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ESSEN

CASE STUDY

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inventaa

Leading grower and exporter of mushrooms pilots RFID-based solution for MUSHROOM FARM MANAGEMENT

Comprehensive solution for efficient overall resource and manpower management of mushroom farm

Efficient identification of production quantity

Real-time tracking of workflow and transportation of harvesting crates

INSIDE:

TECHNOLOGY

Solution:
EPC Gen2 compliant inventory and personnel tracking solution

Tag Type:
Metallica™ UHF Passive
Personna™ UHF Passive

Reader/Antenna:
Xtenna Proximity™
Xtenna Hybrid™
HandyScanna™

Method:
Multiple Tracking via Integrated Reader/Antenna modules

Single Tracking via hand-held

Integration Platform:
RFID Middleware:
Xtenna™ WebToolkit
Xtenna™ Studio
Application: Essen RFID's Farm Management System
Database: SQL Server 2005 Exp. ed.
ERP: Oracle

Tag Manufacturer/Supplier:
Essen RFID, with US based chip inlay

Reader/Antenna Manufacturer:
Essen RFID, with US based module

Systems Integrator:
Essen RFID

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Xtenna™ Integrated RFID Antenna/Reader

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KEY REQUIREMENTS:

Mushroom farms grow various types of mushrooms that need proper care right from growing to harvesting to transportation. Mushrooms are very sensitive to infection and if any growing area is infected with disease, the infection spreads rapidly to other areas in the farm. Hence constant care and monitoring is paramount.

Main challenges in implementation:

- Maintaining daily allowance of permanent employees as well as daily wage earners who are assigned variable jobs spread all over the farm area.
- Efficient allocation of manpower and other resources.
- Identifying quantity of mushrooms grown and ready for market.
- Quality maintenance and enforcing hygienic operations.
- Quick asset location and its efficient utilization.
- Maintaining operating procedures and processes in place with stringent parameters and standards.

SOLUTION:

Essen RFID introduced a RFID based mushroom farm management system that efficiently tracks the entire life-cycle of operations in the farm.

The technology tracks employee movement at the Entry/Exit security gate using Xtenna Hybrid™ antenna-readers. The HandyScanna™ hand-held device is used to assign tasks to employees working as pickers of mushrooms in the growing area. Xtenna Proximity™ is deployed in tagging harvest crates and in associating each tag to the weight data of the crate. It is also used to tag packing crates which are then tracked through HandyScanna™ to confirm that it is ready for transport.

The tracking system uses a SQL Server database and the central database operates using Oracle. Hand-held HandyScanna™ devices are connected over a Wi-Fi network.

IMPLEMENTATION:

RFID implementation at Inventaa required the deployment of the following RFID devices in specific areas:
Security gate - 2 Xtenna Hybrid™
Registration of crates - 1 Xtenna Proximity™
Growing area - 1 HandyScanna™
Packing area - 1 Xtenna Proximity™, 1 HandyScanna™

- Each employee is issued a PERSONNA™ RFID tag. Xtenna Hybrid™ antenna-readers are mounted at the security gate for tracking these employees as they enter or leave the premises.

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- Each area enclosure has a METALLICA™ RFID tag affixed at its entrance. METALLICA™ tags are also affixed to both harvest crates as well as packing crates.
- One Xtenna Proximity™ is used for registering crates, whereas the other Xtenna Proximity™ device is utilized in weighment of each harvest crate.
- HandyScanna™ devices are used for assigning crates to pickers and in confirming transfer of mushrooms from harvest crates to packing crates.

WORKING:

The RFID based mushroom farm management system enables optimum management of resources, and accurate utilization and efficient management of information in the entire operational life-cycle. The system deploys the following modules:

- Personnel Tracking
- Mushroom Tracking
- Asset Tracking

Personnel Tracking:

Personnel Tracking is used for marking daily attendance. The system tracks employee 'In' and 'Out' details in real time. Attendance is maintained for two types of employees:

- Permanent Employee
- Regular (daily wage) Employee

All permanent employees are issued an ID containing a PERSONNA™ RFID tag. The tag is registered once in the database at the time of issue. When the tag is detected at the security gate, the Xtenna Hybrid™ antenna-readers mounted there automatically log attendance entry and exit as per date/time and direction (in/out).

Daily wage employees on the other hand, are required to be registered daily in the database and are issued the PERSONNA™ tag on entry through the gate, at the time of which their tag is read and their attendance gets marked. On exit at the end of the working day/shift, the tag is recovered from them.

