Leverage your project's unique past and control its future

Every project is unique, which makes prediction of its future hard. We developed the Nodes & Links' Opportunity feature to address this challenge: predicting the future of your project without relying on generic databases that underplay the uniqueness of your project. We use your project's schedule updates to understand your performance and give you a realistic prediction for all future activities.

Nodes & Links' Opportunity feature is twice as accurate in predicting the future compared to existing methods (and twice as robust against optimism bias).

→ **Your project is unique. So is our prediction.**

Predicting your project's progress by using past databases of other projects has limited applicability. After all, even constructing the exact same project twice will still involve different teams (and equipment), which inevitably drive differences in future performance. Once you start taking into account additional scope peculiarities, unique sites and contracts, your project's uniqueness becomes even more evident. This is why we developed the Nodes & Links' Opportunity feature — a new way of predicting the progress of your unique project using updated schedules from your project only. Nodes & Links' Opportunity uses your project's schedule updates to understand your performance to date, and uses it to give you a realistic prediction for all future activities and WBS.

Therefore, every project created in Nodes & Links has its own, tailored prediction model.

Nodes & Links' Opportunity relies on a combination of peer-reviewed technology and cloud engineering to deliver predictions straight out of the box — no complicated integrations and large data uploads needed!
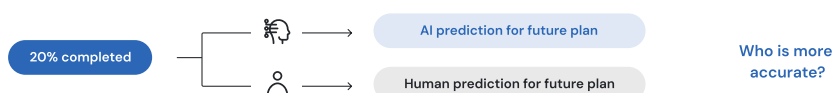
1 **How prediction works?**

20% completed → AI prediction for future plan

2 **The Challenge**

20% completed → AI prediction for future plan
Human prediction for future plan

Who is more accurate?

3 **Compare with what happened**

AI prediction for future plan
75% completed
Human prediction for future plan

Our AI is twice more accurate

→ **How does prediction work?**

The AI uses your existing schedule to learn your performance across the different kinds of activities that you have completed up to now. It then looks into the future activities and updates their expected duration based on the learned performance. That learning is applied in a way that takes into account the similarity between past and future activities.

→ **The Challenge**

Today, project teams already update their schedules (and future activity completion dates) to reflect the project's up to date performance. So the challenge is, who can make better predictions for the future plan based on the up to date project performance - the Human or the AI?

→ **How does prediction compare with reality?**

We look at the completion dates from activities that have now been completed, as found in later schedules from the same project. We compare those completion dates with the predictions and assess who was more accurate at their prediction — the Human or the AI.

We repeated the challenge across 100s of different projects, from energy and construction to aerospace and defence. The result? The **AI is twice as accurate than a Human**. In addition, the **AI is twice as robust against optimism bias, compared to a Human.**

Let's dive into a live project!

