INTERNATIONAL HARDWOOD CONFERENCE · ANTWERP · NOVEMBER 2026

From the grader's eye to the board's data

What AI grading changes for hardwood sawmills, traders and their industrial customers

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Chairman of the Board, Neural Grader · Fordaq Group

Neural Grader

Part of Fordaq Group

WHO WE ARE · FORDAQ GROUP

Digital tools for the wood industry since 2000

FORDAQ

TRADE

B2B marketplace for the wood industry, connecting more than 90,000 companies worldwide.

www.fordaq.com

TallyExpress

MEASURE

Computer-vision tally of lumber bundles for inventory and shipping documents, used by over 200 mills.

www.tallyexpress.com

Neural Grader

GRADE AND CUT

AI vision that grades every board and drives cutting decisions, from the green mill to the cutting line.

www.neuralgrader.com

Smart Bundle

TRACK AND SHARE

Links every board to its bundle, so the board data travels with the pack to the buyer.

www.neuralgrader.com

THE TEAM

70
full-time people
across the three businesses

13
countries
from Québec to Vietnam

24
engineers
software, computer vision & hardware

16
graders
defect annotation

Frontier research in computer vision

Installed & in delivery on three continents

North America · NA Hardwoods, NHLA Grading

Optimization & Grading in Green Mills, Planer Mills & Flooring plants

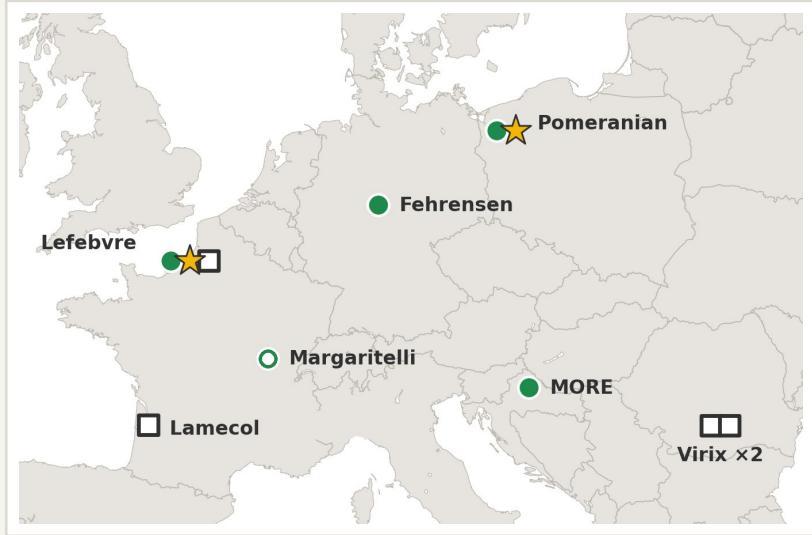
Europe · Oak & beech, proprietary grades

Optimization & Grading in Green & KD rough mills

Asia · Vietnam

Furniture components







in production · scanner delivered, grading tuning process · scanner to be delivered · Smart Bundle live

9
SCANNERS IN PRODUCTION

4
DELIVERED, GRADING TUNING PROCESS

10
SCANNERS TO BE DELIVERED

8
COUNTRIES

1 · THE HARDWOOD GRADING PROBLEM

Why most hardwood mills still grade by eye

	Softwood	Hardwood
Volume	Large mills, high volume per line	Smaller mills on average: less volume, less money to invest
Defects	Mostly knots, wane, cracks and blue stain	Visual defects: stain vs mineral vs dirt, pin holes, colour, heartwood
Grading rules	Established guidelines: Nordic Blue Book, strength (stress) grades	Complex, appearance-based, open to interpretation
Result	Scanners widespread for decades	Hard to automate, harder to pay back

1 · WHAT THE AI SEES · NORTH AMERICA

Every defect named and measured

Red oak · green GRADED 2C & LOWER

23 defect types in hardwoods: wane, heart, stain, checks, shake, pin knots…



Hard maple · S2S GRADED FLOORING

Models learn to disregard watermarks, chain marks and grease.

