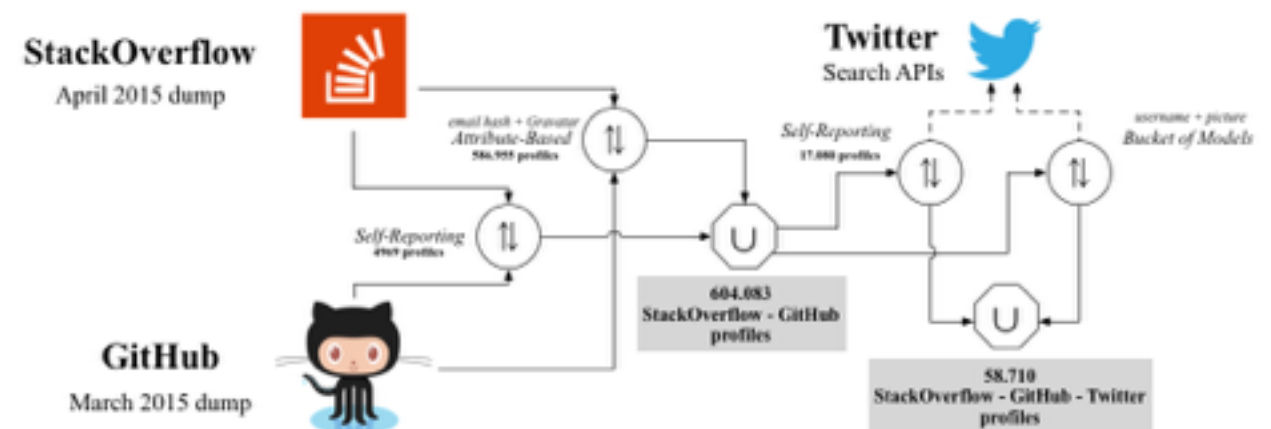


Topics:

- User Modeling
- Crowdsourcing
- Urban Analytics
- Recommendation

Knowledge Crowdsourcing
Acceleration

Example 1: modeling *user expertise, engagement, and topical diversity* for question recommendation in community Q&A systems.



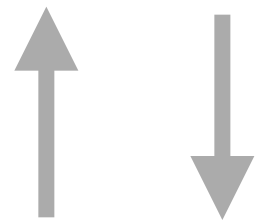
Example 2: modeling *user cultural background, and city gene* for POI recommendation in socio-spatial data analytics systems.



What do we contribute?

