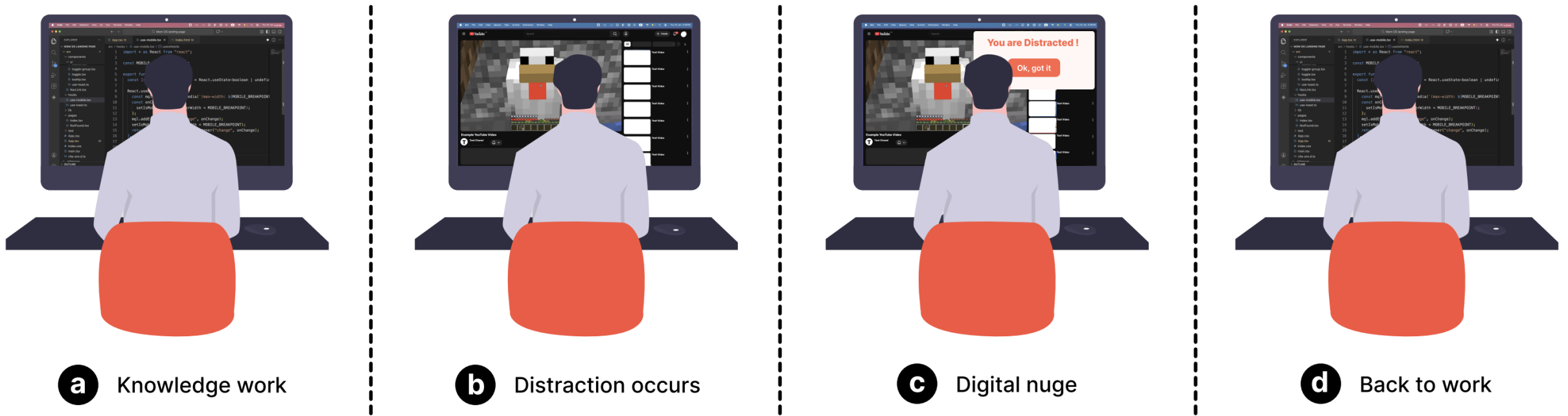


OpenSearch for Association Rule Mining: With ActivityWatch

Indrajith Ekanayake
(Microsoft MVP, Researcher)



The problem was simple



*Developers are highly sensitive to sudden changes of attention or "**bursts**"*



But look at the solutions; are they intelligent?

1

Digital self-control tools

- Forrest
 - Freedom
 - StickK
- etc

2

Established self-support techniques

- Pomodoro Technique
 - Timeboxing / Timeslising
 - Eisenhower Matrix
 - Vibrational feedback
 - Always visible screen on screen task widgets
- etc

3

Experimental interventions

- Wearable intervention design (Wearable EEG device)
 - Human robot interaction designs
 - Rule based intervention designs
- etc

