

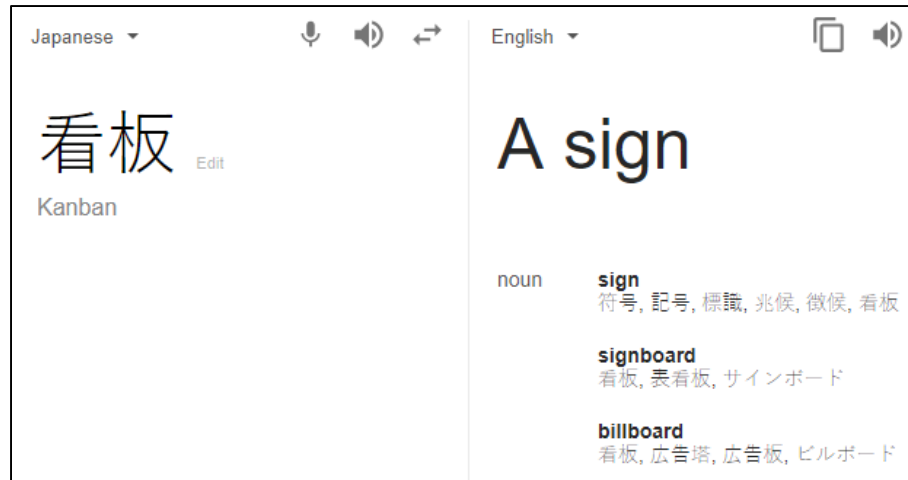
Application of Bayesian Belief Network for Agile Kanban Backlog Estimation

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What is Agile Kanban? [1,2]

- Different from Kanban for JIT manufacturing!
- Visualization of workflow
- Limit work in process (WIP)

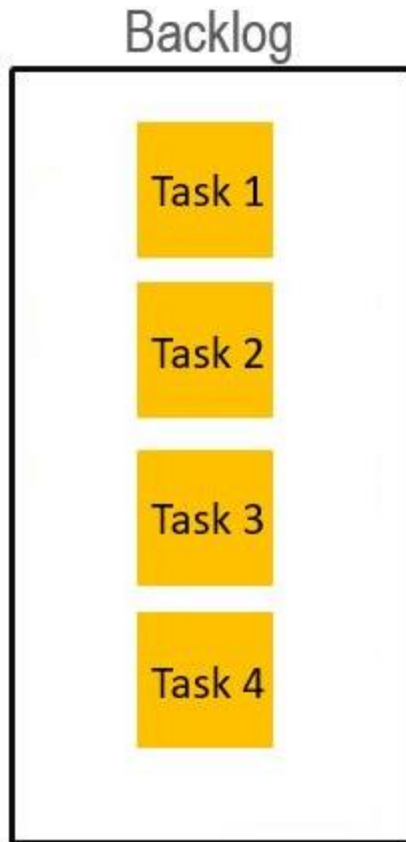


[1] E. Brechner, 2015, Agile project management with Kanban., Microsoft Press, Washington.

[2] Google Translate [Image] (2018) Retrieved from URL:

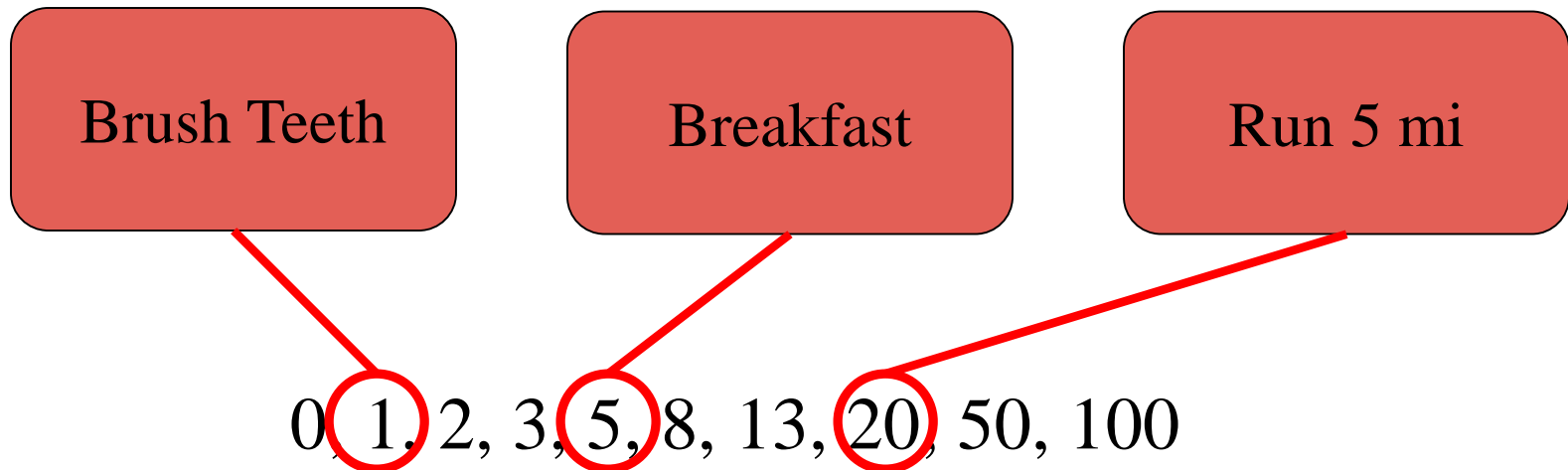
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What is Agile Kanban?



