Infusing Work Order Management with AI

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Goal

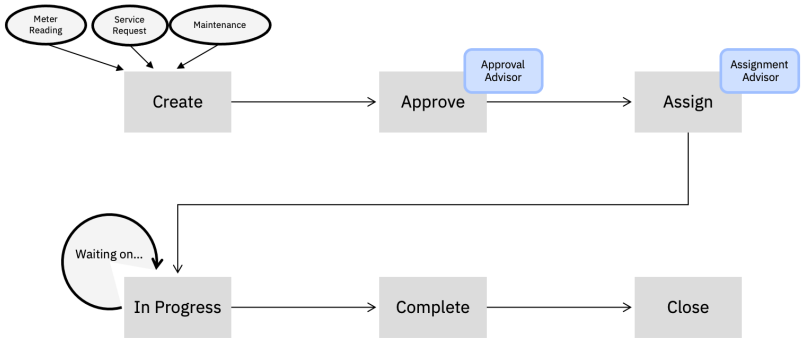
Improve employee performance in Work Order (WO) Management by automating suggestions for WO approval & assignment using AI

Hypotheses

- Assistance by AI models improves employee **performance** in terms of **correctness** and **duration**
- Presenting AI model's **confidence** level influences the performance

Work Order Lifecycle

- Typical WO process and the suggested AI models



Data

- Maintenance WO records from a global resource organization
- +1M records globally, with +20K records for the case study site
- Approval is a binary decision having approval rates of ~97%
- Assignment is a multi-class decision having ~30 classes per site
- On-site data is sparse & incomplete and therefore hard to predict
- Ground truth subset taken from expert actions was used as reference for all performance measurements

Models

- XGBoost based models deployed in 5 sites and tested on-site for 2 months, by a total of 10 professional users
- Results of the deployed model (F1-score) for on-site data:
- Assignment: 0.84 top-1 and 0.92 top-3, Approval: 0.71
- Models received +90% positive feedback for advices
- User testimonials: *"...this tool will be of great help..."*

Experiment

Evaluated the effectiveness of the AI assistance by measuring performance of employees in various conditions

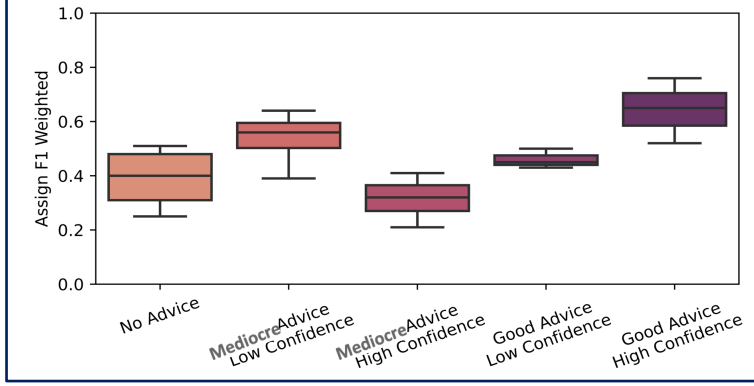
- Performance is measured by **correctness** and **duration**

Manipulated factors -

Professional users perform *Approval* and *Assignment*, first without any AI advice and then with manipulations of

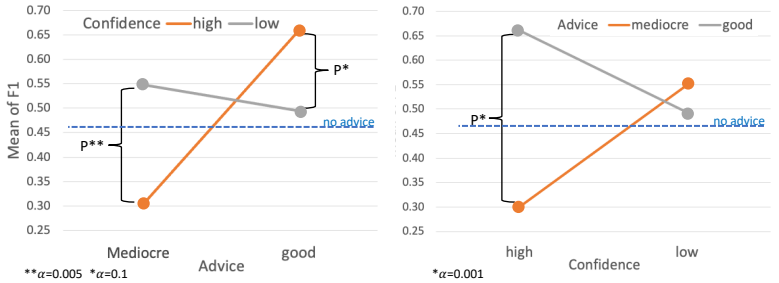
- *quality of advice*: *good* or *mediocre* advice
- confidence: *high* or *low*

Results



Results (cont.)

- Testing using 2-way ANOVA shows statistical significance of the performance for the interaction of quality and confidence (p=0.001)
- Post-hoc analysis shows significance when comparing *low* vs. *high* confidence for a *mediocre* advice (p=0.002) but only mild significance for different confidence having a *good* advice (p=0.09)



- When the confidence is *high*, a *good* advice is statistically significant compared against a *mediocre* advice (p<0.001) or against *no-advice* (p=0.02), but not so when the confidence is *low*

Conclusions and Future Work

AI recommendations and their confidence scores have significant influence on employees' performance in a WO business process:

- **When the confidence score is high, a good advice is effective compared to no-advice, but a mediocre advice might be harmful**
- **When the confidence score is low, the effect of the advice is insignificant, compared with no-advice, regardless of its quality**

In our future work we broaden the experiment:

- Additional subjects and better quantification of the duration
- Measure the subjects' perception of their performance