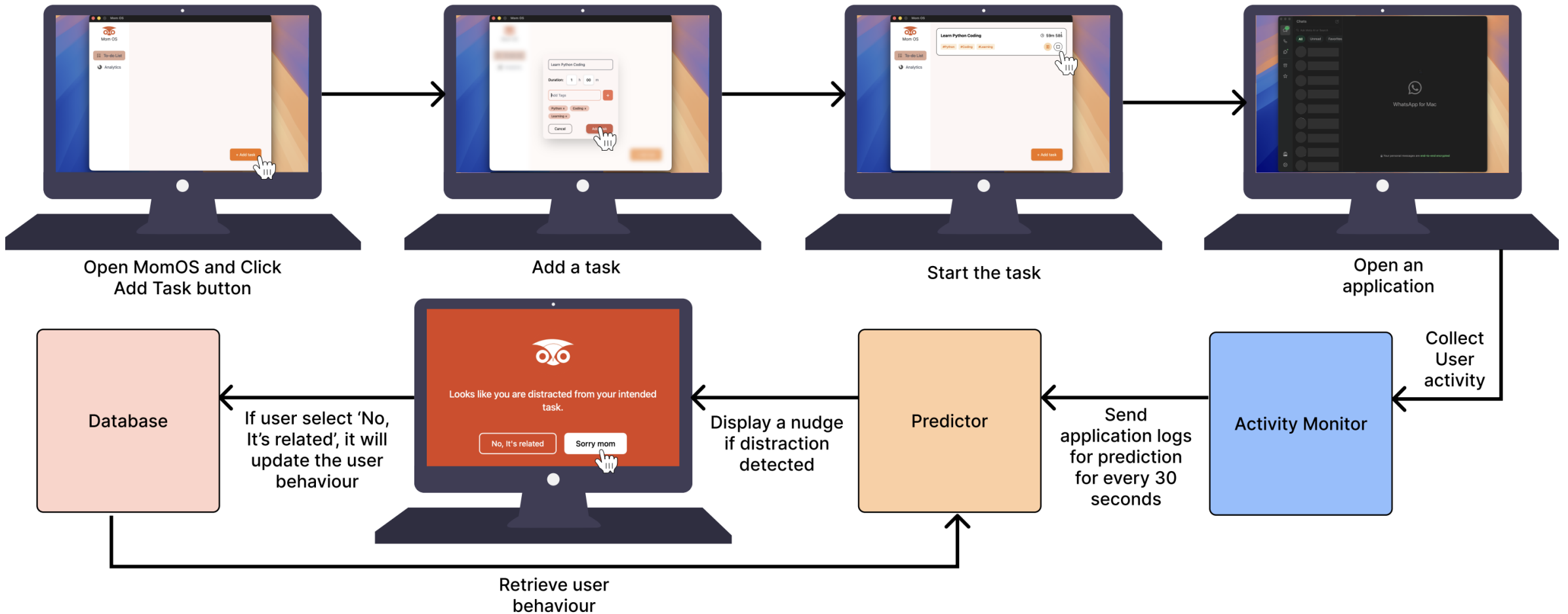
4

Intelligent interventions

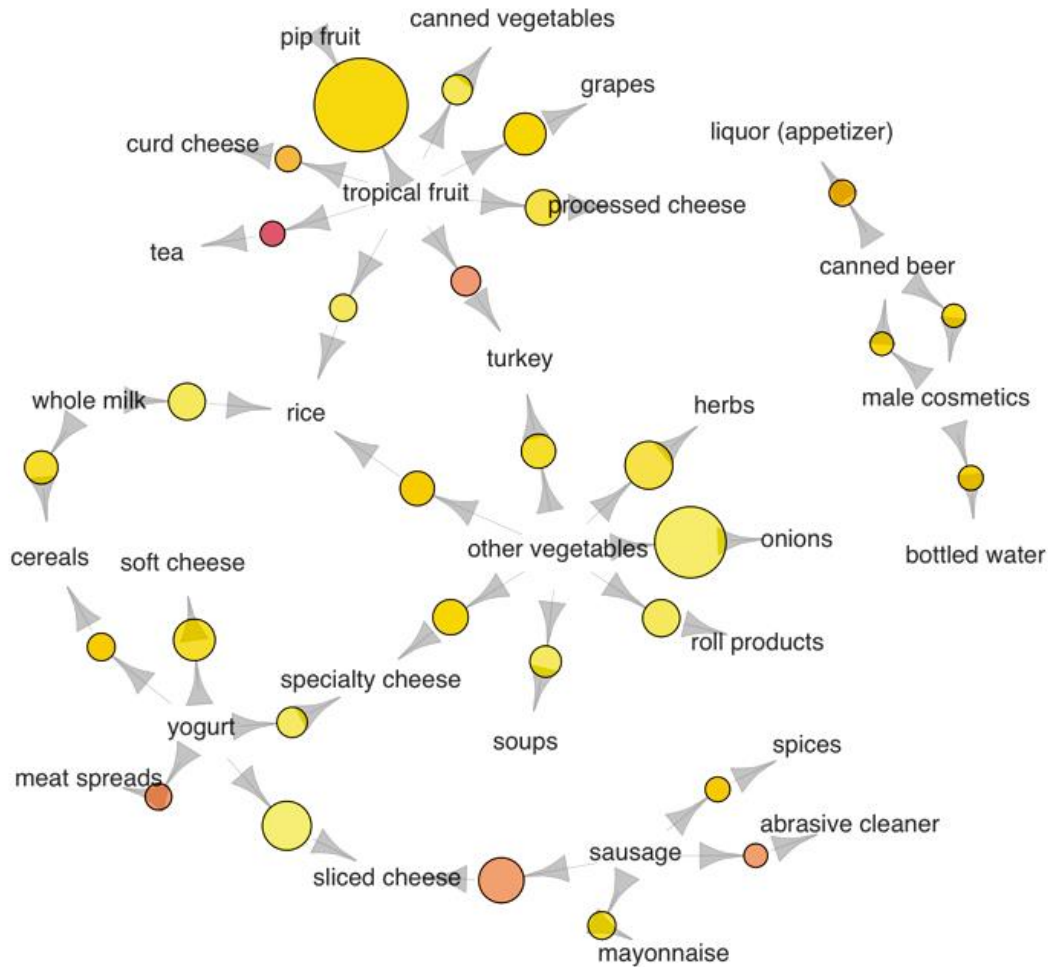
- RL-based approaches
 - LLM based approaches
 - Intelligent nudging
- etc



