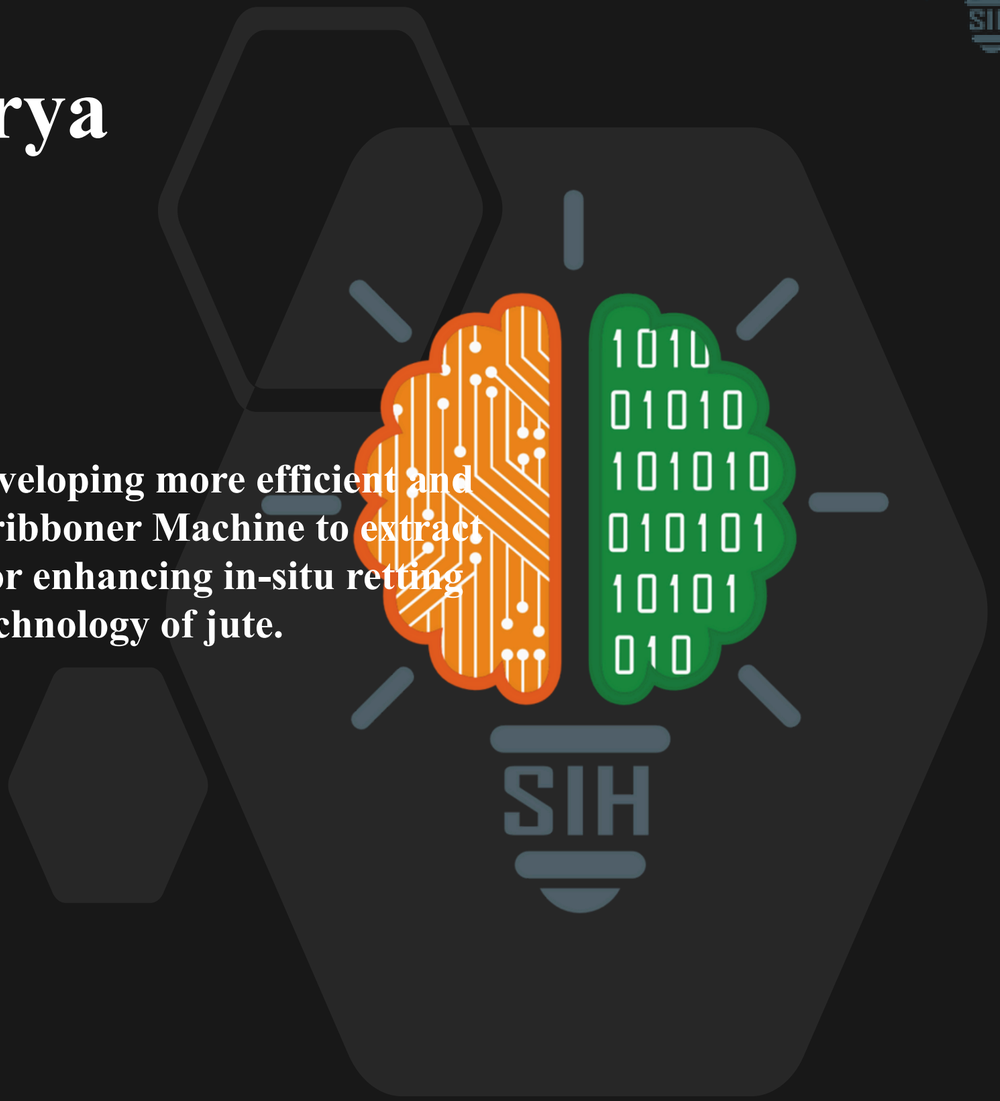
SMART INDIA HACKATHON 2025

Sourya

- **Problem Statement ID –25267**
- **Problem Statement Title-** Designing/developing more efficient and suitable jute ribboner Machine to extract bark/fibre for enhancing in-situ retting technology of jute.
- **Theme-** Agriculture, FoodTech & Rural Development
- **PS Category- Hardware**
- **Team ID-54534**
- Team Name - Teravax