→ **Nodes & Links on a rail project**

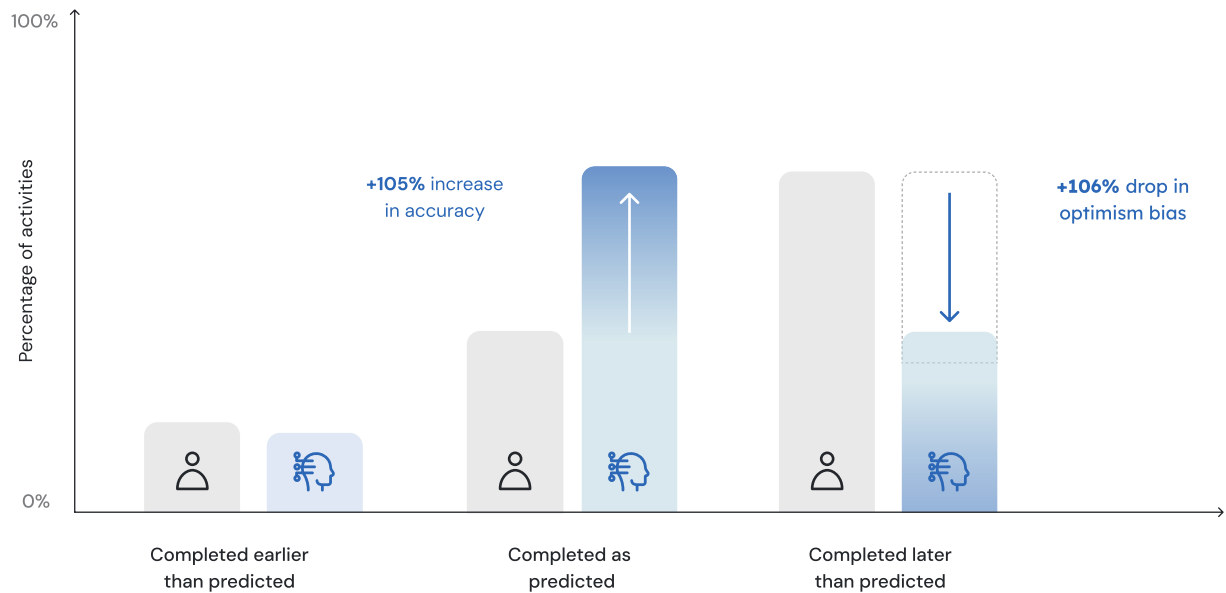As an example, let's see focus on this rail project, with a planned duration of 640 days.

For this example, we first use a schedule where 47% of the work has already been completed - this is our training data set and is the only input for our AI (see technical note). This schedule already includes the project's team prediction about the future plan, based on the work already completed.

We then use a later schedule from the same project, where 73% of work has now been completed. This means that there is 73%-47%=26% of additional work completed compared to the training schedule.

We can now treat this 26% of additional work that has been completed as our ground truth, and assess the accuracy of the Human prediction vs the AI prediction. In other words, we can now compare the project's team prediction (which was already included in the training schedule) with the AI's prediction which learned the project's performance from exactly the same schedule as the Human.

The AI is twice as accurate in predicting the completion date of activities and twice as robust against optimism bias. Accuracy is measured using the number of activities that have been correctly predicted to finish. Optimism bias is measured using the number of activities that have been optimistically predicted to finish.

The figure below showcases the results for this rail project. These results are representative across our entire database with 100s of live projects.

100%

Percentage of activities

+105% increase
in accuracy

+106% drop in
optimism bias

0%

Completed earlier
than predicted

Completed as
predicted

Completed later
than predicted

As more and more updates are uploaded for the same project, the AI learns more and more about both short and long term performance of the project, improving accuracy even further.

Most Machine Learning techniques require tons of data to train their models in order to make predictions. Our **proprietary, peer-reviewed technology** gets around this hard constraint by unlocking accurate predictions **using your project's schedules only.**

This means that effectively, **every project created in Nodes & Links has its own, tailored prediction model.** At a high level, our technology is multifolded and relies on the following steps.

Once the first schedule is uploaded, the AI model will first group activities in the past (completed up to the Data Date) and future (rest of activities).

Focusing on the past activities, the AI model will first (1) classify similar activities together; in this case, similarity is computed based on a wide range of parameters that take into account context (like WBS assignment and resources), time (like float and time stamps), and connectivity (like paths and embendess). It will then (2) assign performance rates on each of these activity classes. These performance rates are weighted ratios of actual vs expected performance.

The AI model will now focus on the future activities, by first (3) classifying them in a way similar to Step 1, and then will (4) revise the duration of these activities by weighting their similarity to the classes in Step 2. Once completed, we then enrIch the output of this AI model with Monte Carlo simulations to assess the impact of the performance rates (and to get convergence).

These steps are repeated every time a new updated schedule is uploaded, which means that the AI model is continuously updated with the latest information. The entire process on a 50k activity schedule takes just a few minutes.

In this way, you can rest assure that any project your upload on Nodes & Links gets a tailored prediction model that takes into account your project's unique nature.

Contact Nodes & Links

The best project teams understand and proactively manage their plan
Nodes & Links is built for every member of your team to track, analyse and prioritise work to make great decisions.

Principal Data Scientist
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Find out more by contacting **support@nodeslinks.com**