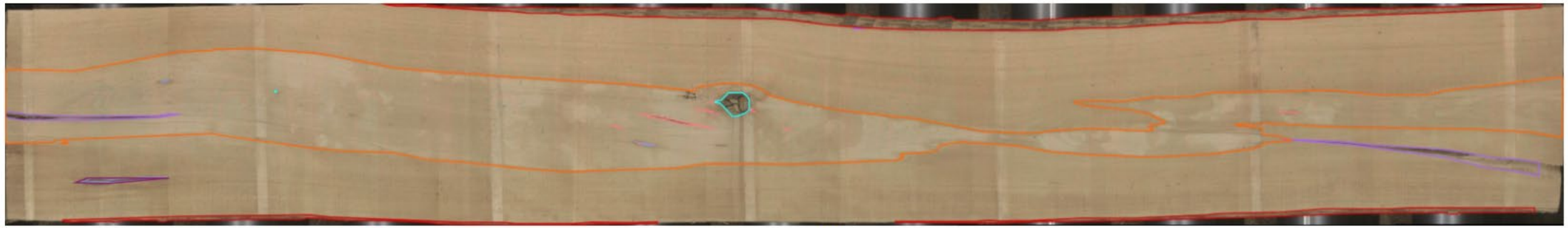


Beech and oak: the European species

Beech · kiln-dried

RED HEART OUTLINED IN ORANGE

Red heart, the toughest defect in European beech, with knots, splits and wane.

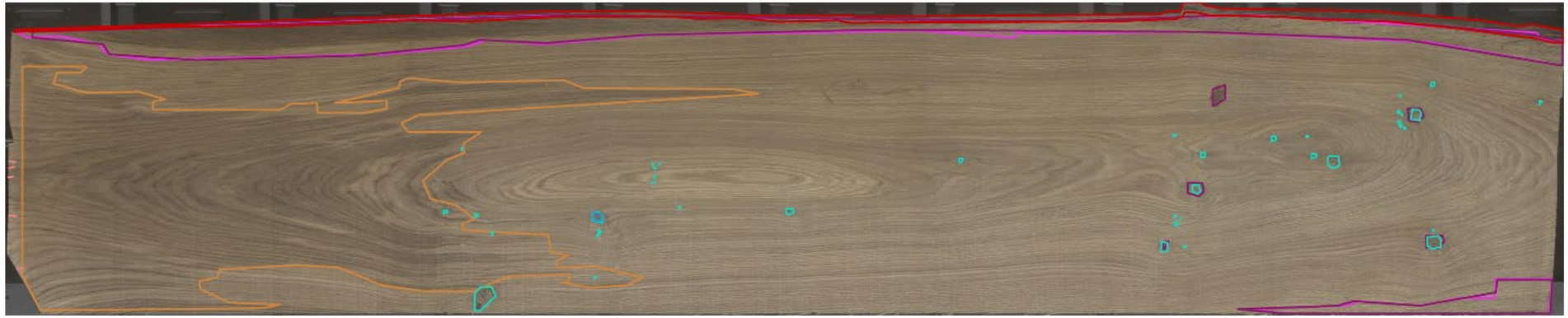


Check (10) · Bark (4) · Split (3) · Wane (3) · Unsound knot (2) · Red heart (2) · Through knot (1) · Stain (1)

Oak · green

COLOUR DEFECTS AND KNOTS

55 defects of 7 types on a single face, sap and cow tail included.



