

## **EXPRESSION OF INTEREST for TRANSFER OF TECHNOLOGY**

### **“CT-VIEU System”**

An AI based conveyorised machine vision solution for quality analysis of dry red chilli



Issued by

Centre for Development of Advanced Computing  
Plot - E-2/1, Block-GP, Sector-V  
Salt Lake Electronics Complex  
Bidhannagar, Kolkata - 700 091 – West Bengal (India)  
Phone: +91-33-23579846/5989  
Fax: +91-33-2357-5141  
Website: [www.cdac.in](http://www.cdac.in)

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## Table of Contents

<b>SL No.</b>	<b>Section</b>	<b>Page No.</b>
<b>1</b>	Introduction	3
<b>2</b>	Brief about C-DAC	3
<b>3</b>	Brief description about the technology to be transferred	4
<b>4</b>	Invitation for Expression of Interest	5
<b>5</b>	Who can Apply	7
<b>6</b>	How to Apply	7
<b>7</b>	ToT Agreement	7
<b>8</b>	Validity & Renewal of ToT agreement	8
<b>9</b>	C-DAC Deliverables	8
<b>10</b>	Annexure-I (Part A & Part B) –(2 pages)	10
<b>11</b>	Annexure – II (Financial Bid Format)	12
<b>12</b>	Annexure – III (Product Brochure)	13

## 1. Introduction

C-DAC Kolkata has developed a product, namely, “CT-VIEU” – An AI based conveyorised machine vision solution for quality analysis of dry red chilli, under a MeitY funded program, titled, “National Programme on Electronics and ICT Applications in Agriculture and Environment (AgriEnIcs)”. C-DAC, Kolkata has design and developed of the hardware setup alongside crafting the AI-based image analysis solution for the quality analysis of chilli.

Centre for Development of Advanced Computing (C-DAC) invites “**Expression of Interest**” (EOI) from Indian companies for Transfer of Technology (ToT) from C-DAC to manufacture, market, sell and deploy **CT-VIEU system**, An AI based conveyorised machine vision solution for quality analysis of dry red chilli.

This document gives details about

- The product
- The terms and conditions for companies to propose their Expression of Interest and
- How to enter into Transfer of Technology (ToT) agreement based on the terms given herein.

## 2. Brief about C-DAC

Centre for Development of Advanced Computing (C-DAC) is the premier R&D organization of the Ministry of Electronics & Information Technology (MeitY), Government of India for carrying out R&D in IT, Electronics and associated areas. Different areas of C-DAC, had originated at different times, many of which came out as a result of the identification of opportunities.

C-DAC is working on strengthening national technological capabilities in the context of global developments in the field and responding to change in the market needs in selected foundation areas. In that process, C-DAC represents a unique facet working in close junction with MeitY to realize the nation’s policy and pragmatic interventions and initiatives in Information Technology. As an institution for high-end Research and Development (R&D), C-DAC has been at the forefront of the Information Technology (IT) revolution, constantly building capacities in emerging/enabling technologies and innovating and leveraging its expertise, caliber, skill sets to develop and deploy IT products and solutions for different sectors of the economy, as per the mandate of its parent, the Ministry of Electronics and Information Technology (MeitY), Government of India and other stakeholders including other funding agencies, collaborators, users and the market-place.

C-DAC, Kolkata is one of the 12 Centres of C-DAC in India and situated at most privileged and strategic location at Kolkata, India for pursuing R&D activities in the area of electronics & IT.

C-DAC Kolkata’s laboratory infrastructure and manpower have got unique strength of pursuing R&D activities in the fields blended with electronics & sensing system, machine vision and image processing, advanced instrumentation, soft computing and software development.

### **3. Brief description about the technology to be transferred**

The CT-VIEU System is an automated vision inspection setup designed for analyzing the quality of dry red chillies. It employs a digital camera linked to a computer via a USB connection to capture real-time images of chilli samples moving along a conveyor belt. These images are then analyzed using specialized software installed on the computer to assess various quality parameters of the chillies. These parameters include pod length categories (greater than 5 cm, between 3 to 5 cm), presence of broken chillies, discoloration, pods without stalks, presence of loose seeds, and detection of foreign matters such as stalks. The results are presented as percentage weights, allowing for precise quantification of quality attributes. This system finds application in quality control laboratories, facilitating efficient and accurate quality assessment of chilli samples.

