NAU develops Wood Identification AI models for Teak, Malabar Neem & Ardu using Xylorix Platform

NAVSARI AGRICULTURAL UNIVERSITY
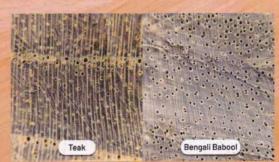
XYLORIX INSPECTOR
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- Navsari, 05 March 2022 -

Wood is a versatile raw material that has been used from time immemorial for domestic as well as heavy structural purposes. In India, there are over 4,500 wood-yielding species; of which 1,600 tree species have commercial timber value including some of the best known and highly prized tropical hardwoods. Moreover, more than 450 species have been well studied for various end uses. Wood is considered as one of the most multipurpose raw materials in India; therefore, it is highly demanded in the construction, furniture and building sectors. Although India is a timber-rich country and one of the major producers of tropical logs in the world, people still prefer some highly-prized timbers such as Teak, Sal, Rosewood, Mahogany, *etc*. It is reported that **India spends a huge amount of INR 22,000 crores (~USD 30 million) alone on Teak (*Tectona grandis* L. f.) cultivation annually** for different end uses.

Sawn teak planks arranged in stacks after processing@ wood depot, Waghai, Gujarat

Teak Bengali Babool

Magnified end-grain surface of a Teak and Bengali Babool captured using a Xylorix WIDK-24X01 illuminated macro-lens.

Due to the emphasis on forest conservation policy and legal regulations in India, timber extraction from forests has declined which resulted in an increase of timber prices. The combination of high demand of raw materials and high timber price have introduced the chance of adulteration of precious timbers with inferior ones due to their physical resemblance, which may bring monetary loss to unaware traders. For instance, **1% of teak wood in India is adulterated with Bengali Babool (*Acacia auriculiformis* A. Cunn. Ex Benth.) and sold in markets under the name of Assam teak.** In this context, identification of timber becomes important from a utilization point of view. Wood anatomy is a scientific way to identify adulterated timbers and to provide the entity of a particular woody species based on the unique microscopic structures present on different surfaces of wood. However, this skill is largely limited to the wood anatomical experts only. Although DNA barcoding technique is also available to identify important timber species, it is a much more time-consuming process.

To that end, Navsari Agricultural University (https://nau.in), Navsari, Gujarat, India has recently developed wood identification artificial intelligence (AI) models for three selected Indian timber species *viz.,* Teak (*Tectona grandis* L.f.), Malabar neem (*Melia dubia* Cav.) and Ardu (*Ailanthus excelsa* Roxb.) using Xylorix (https://www.xylorix.com) platform. These wood identification AI models are first of its kind to be developed in India on the Xylorix platform. The three AI models are available in the **Xylorix Inspector** mobile app under the name of Navsari Agricultural University (NAU) Model Album. **This work has been initiated and led by Dr. Satish Kumar Sinha, Assistant Professor (Wood Science & Technology) through the ICAR-NAHEP CAAST project, NAU, Navsari.** These expert-trained AI models are able to identify their assigned wood species through image recognition by looking at the magnified pictures of the wood end-grain surface. Having these AI models, with very little training, non-wood anatomical experts such as custom officers, farmers, border patrol and timber traders are able to quickly verify the said woody species to prevent adulteration and illegal transportation of mislabelled woods in the field with just a knife, an illuminated macro-lens, the Internet connection and access to the models using the Xylorix Inspector mobile app.

Three steps of wood identification process using Xylorix Inspector mobile app.

Xylorix Inspector app is an automated macroscopic wood identification app that is designed to be user-friendly and quick-to-use in the field. To use the app, users will need to prepare a cutting tool (a heavy-duty utility knife is recommended) and a WIDK-24X01 illuminated macro-lens. To identify a wood piece, users just need to follow the 3 simple steps [C.S.I or Cut, Snap and Identify]:
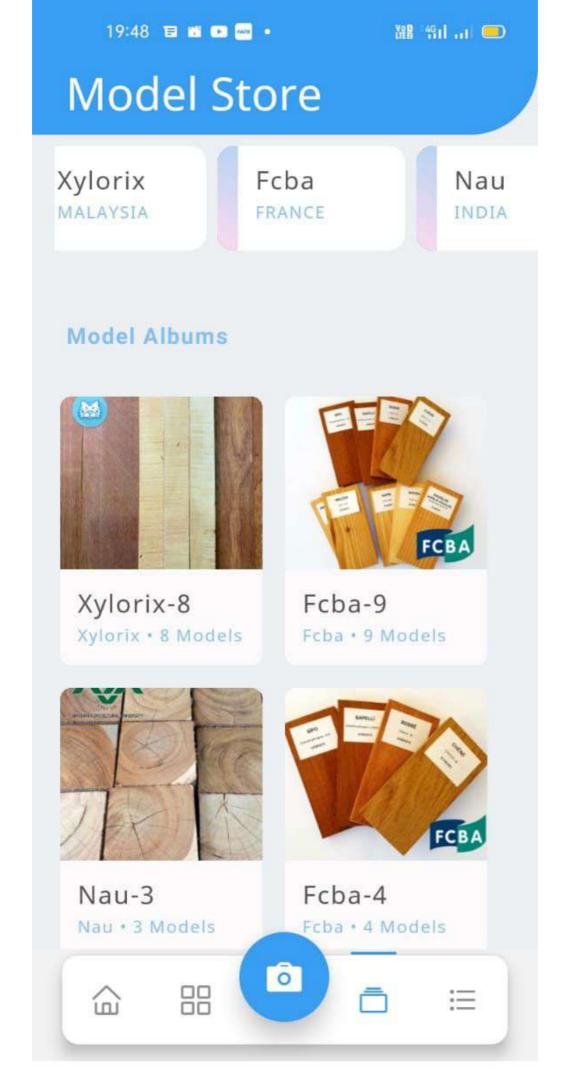
1. Cut the wood end-grain surface to reveal macroscopic features
2. Select a model and snap pictures of the revealed surface
3. The wood identification result is returned within a few seconds

The Xylorix Inspector app is available for both Google Android and Apple iPhone platform as linked below. For more information, users can check out the app user guide video on youtube or on the Xylorix website.

Xylorix Inspector (Android): http://bit.ly/XyInsp_Android
Xylorix Inspector (iPhone): https://apple.co/2TUCC9G
Xylorix Inspector user guide: https://youtu.be/C0CBZ_xmOOs
WIDK-24X01 illuminated macro-lens: https://www.xylorix.com/products/widk24x01

Model Store

Xylorix	Fcba	Nau
MALAYSIA	FRANCE	INDIA

Model Albums

Xylorix-8
Xylorix • 8 Models

Fcba-9
Fcba • 9 Models

Nau-3
Nau • 3 Models

Fcba-4
Fcba • 4 Models

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WIDK-24X01 illuminated macro-lens: https://www.xylorix.com/products/widk24x01