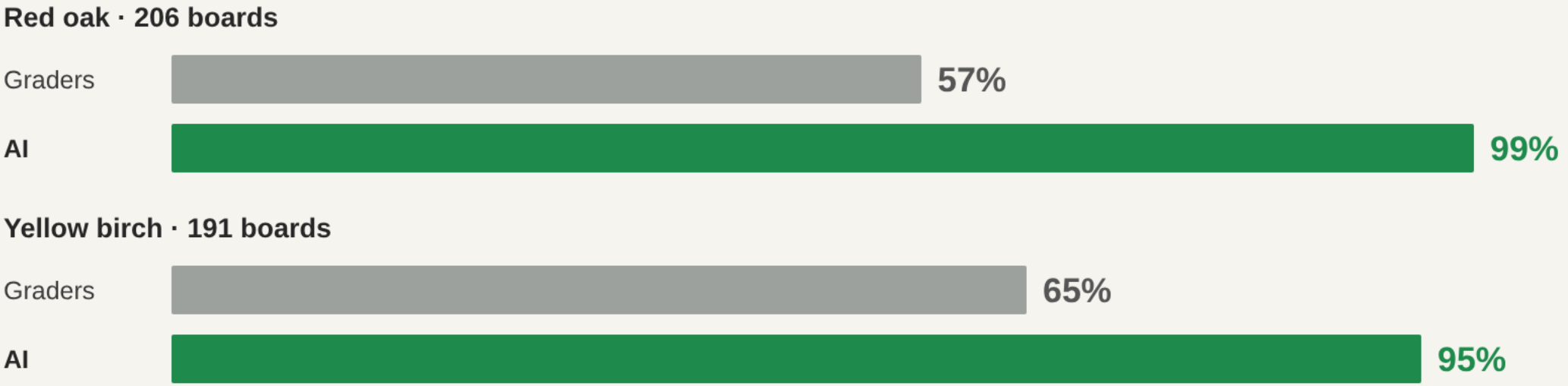
Unsound knot (38) · Stain (7) · Check (5) · Sap (2) · Cow tail (1) · Wane (1) · Sound knot (1)

2 · MEASURED GAINS · LARGE HARDWOOD MILL IN MICHIGAN, SEPTEMBER 2026

AI boosts grade precision: same boards, line graders vs AI

Each board was graded by the line graders and by the AI, then checked by the mill's inspectors to set the correct grade.

Boards graded correctly



2 · WHAT IS STILL HARD

Why every project takes months of work

ANNOTATION

The AI only learns what people have labelled on real boards

Every defect is outlined by hand, on both faces.

New labelled boards are needed for each:

- new species
- new surface (green, kiln-dried, planed)
- new defect type
- and in some cases, new region of origin

GRADING RULES

Every mill grades its own way, and few rules are written down

NORTH AMERICA

NHLA grade book, plus each mill's proprietary grades and its own reading of NHLA.

EUROPE

One rule book per company, mostly in the graders' heads.

So the grades must be refined with each mill in an interactive process: write each rule down precisely (which defects, what size, how many, on which face), grade sample boards, review them together, adjust, repeat.

Tech is evolving fast and will **accelerate project speed**.

3 · LOOKING AHEAD

How will AI grading change the industry?

01

Transparency in grading and measurement

Suppliers grade and measure precisely; buyers compare apples with apples.

02

Better use of material

Better cutting decisions, worth most in lower grades and unedged lumber.

03

From a black box to precise data

Mills and transformation plants test decisions on their own production.

Three suppliers, three "B grades"

Supplier 1 *"B grade"*



Volume: 9.8 m³
Grade: C in places
Yield: 71%

Supplier 2 *"B grade"*



Volume: 10.4 m³
Grade: graded loosely
Yield: 52%

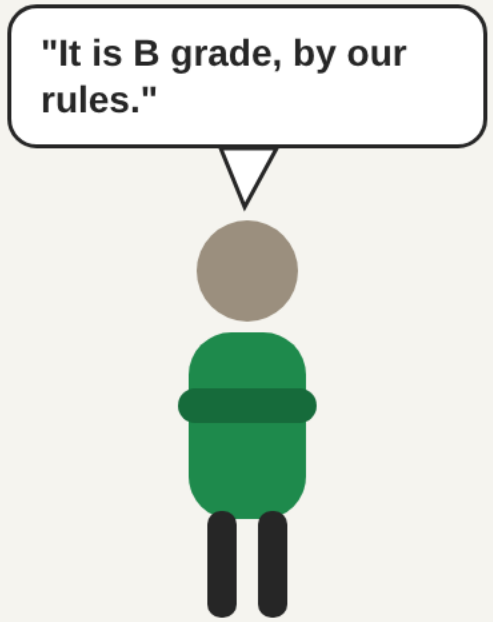
Supplier 3 *"B grade"*



Volume: 10.1 m³
Grade: own rule
Yield: 64%



The buyer



The supplier

Claims · Re-inspections · Flights to look at the lumber · Time lost on both sides

3.1 · TRANSPARENCY IN GRADING AND MEASUREMENT

Two problems, two fixes

PROBLEM 1 · INSIDE EACH SUPPLIER

Grades and measurement methods are unclear

BEFORE

Rules loosely defined and applied unevenly, from one pack to the next. The buyer finds out on arrival.