Team Teravax

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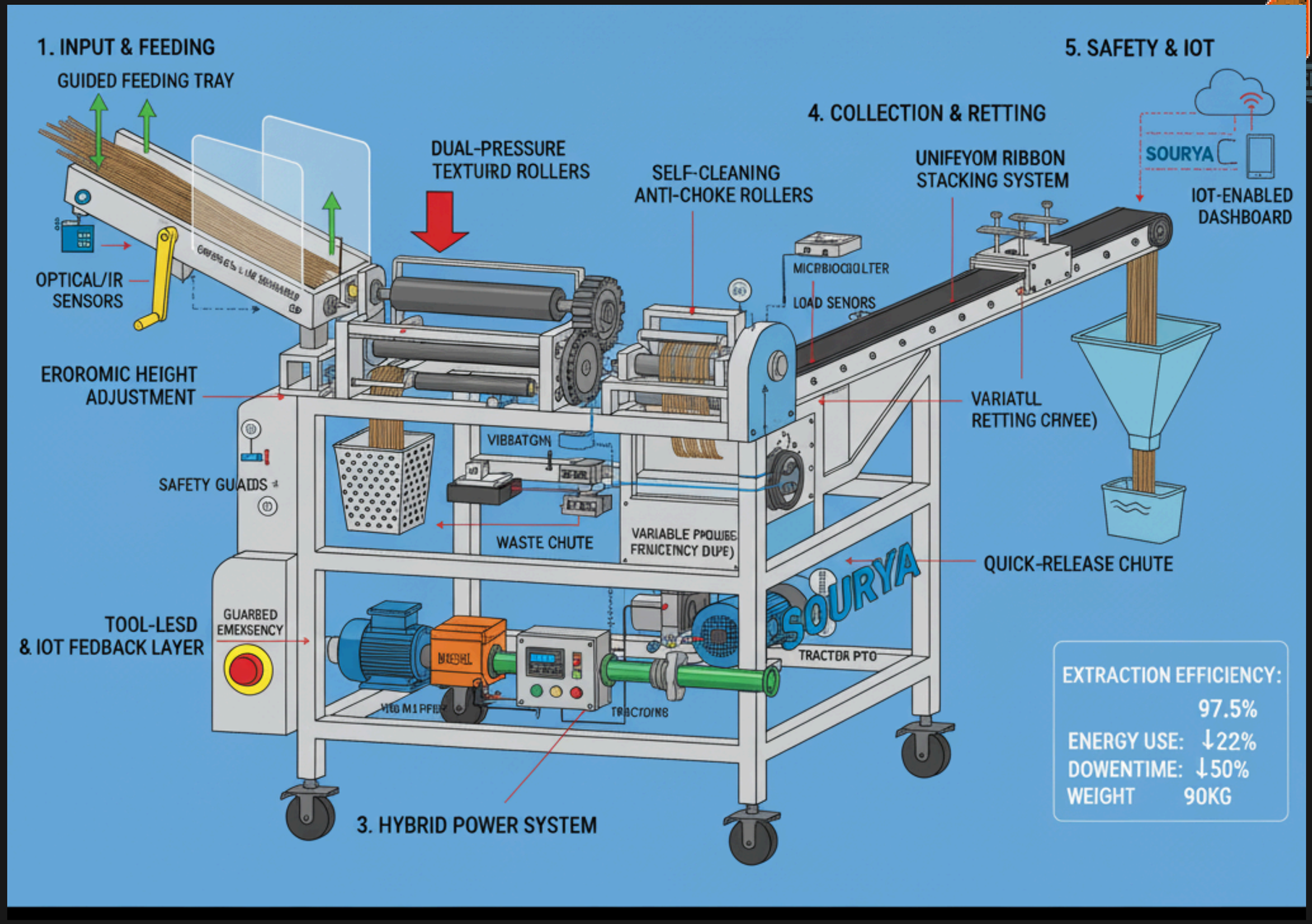

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IMPACT AND BENEFITS

SMART INDIA HACKATHON 2025

CURRENT MACHINES

Input & Feeding Stage (Crop Entry & Alignment)
- Manual feeding causes operator fatigue
- Uneven stalks jam during feeding
- No guided tray or alignment system

Extraction & Roller Mechanism
- Uneven rollers cause partial fibre extraction
- Frequent choking from pith residue buildup
- No pressure control or speed adjustment
- Slippage reduces grip and extraction efficiency

Power & Drive System (Motor Control & Energy Flow)
- High energy use and motor overheating
- No PTO or variable speed option
- Manual start-stop, unsafe during overload

Collection & Retting Handling
- Manual collection causes fibre tangling issues
- High water usage during retting process

Maintenance, Safety & Usability Layer
- No safety guard or emergency stop
- Heavy design reduces field portability

SOURYA (OUR MACHINE)

Smart Feeding & Auto Alignment
- Multi-source hybrid mode (PTO + Electric + Diesel)
- Smart VFD control for dynamic torque
- Auto-cutoff with intelligent load sensing

Precision Extraction & Roller Control
- Dual-pressure smart rollers for uniform extraction
- Self-cleaning rollers prevent fibre choking
- Variable speed-torque ensures smooth operation

Hybrid Power & Efficiency System – Adaptive Drive Control
- Multi-source hybrid — PTO, electric, diesel
- Smart VFD enables dynamic torque control
- Auto-cutoff with intelligent load sensing

Auto Collection & Retting Integration
- Conveyor-based collector with quick-release chute
- In-situ retting system reduces water use

Modular Safety, Mobility & IoT Feedback
- Guarded emergency stop with smart monitoring
- Wheel-based portable frame, tool-less upkeep

IMPACT AND BENIFITS

Faster , Cost Saving & Effortless Feeding
decrease ↓ 70% manual effort → 💪 lowers fatigue, ⚡ boosts throughput 250→420 bundles , 25 % cost saving

Superior Fibre Quality & Yield
Extraction ↑ 90→95.85% → ✨ uniform fibre, 🎀 fewer breakages, +12% premium output

Rapid & Sustainable Retting
Retting ↓30%, water ↓40% → ♻️ faster cycles, 🌍 pond-independent, 💧 eco-friendly

Safer & Smarter Operations
Downtime ↓50%, maintenance <5 min → 🚨 safer, 🧠 IoT diagnostics, ⚙️ reliable

Lightweight & Widely Adoptable
Weight ↓140→90kg, vibration ↓45% → 🚶 easy mobility, 👨‍🌾 small farmer friendly, ✅ adoption +45%

Energy-Efficient Hybrid Drive
↓ 22% energy/hour → 💰 cost ₹9→₹7/hr, motor life extended