Traditional Delivery Estimation

- Use “Story Point” estimation



- Calculate Velocity (points/day)
- Use Velocity to estimate when task leave backlog

[3] Buckl, S. et al., 2010, Essential Scrum : a practical guide to the most popular agile process, Addison-Wesley, Boston.

Traditional Delivery Estimation

- High level of maintenance
- Difficult to predict lead times
 - New tasks added constantly
 - Tasks cancelled
 - Reprioritization
- Current tools adapted to Agile Kanban

Bayesian Networks

(influence diagrams)

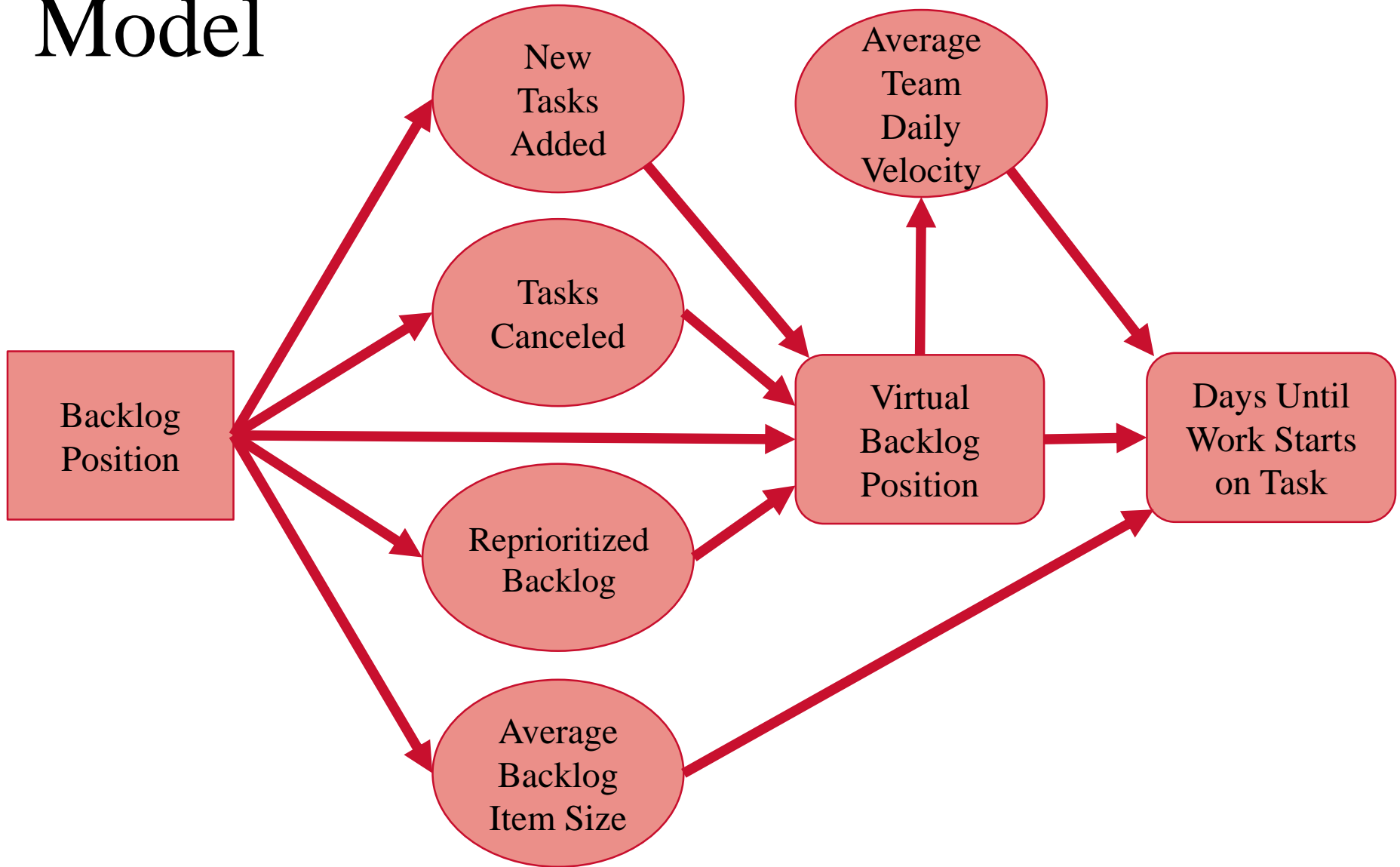
Graphical representation of a complex uncertainty