AFTER · SCANNER AT THE SAWMILL

The supplier must define its grading and measurement methods precisely and apply them on every board: more transparency, fewer claims.

PROBLEM 2 · BETWEEN SUPPLIERS

Every supplier measures and grades its own way

BEFORE

Three "B grades", three volumes, three yields. The buyer cannot tell which supplier really gives him the best value.

AFTER · SCANNER AT THE BUYER

m^3 and yield of every board measured, from every supplier: the buyer compares apples with apples.

3.1 · TRANSPARENCY IN GRADING AND MEASUREMENT

Board ID: claims solved remotely



EVERY BOARD HAS AN ID, LINKED TO

- Images of both faces
- Defect map
- Grade
- Dimensions & volume
- Pack / bundle

REMOTE CLAIM SOLVING

Supplier and buyer review the same board, online

A claim points to the board IDs. Both sides look at the same images and data and settle it, without a re-inspection trip.

EUDR

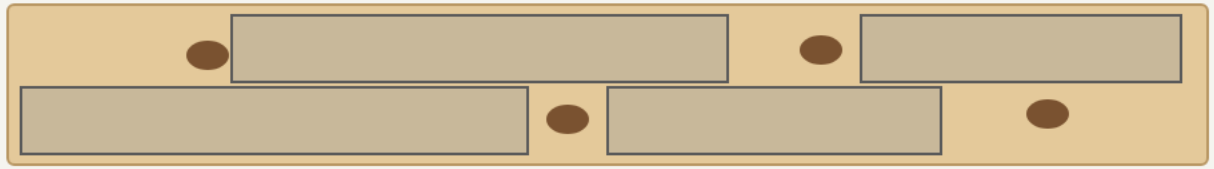
Board ID linked to EUDR data

The board ID can carry the due-diligence data of the lot it comes from, so compliance follows the wood down the chain.

3.2 · BETTER USE OF MATERIAL

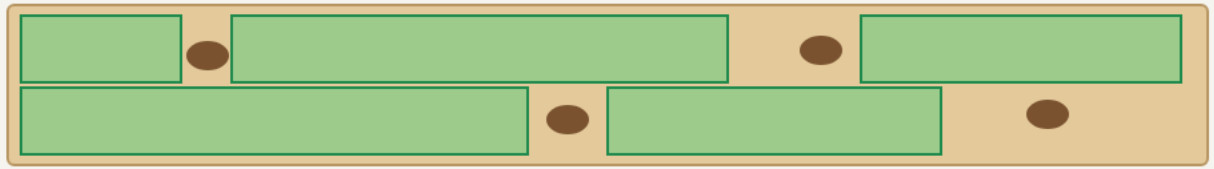
Humans are not good at optimising cuts. Scanners do the maths in seconds

Human decision · a few seconds, a few options



58%

Optimiser · every option against the cutting list



63%

+9% more parts

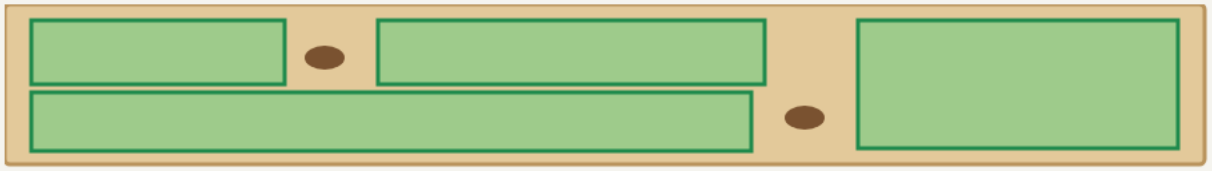
Better yield, and the gain is largest in **lower grades**, where cutting is harder and slows down production.

