Licensing and Technology Transfer Opportunity: Manipal University

1. **Title of Technology Available**:
System and Method for Locating and Enabling Retrieval of Containers from a Tray (Technology name: Sample Retrieval System - InstaRet)

2. **Brief Description of Invention**:
The present invention relates to the field of sample/specimen information storing, archival and retrieval systems. More particularly, the present disclosure relates to a semi-automated system and method for sorting and identifying/locating vacutainers or any other containers placed in a tray to enable retrieval of the placed vacutainers from the tray in an efficient manner. A software that scans and extracts barcodes from images or videos and conveniently stores it in a database along with the position of the product in the tray it is kept.

3. **Brief Background of Invention**:
With the ever-expanding demand for diagnostics services, there is always a challenge to provide a valid report in the shortest possible time for effective management of clinical disorders. Realizing this, various diagnostic industries worldwide have come up with fully automated analyzers with high throughput that can generate large number of reports quickly. As these equipment's are thriving on consumables purchased from specific vendors, industries provide them to the lab by reagent rental contract without the need for procuring them. a moderate to high capacity diagnostic laboratory can process more than 500 samples daily. Once a sample is processed, the labs often receive request for additional tests/ reassessments, so samples are usually stored for 24 hours as per the NABL guidelines. But retrieving a sample after processing is very difficult and time consuming. This can be addressed if there is a proper system available for sample sorting and retrieving. Although there are vendors providing such solutions, they must be purchased and are usually not in the reach of any average lab as they are exorbitantly costly. Realizing this potential, this study has developed a prototype by using a hybrid model of image capture used in e-commerce platform and a software which can be installed in any computer, requiring minimum instrumentation/sophistication, hence making it affordable by all. Such solutions are certain to grasp attention of labs in a country like ours and might have a huge commercial potential.

4. **Describe the final product**:
The prototype developed is a portable minicomputer with a camera that can be deployed anywhere and scans the barcode from the live feed. It stores the position of the item along with its barcode in a database which can be easily managed using a user-friendly interface. The final product which we intend to develop is described in the Illustration below (Section 6).

5. **Technological Domain (Keywords)**:
Sample retrieval, Barcode, Vacutainer, Image capturing, Sample sorting

6. **Proof of Concept**:

The description of the prototype is explained below:

Method Description:
The proposed system basically works on two principles – Barcode image capturing and decoding barcode from images.

Steps involved:
1) Manually position ten barcoded vacutainers in a labelled rack with the barcodes facing the camera.
2) A camera (installed setup) would capture an image of all the vacutainers. The software will further decode the barcode into a number format, which will be saved in a designated position/slot complimentary to their physical position in the tray.
3) After the image is captured, a signal will be generated which would then mark the beginning of next cycle (step1-2), thereby storing the barcode numbers (unique identification number) of each vacutainer, so that a specific vacutainer could be retrieved at a later period.

The complete system setup will be connected to a conveyor belt and pedal having two ends – an input end which would receive the samples and an output end from where the processed samples will be collected manually to be placed in the vacutainer trays (For example: Tray 1, 2...).

Illustration
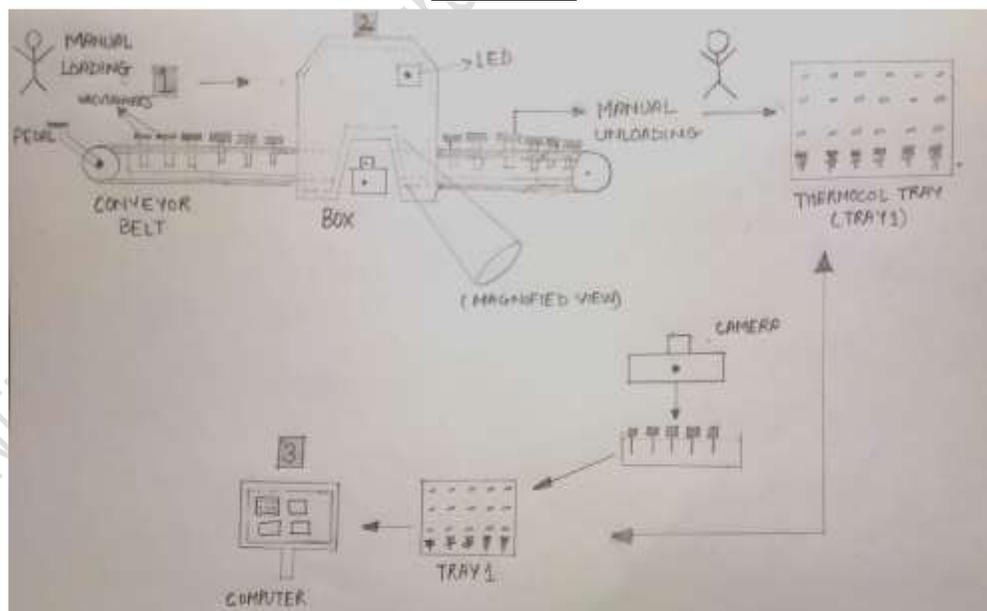
Please note that, we have presently made the prototype of the system, which demonstrates the image capturing and retrieval using camera and software (made by us) respectively (the other componenets of the system has not been designed yet).

7. **Stage of Development**: Prototype

Provide Information on Competitors who manufacture and/or sell similar products:
Roche Diagnostics, Beckman Coulter, Yaskawa Motoman Robotics

8. **What are the unique advantages your innovation has compared to the competition**:
- The present disclosure provides a system and method for sorting and locating containers placed in a tray.
- The present disclosure provides a semi-automatic system and method for sorting and locating containers placed in a tray to enable retrieval of containers placed in the tray.
- The present disclosure provides a simple and cost-effective system and method for locating containers placed in a tray to enable retrieval of containers placed in the tray.
- The present disclosure provides a system and method for locating containers/vacutainers carrying samples placed in a tray to enable easy retrieval of any of the containers/vacutainers placed in the tray.
- The present disclosure provides a precise and time-efficient system and method for locating containers carrying samples placed in a tray to enable retrieval of any of the containers placed in the tray.
- The present disclosure provides a system and method for locating containers carrying samples placed in a tray to enable retrieval and/or tracing of any of the containers carrying samples placed in the tray with enhanced accuracy and speed.
- The present disclosure provides a system and method for locating containers carrying samples placed in a tray to enable retrieval of any of the containers placed in the tray with reduced human interaction and efforts.

Commercial potential or economic application of the work:
The described system could be used in diagnostic laboratories wherein storage and retrieval of samples is necessary thereby reducing the manual effort and the burden of costly automated systems. Also, by implementing the principle of the proposed system, it can be used in fields like logistics and food industry.

9. **Intellectual Property Status: Indian Patent application with number filed in (mention year)**
Patent Application Number: 201941027085 (2019)