Research Question

Can a Bayesian Belief Network be used to estimate lead time for tasks to leave the backlog?

Model



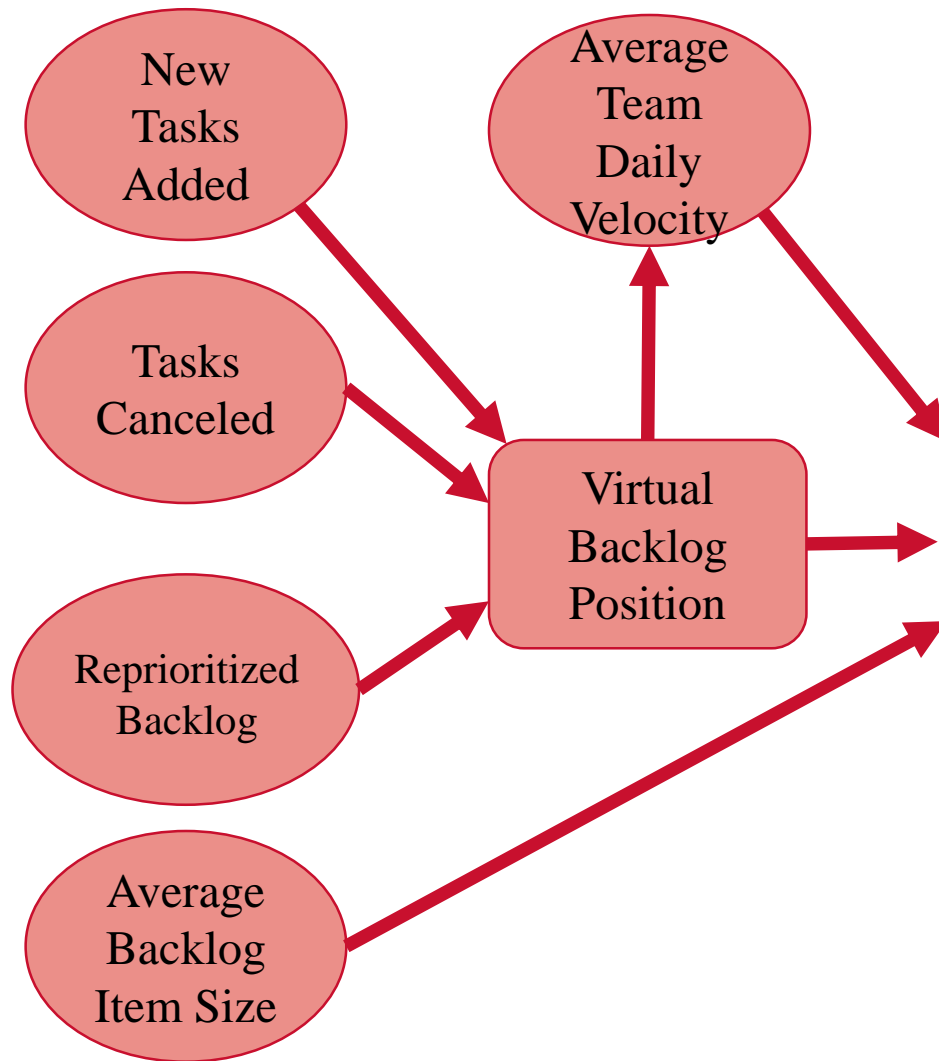
Model – Data Collection

- Need historical team data
- Tracked Kanban team at Andersen Crop.
- Team used Story Point estimation
- Collected data for 4 weeks
- Estimated conditional probabilities for 5 uncertainties