Mushroom Tracking:

This module tracks the entire process flow, from harvest crate registration to assigning picker to transfer of produce from harvest crate to packing crate. The following process flow shows the sequence that is followed along with related information and logs pertaining to each part of the process.

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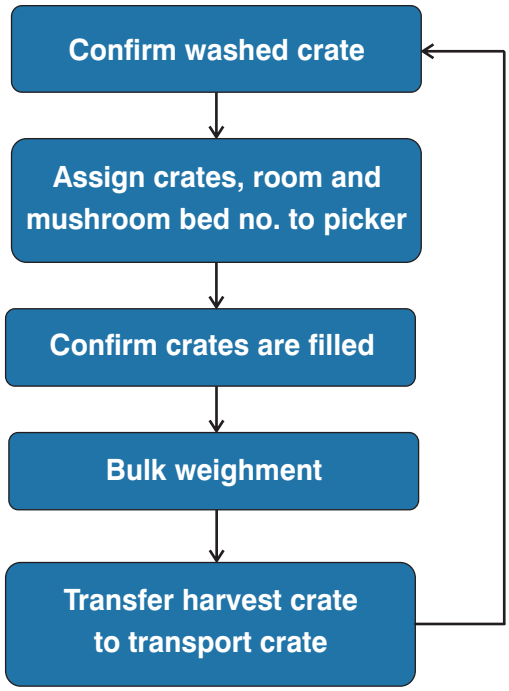
Process Flow:

1. Crate registration (one-time registration)
2. Harvest crate associated with Picker
3. Room (growing area) associated with Picker by Supervisor
4. Crate goes for bulk weighment
5. Mushrooms are packed in 200 gm. packets by the Packer
6. Packets are transferred to a transport crate
7. Transfer to transport crate is confirmed

Operation Flow - Crate Movement:

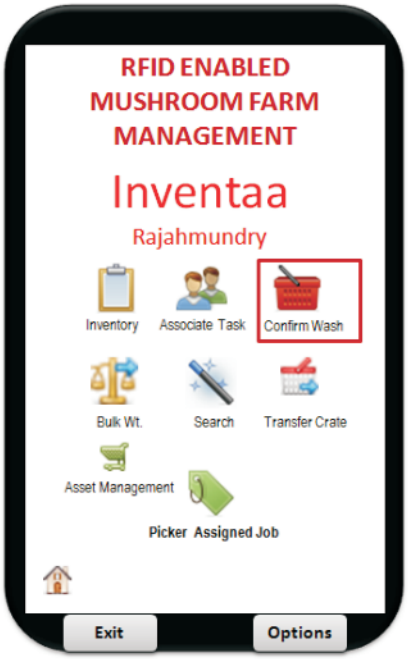


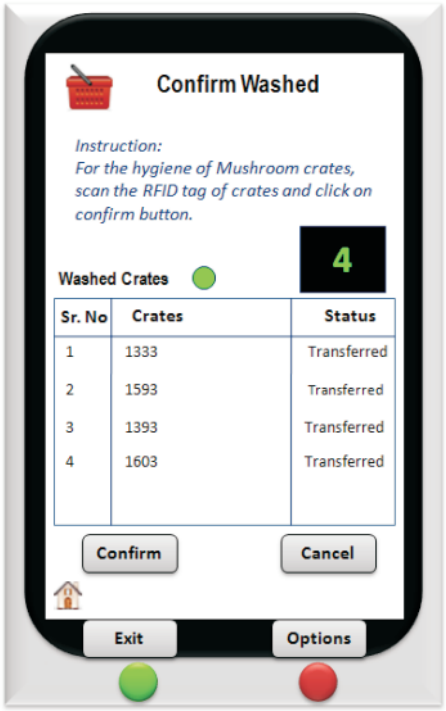
Operation Flow - Life-cycle:

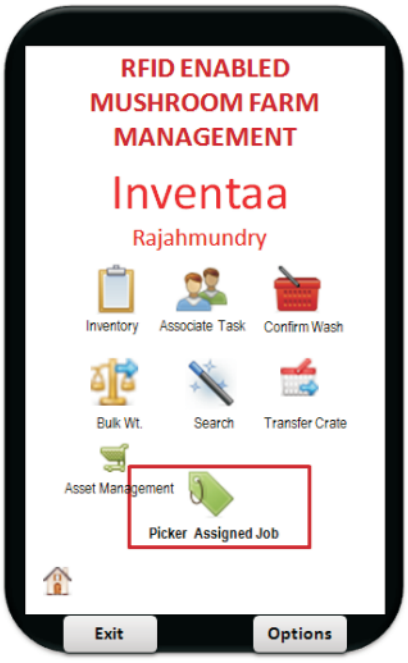
1. Crate registration
   Each crate is provided a one-time registration when it is first introduced in the system. The crate is affixed with a METALLICA™ tag and is registered into the central database by the Xtenna Proximity™ reader with information such as type of crate, crate number etc.