Our hypothesis



Quick word on Association Rule Mining



TID	Items
1	{Bread, Milk}
2	{Bread, Diapers, Beer, Eggs}
3	{Milk, Diapers, Beer, Cola}
4	{Bread, Milk, Diapers, Beer}
5	{Bread, Milk, Diapers, Cola}

Bread -> Milk

$$\text{Support} = 3 / 5 = 0.60$$

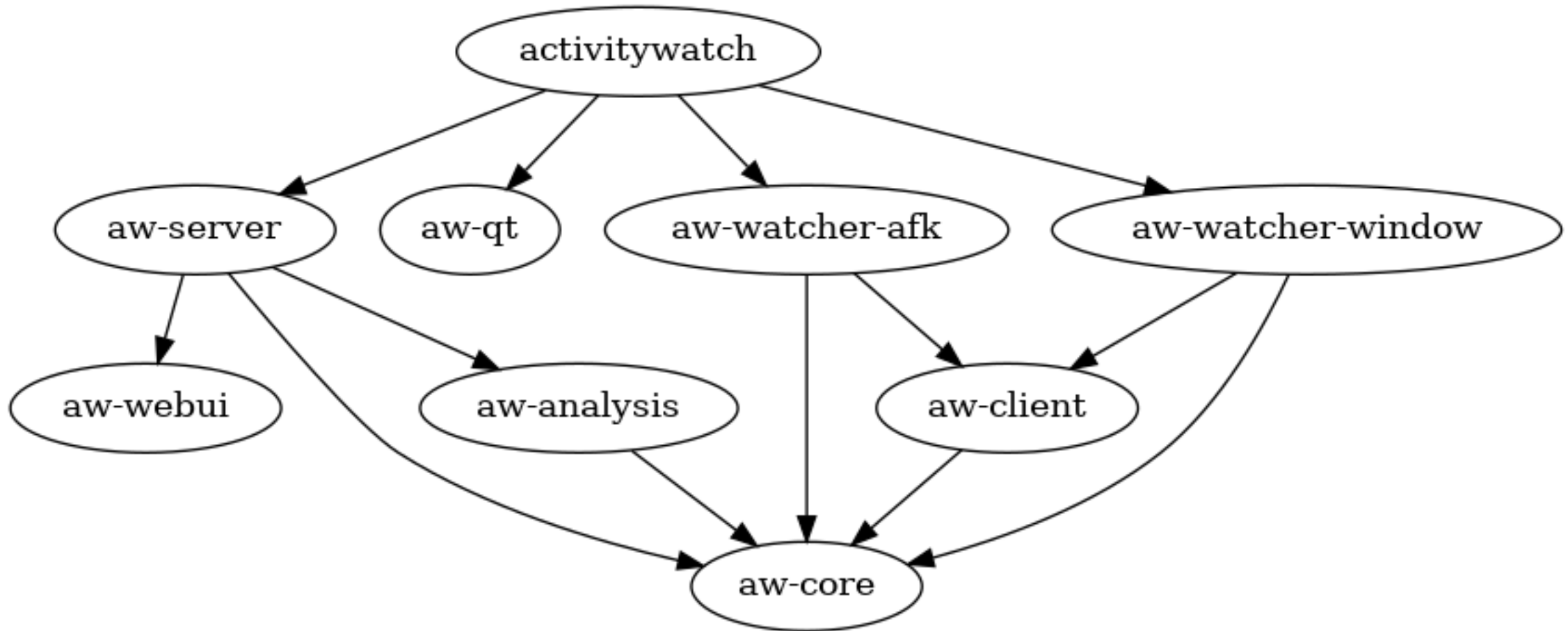
$$\text{Confidence} = 3 / 4 = 0.75$$

$$\begin{aligned} \text{Lift} &= \text{Confidence}(\text{Bread} \rightarrow \text{Milk}) / \\ &\text{Support}(\text{Milk}) \\ &= (4/5) / (0.75/0.80) \\ &= 0.9375 \end{aligned}$$

Source: [Keggle](http://Keggle.com)