Decision – Backlog Position

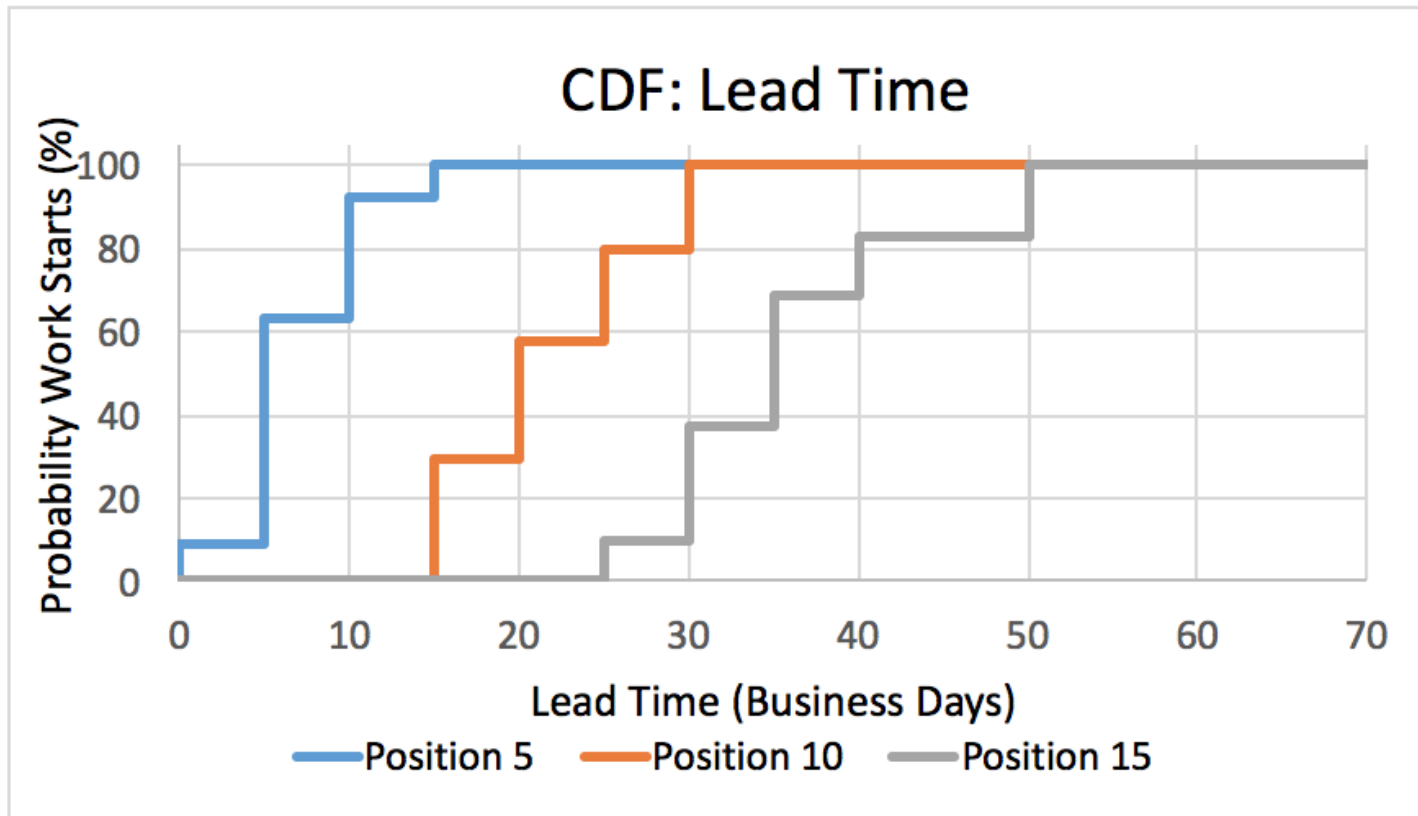
- New project arrives
- Team needs to decide where in the ordered list the new project should be placed
- Alternatives: Position 5, 10, 15, 20, or 25

Backlog Position #5



Days Until Work Starts on Task	
0	0
0 to 5	8.92
5 to 10	54.7
10 to 15	28.5
15 to 20	7.81
20 to 25	0
25 to 30	0
30 to 35	0
35 to 40	0
40 to 45	0
45 to 50	0
50 to 60	0
60 to 70	0
70 to 100	0
100 to 700	0
9.26 ± 4	

Results - Cumulative Density Function



Conclusions

- Account for risks missed by story point estimation
- Reduce maintenance overhead
- Further work needed to verify accuracy