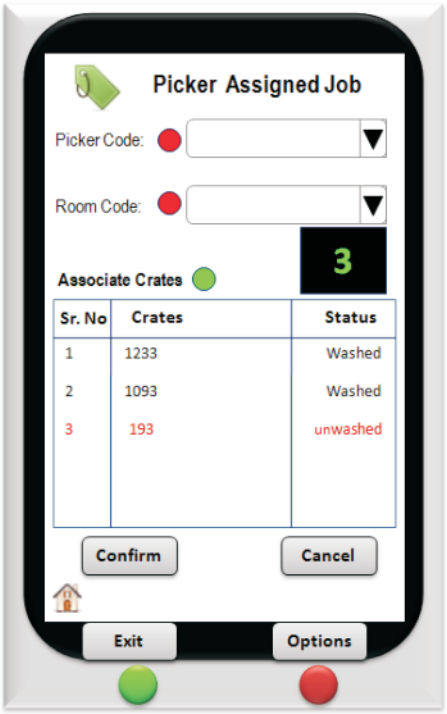
2. Crate Washing

Harvest crates are thoroughly washed to maintain full cleanliness. They are then scanned by the HandyScanna™ and confirmed in the system.









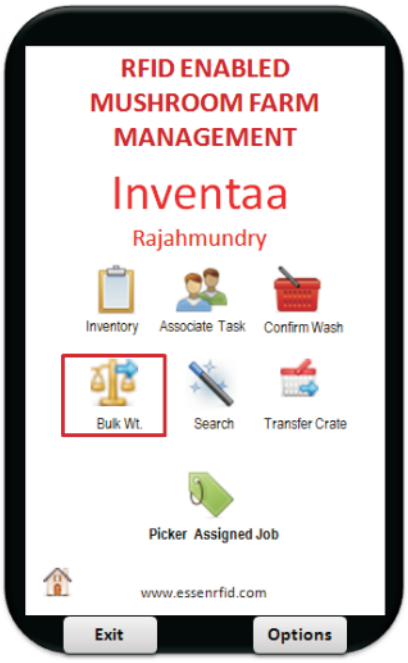
3. Assigning Task

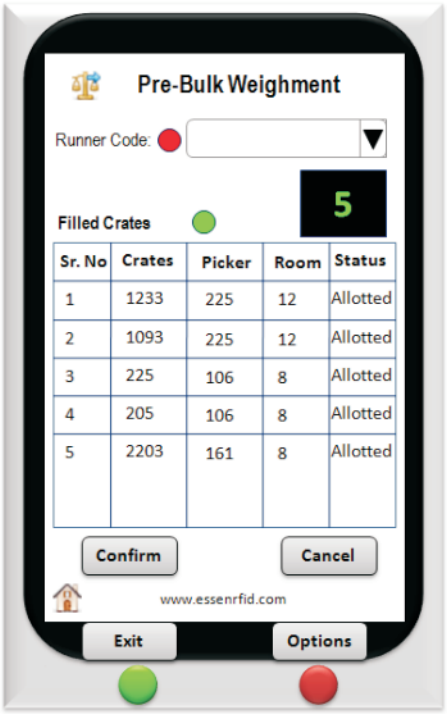
HandyScanna™ is used to assign mushroom harvesting tasks to Pickers by the Supervisor. The Supervisor selects the option on the HandyScanna™

display and scans the Picker's PERSONNA™ tag, the mushroom growing room's METALLICA™ tag and also scans the METALLICA™ tags on all the harvest crates given to the Picker. He then selects the mushroom bed from the list where the task of picking is assigned and finally confirms the assigning of task.

4. Bulk Weighment

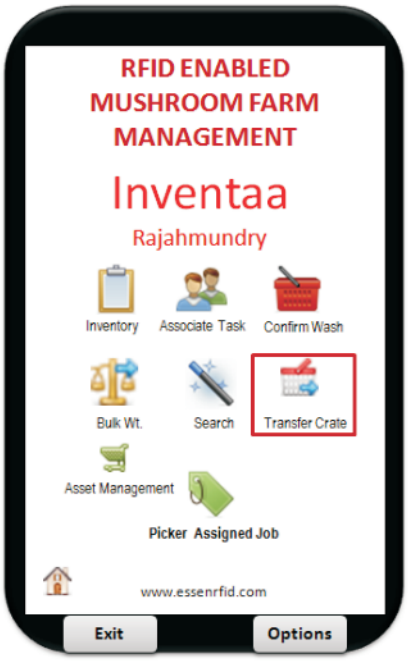
Before commencing bulk weighment, the Supervisor has to scan the filled harvest crates coming out of the growing room that are sent to him by the various Pickers. The filled harvest crates are then kept on the weighing machine. Each harvest crate tag is detected by Xtenna Proximity™ and the weighment taken on the weighing scale. The data captured automatically goes to the central database. The crates are then sent to the packing area.

