



Technology for Pervasive Computing

How to design Al-decision support?

HCI-Outcomes of AI-interventions in decision environments

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Psychological research has shown ways to efficiently combine multiple human judgments to obtain the best results. But how should we combine human and machine judgments ^[1]?

Challenges of AI

- Algorithmic accountability
- Ethical conflicts
- User acceptance



https://xkcd.com/2237/

Runde 1 vo	on 12						
Kennzahl	Wert	Planung	Kennz	ihl	Wert	Planung	
Flüssigkapital	165775		Gesam	tkapital	250685		
Hemden verkauft	407		Nachfr	sge	767		
Preis Rohmaterial	3.99		Rohma	Rohmaterial auf Lager			Andem
Hemden auf Lager	81		50er M	aschinen	10	[Andem
Arbeiter 50er	8	Andem	100er	100er Maschinen			Andem
Arbeiter 100er	0	Andem	Repara	Reparatur & Service			Andem
Lohn	1080	Andem	Sozialk	osten pro Arb.	50		Andem
Hemdenpreis	52	Andem	Werbe	ausgaben	2800		Andem
Lieferwagen	1 [Andem	Geschi	äftslage	Cityrand		Andem
Arbeitszufriedenheit %	57.7		Maschi	nenschäden in 9	6 5.9		
Produktionsausfall	0.0						
Informationen							
Produktion	Nachfrage	Lohn & Sozialkosten	Maschinen	Rohmeterial			
Geschäftslage	Zufriedenheit	Hemdenpreis	Reparatur&Service	Maschinenschär	den		

https://www.psychologie.uni-heidelberg.de/ae/allg/tools/tailorshop/

Implication

- Research at the intersection between
 Psychology and Technology
- Interdisciplinary team of experts in Psychology, Economics, Computer Science, and Data Science

Outcomes of diverse Al-interventions and their visualization:

- CNN
- Logistic Regression ^[3]
- Random Forest
- Explainable AI ^[2]

User outcomes:

- Performance
- Comfort
- Acceptance



Preparation for a prospective Master-Thesis



References

[1] Aleksandra Litvinova. Extending the wisdom of crowds: how to harness the wisdom of the inner crowd. PhD thesis, 2020.
 [2] Himabindu Lakkaraju, Stephen H Bach, and Jure Leskovec. Interpretable decision sets: A joint framework for description and prediction. In Proceedings of the 22nd ACM SIGKDD international conference on knowledge discovery and data mining, pages 1675–1684, 2016.
 [3] Jongbin Jung, Connor Concannon, Ravi Shroff, Sharad Goel, and Daniel G Goldstein. Simple rules for complex decisions. arXiv preprint arXiv:1702.04690, 2017.

[4] Julio Borges, Matthias Budde, Oleg Peters, Till Riedel, and Michael Beigl. Towards two-tier citizen sensing. In 2016 IEEE International Smart Cities Conference (ISC2), pages 1–4. IEEE, 2016.

[5] Daniel Danner, Dirk Hagemann, Daniel V Holt, Marieke Hager, Andrea Schankin, Sascha Wüstenberg, and Joachim Funke. Measuring performance in dynamic decision making. Journal of Individual Differences, 2011.