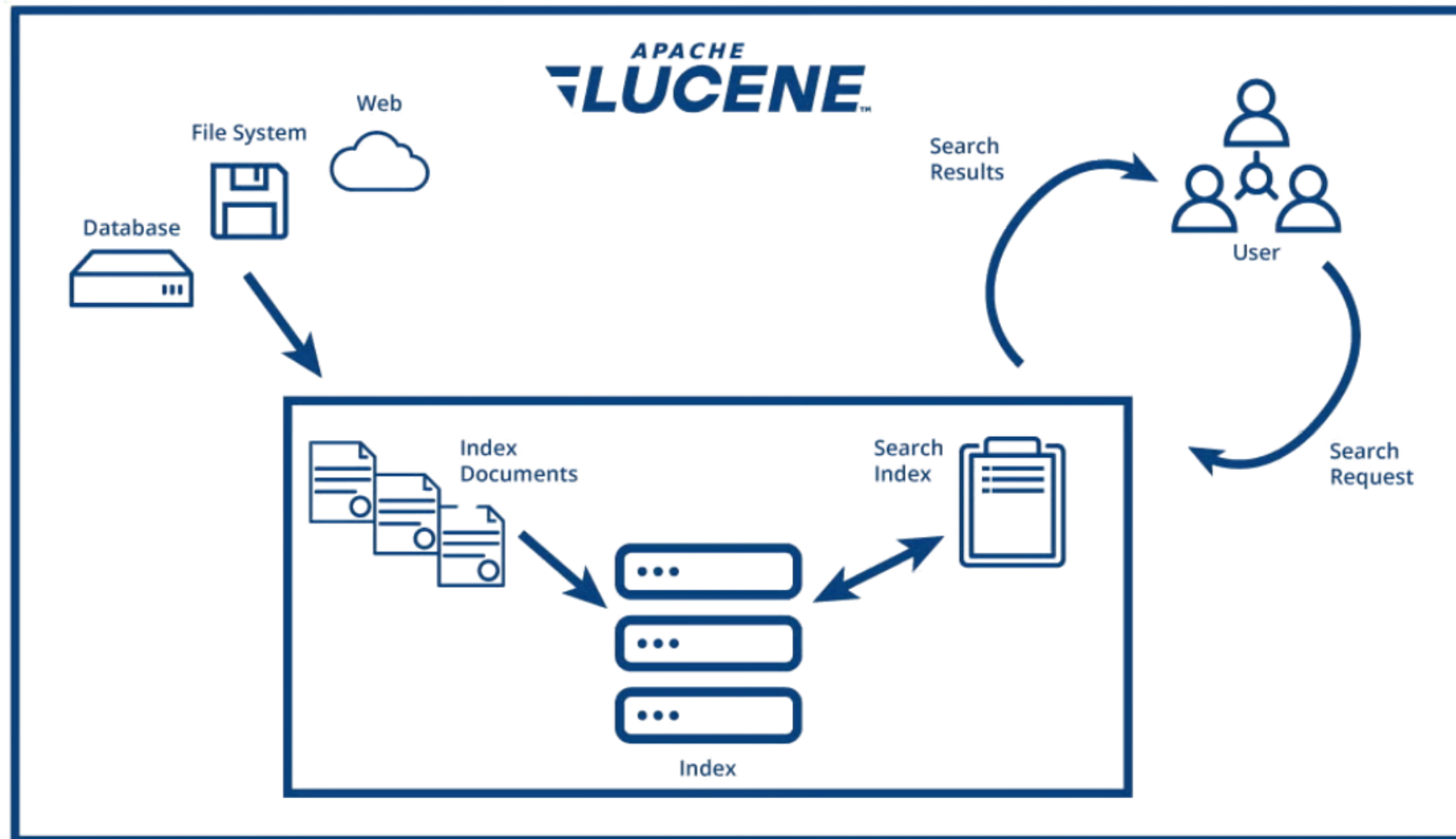
Quick word on ActivityWatch



Source: [ActivityWatch](#)