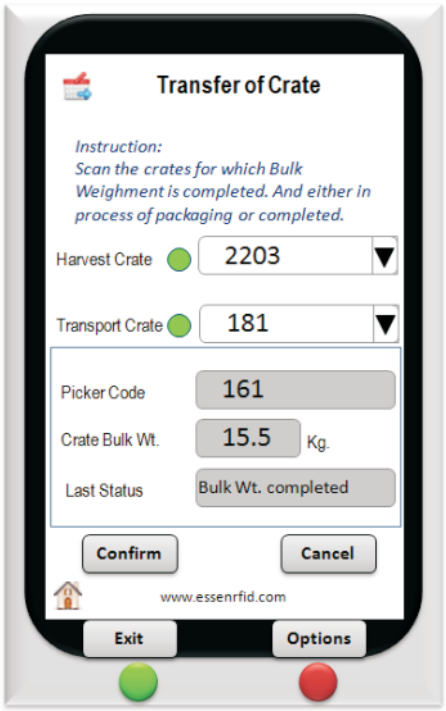




5. Transfer Crates

The mushrooms are now packed in 200 gm. packets by packing personnel. The packets are then put into a transport crate. The Supervisor using the HandyScanna™ scans the harvest crate and then scans the transport crate. He confirms the transfer and marks the harvest crate as empty but unwashed. The unwashed harvest crates are then sent for washing.





6. Associate Task

Using HandyScanna™, the Supervisor can also allot other tasks to workers, such as cleaning growing rooms, sterilizing them or watering. He selects the 'Associate Task' option in the application, then scans the employee's PERSONNA™ tag, selects a task from the list and confirms task allotment.

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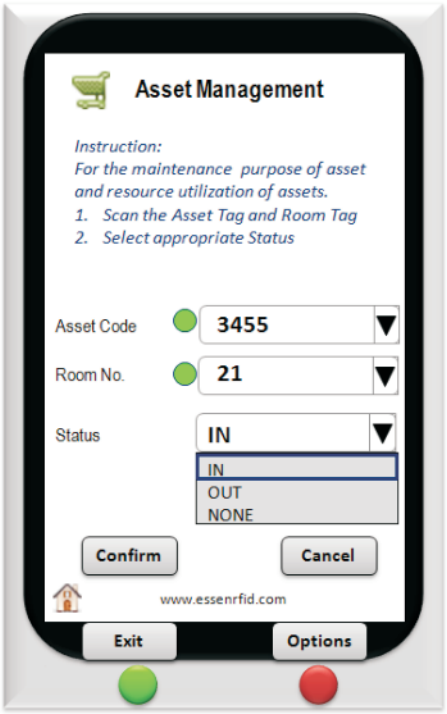
Asset Tracking:

This module is primarily used in the growing enclosures (rooms). The process is as follows:

1. The Supervisor selects 'Asset Management' within in the HandyScanna™ application.
2. Using HandyScanna™ he scans the asset's METALLICA™ tag.
3. The room's METALLICA™ tag is also scanned, in order to associate the asset with the room in the database.
4. The asset's status is selected on the HandyScanna™ screen as either 'IN', 'OUT' or 'NONE'. The asset within the room is marked as 'IN'.
5. If the asset is moved out of the room on completion of task, the 'OUT' option is selected to mark the asset as having left the room.



BENEFITS:

- Easy identification and attendance management of permanent and daily wage employees.
- Efficient resource management for the entire production life-cycle.
- Quickly and accurately ascertain individual employee productivity in quantity of mushrooms picked.
- Facilitates systematic monitoring and supervision, as well as report analysis.
- Ease in real-time ascertaining of asset status.

LINKS:

Hardware:

Xtenna Proximity™

Xtenna Hybrid™

Handy Scanna™

Tags:

METALLICA™

PERSONNA™

Software:

Xtenna WebToolkit™

Xtenna Studio™

Reference Example:

http://www.essenrfid.com/Mailer/manufacture-flash-demo.pdf