> *"The Chinese toy producer that buys A grade will disappear."*
>
> With an optimiser, a lower grade gives him the same parts.

Illustration. The optimiser computes the best combination of parts for each board in 2 to 6 seconds, depending on decision complexity.

Unedged lumber: harder to transform, bigger gain

Edged board · straight edges, a few decisions



Unedged board · wane, curved edges, many more possible cuts

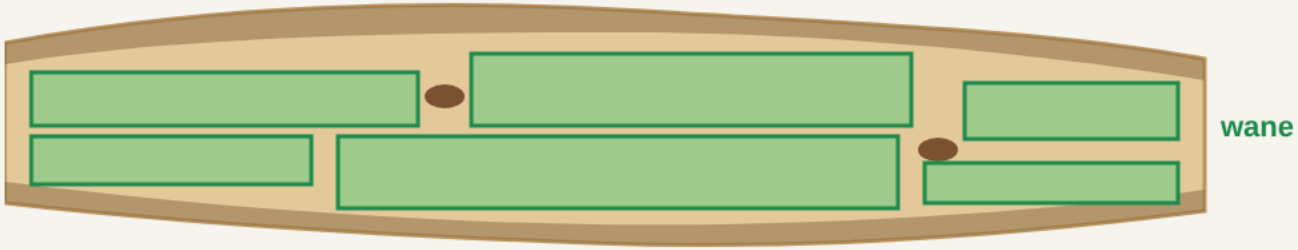


Illustration.

Like the lower grades, unedged lumber is **more complex to transform**: varying width, wane, curved edges and many more ways to cut each board.

So the scanner and the optimiser help it **disproportionately more**.

FOR TRANSFORMATION COMPANIES

Compare the yield from unedged and from edged material on their own production, and buy the one that pays.

3.2 · BETTER USE OF MATERIAL

Creating custom sorts becomes easier. Having enough bins is the issue

Today · what a grader can keep in his head



With a scanner · every customer's specification as a rule



Illustration. **Bright green**: lower-grade boards sorted for a customer who values them.

Mills already adapt part of their production to specific customers, but **in an artisanal way**, with poorly defined sorts.

And **the more complex the grading, the harder it is for people** to apply it consistently.

Machines solve both: any rule, applied to every board. Suppliers can offer **custom sorts much closer to what each buyer needs**. The only limit left is the number of bins.

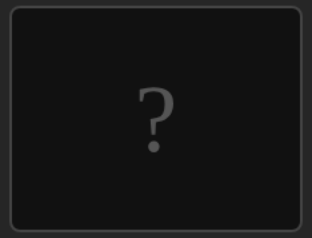
ESPECIALLY FOR LOWER GRADES

The right board for the right customer gives lower grades a value they never get in a generic sort.

3.3 · MILLS AND SECOND TRANSFORMATION

From a black box to precise data

WITHOUT SCANNER DATA



Wood in — Products out

Mills and transformation plants see totals per shift and per grade, but not what happens board by board, so every change to the rules is a guess.

→

GRADING RULES

What does a small change in a rule do to revenue?

Re-grade last month's boards with the new rule before touching the line.

SPECIAL SORTS

What does a sort for one customer or region earn or cost?

See which boards it takes and what the rest of the production is then worth.

PROPRIETARY GRADES

Which in-house grades add value, and which only add complexity?

Compare each grade with the standard it replaces, on the same boards.

PROFITABILITY

Where is the money made?

Compare value and yield by species, grade, product and customer.

With every board measured, a decision can be **tested on last month's production** before it is applied on the line.

TO REMEMBER

AI grading is a game changer for the hardwood supply chain.

Smart operators will want to be ahead of the game.

We want to work with the full hardwood supply chain, traders included.
Let's develop together solutions that make this industry more competitive!

Thank you · Sampsa Auvinen
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