Systems

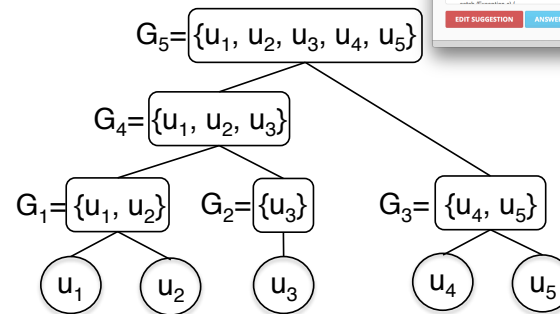
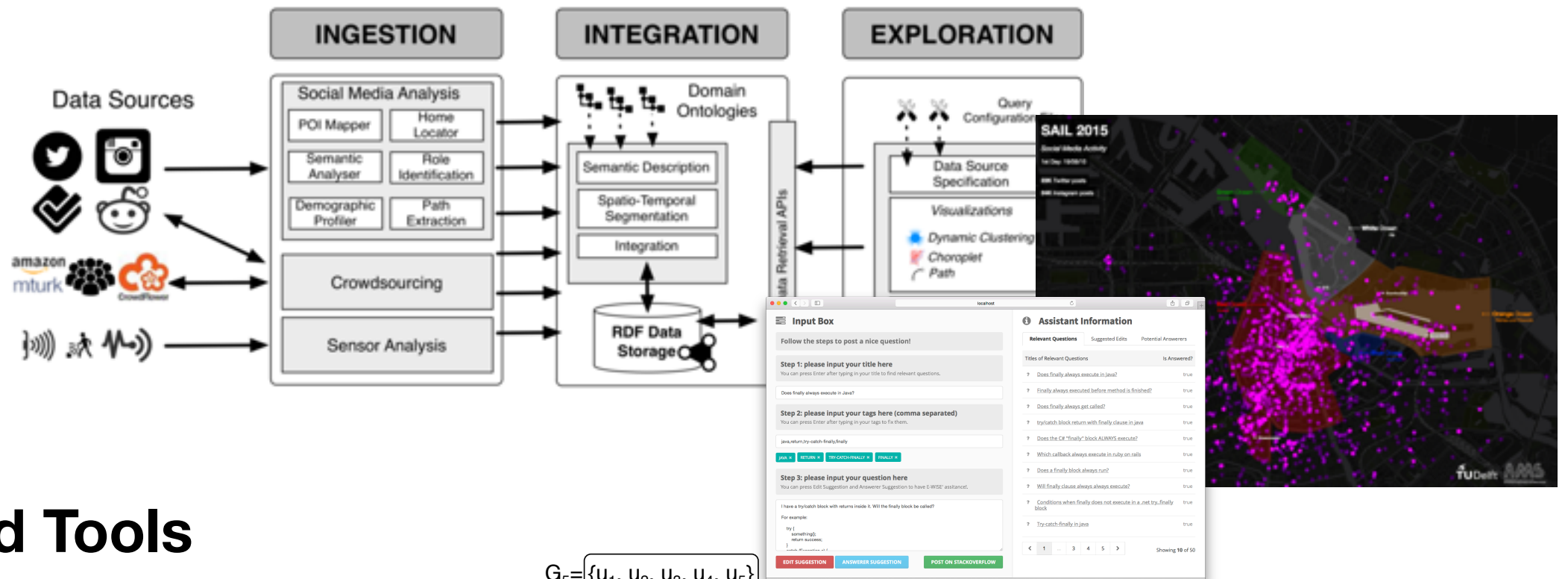
- Social Glass
- E-WISE



Methods and Tools

user model based recommendation

- Matrix and tensor factorisation
- Learning to rank
- LibMTF



City	Algorithm	rate	reg	iter	alpha	MAE	RMSE
London	MF	0,01	0,05	200	/	0.1793	0.2997
Rome	MF	0,01	0,05	200	/	0.2551	0.3914
Paris	MF	0,01	0,05	200	/	0.1537	0.2706
Amster	MF	0,01	0,05	200	/	0.1956	0.3167
London	TreeMF	0,0001	0,001	100	0,01	0.1509	0.2416
Rome	TreeMF	0,001	0,001	100	0,01	0.1334	0.2038
Paris	TreeMF	0,001	0,001	70	0,01	0.1481	0.2342
Amster	TreeMF	0,001	0,001	70	0,01	0.1240	0.2062
London	LeafMF	0,0001	0,001	100	0,01	0.1723	0.2366
Rome	LeafMF	0,001	0,001	100	0,01	0.1830	0.2570
Paris	LeafMF	0,001	0,001	70	0,01	0.1873	0.2628
Amster	LeafMF	0,001	0,001	70	0,01	0.1610	0.2344

$$\frac{\partial \mathcal{J}}{\partial \mathbf{U}} = ((\mathbf{O} \odot \mathbf{UV}^T) \mathbf{V} - (\mathbf{O} \odot \mathbf{R}) \mathbf{V} + \alpha \mathcal{L} \mathbf{U} + \lambda \mathbf{U}),$$

$$\frac{\partial \mathcal{J}}{\partial \mathbf{V}} = ((\mathbf{O}^T \odot \mathbf{VU}^T) \mathbf{U} - (\mathbf{O}^T \odot \mathbf{R}^T) \mathbf{U} + \lambda \mathbf{V}).$$

$$\frac{\partial \mathcal{J}}{\partial g_p} = \prod_{\forall a: G_a \in \text{ancestors}(G_p)} s_a \text{Dis}(G_p),$$

$$\frac{\partial \mathcal{J}}{\partial s_p} = \prod_{\forall a: G_a \in \text{ancestors}(G_p)} s_a \left(\sum_{\forall G_c \in \text{children}(G_p)} \mathbf{W}(G_c) \right).$$

Opportunities?