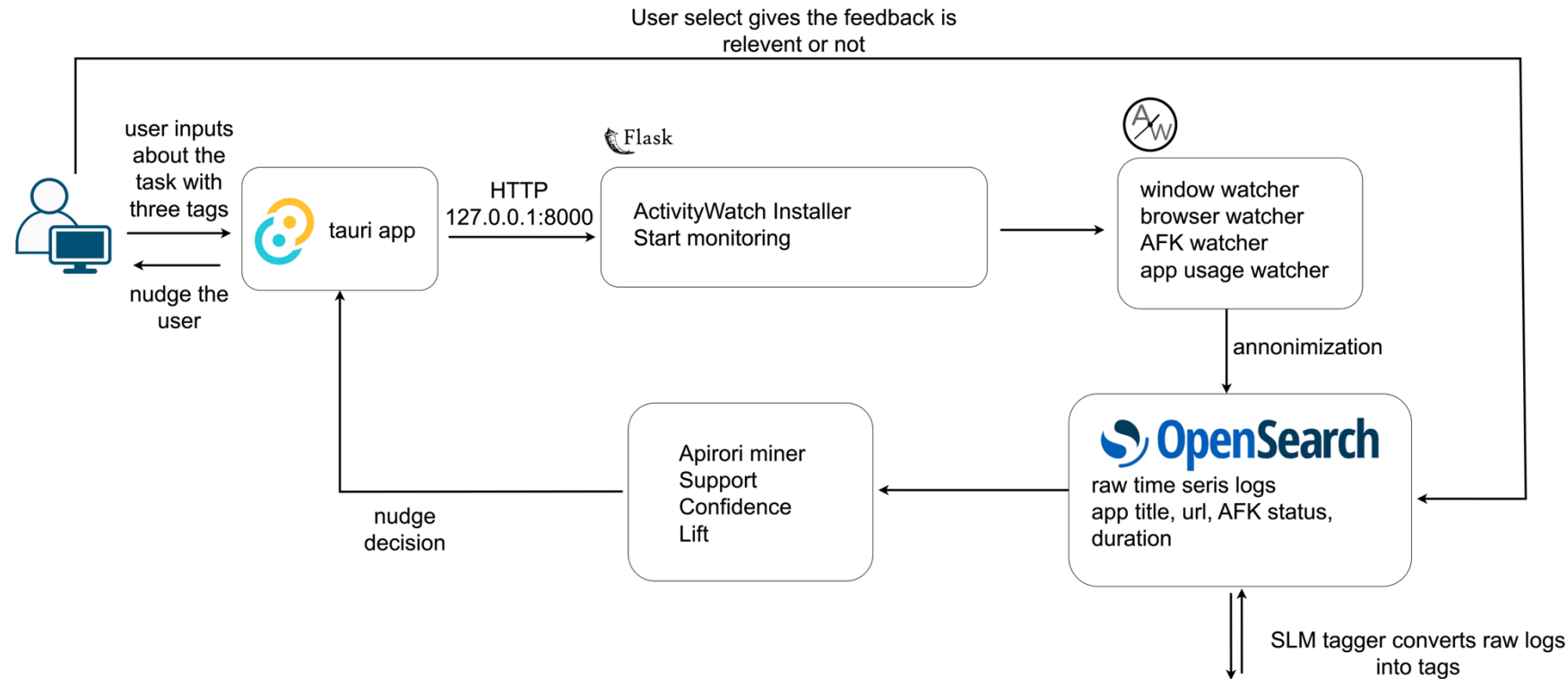
Quick word on OpenSearch



Source: [OpenSearch Core](#)



How we built context-aware AUI with OpenSearch



TID	Items (LLM tags + context)	Label
T1	coding, editor, morning	on-task
T2	coding, github, morning	on-task
T3	video, music, evening	off-task
T4	coding, reference, afternoon	on-task
T5	video, social, evening	off-task
T6	coding, editor, evening	on-task
T7	video, music, evening	off-task
T8	coding, github, afternoon	on-task



Promising early results

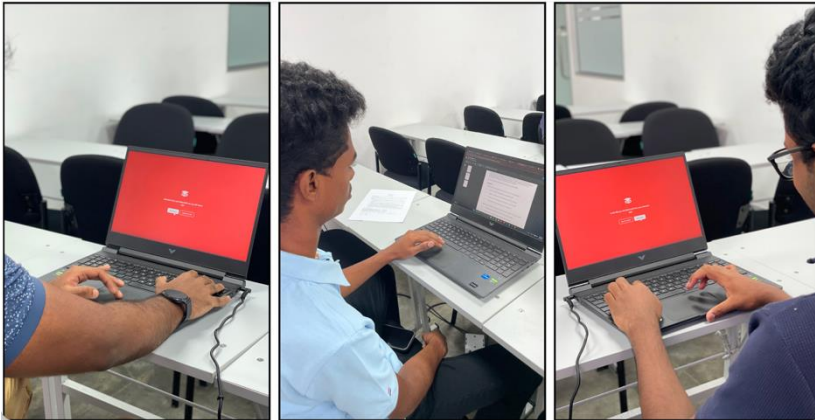
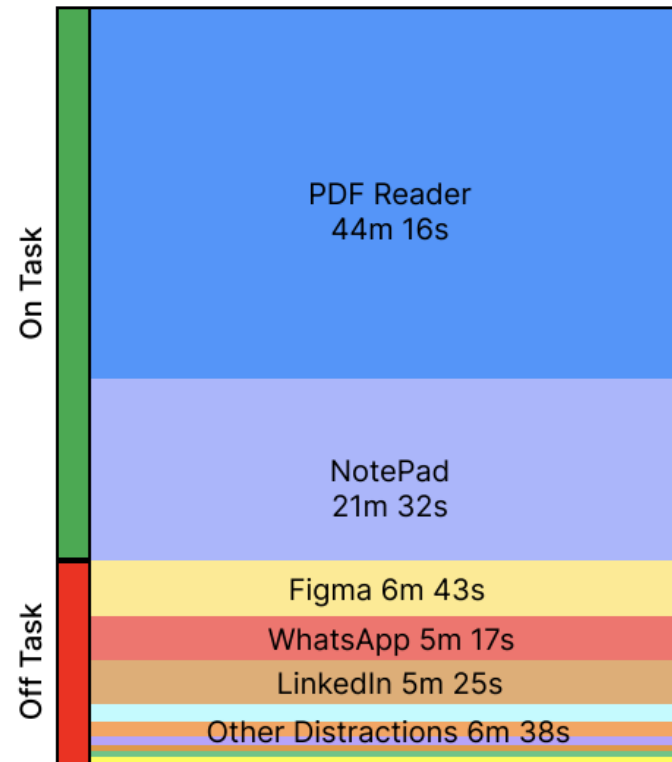
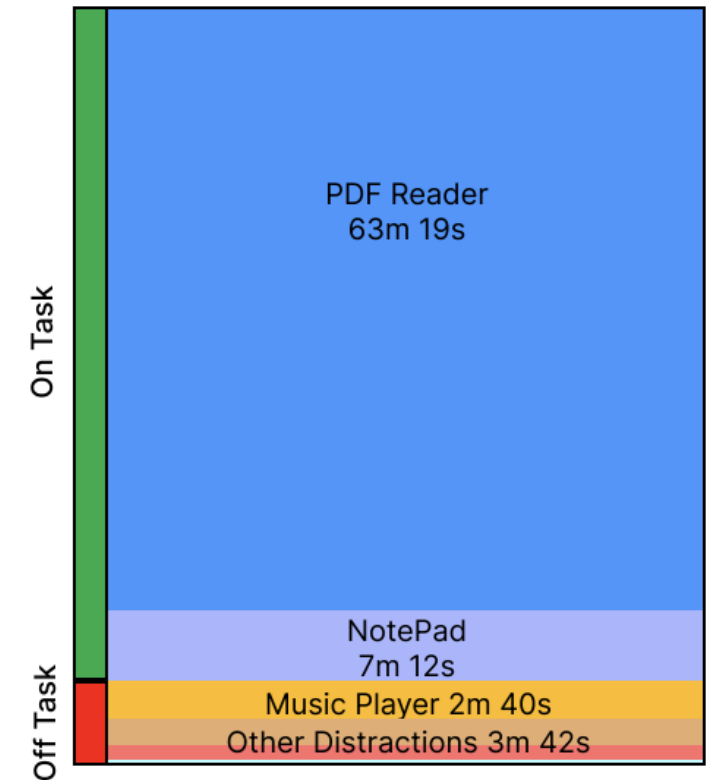


Fig: Some of our students at our research lab taking the task

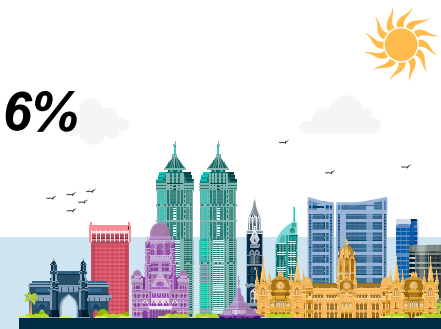


Without Mom OS
Productivity 74.9%



With Mom OS
Productivity 90.5%

Productivity has jumped over 15.6%



Three main takeaways

- Attention is a finite cognitive resource. We (humans) have to innovate intelligent ways to own the control of it
- OpenSearch is a powerhouse when it comes to near real-time search, log analytics, and activity observability.
- Association Rule Learning helps convert activity signals into explainable behavior patterns, allowing the system to decide when a nudge would be useful rather than disruptive.





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