**System Setup:** The CT-VIEU system is a conveyORIZED setup consisting of essential components such as a hopper equipped with vibration unit, a conveyor belt, and imaging unit for capturing the image of the samples for analysis. To avoid redundant frame analysis, the conveyor belt is segmented into four distinct frames using coloured rubber strips.

Enclosed within a cabinet to mitigate external interference, the camera captures high resolution images of the chilli samples. The CT-VIEU software, installed on the computer conducts samples analysis, generating percentages for various quality attributes. This process iterates continuously until the user triggers the "Stop" command.

Utilizing a user-friendly graphical interface (GUI), the software presents comprehensive reports of analyzed samples, allowing users to access real-time results or retrieve reports from past analyses with ease.

#### **3.1. Product Specification and features**

##### **3.1.1. Major Features**

- ConveyORIZED machine vision system with computer based solution.
- Automatic sample handling and vibratory spreading arrangement.
- Vision inspection cabinet with controlled LED based illumination.
- Digital camera for image acquisition.
- Online image analysis with graphical user interface (GUI).
- Estimation of quality based correlation with weight.
- Instant analysis and report generation.
- Quantification of Chillies' quality parameters e.g. pod length greater than 5 cm, pod length between 3 to 5 cm, broken chillies, discolour, pod without stalk, Good quality, loose seeds, foreign matters (stalks)
- Power supply- 220 Volt, 50 Hz AC
- System dimension (LxWxH) – 2700 mm, 580 mm, 1600 mm



Fig. CT-VIEU System.

### 3.1.2. Prospective End Users

- Agriculture Market (APMCs/ AMCs)
- Research Laboratories
- Agri/ Food Quality Control Laboratory

## 4. Invitation for Expression of Interest

- a) C-DAC invites “Expression of Interest” (EOI) from Indian Companies in the format given in Annexure-1 (Part A & Part B) and Annexure-II. Companies can become transfer of technology (ToT) partner of C-DAC based on the information furnished in Annexure – I (Part A & Part B) and Annexure-II subject to the assessment by the C-DAC.
- b) This invitation of EOI will be open till 23rd June 2024. Techno-commercial and financial bids received after this closing date will not be considered.
- c) The EOI offers received from the vendors shall be evaluated by C-DAC as per C-DAC ToT rule.
- d) The transfer of technology to selected party / parties will be done in a non-exclusive manner.

- e) C-DAC reserves the right in selecting a single party or multiple parties and the C-DAC decision in this selection process is final.
- f) The selected party / parties need to sign an agreement with C-DAC to be eligible for obtaining this technology.
- g) Participation in this EOI does not guarantee any association with C-DAC, unless the agreement is signed.
- h) The submission of the EOI shall include all such documents that are specified herein to prove the authenticity of their offer and any claim made therein. All cost and expenses associated with submission of EOI shall be borne by the bidder while submitting the EOI and C-DAC shall have no liability, in any manner in this regard, or if it decides to terminate the process of short listing for any reason whatsoever.
- i) There is neither a business guarantee nor any commitment for funding support from C-DAC to the selected ToT partner.
- j) C-DAC Kolkata reserves the right to extend the above mentioned bid submission deadline, in which case, all rights and obligations of C-DAC Kolkata and the bidders relevant to the previous bid submission deadline shall remain same for the extended deadline.
- k) C-DAC Kolkata also reserves the right to amend the EOI bid documents already published which would be binding on all the interested bidders. The amendment will be made available on C-DAC's website, i.e., [www.cdac.in](http://www.cdac.in) , well in advance.
- l) EOI bids that are incomplete in any respect or those that are not consistent with the requirements as specified in this EOI document or those do not adhere to the format given below under Annexure-I (Part-A and Part-B) and/or Annexure-II, may be liable for rejection and no further correspondences will be entertained with such bidders.
- m) During the evaluation process of the submitted EOI bids, C-DAC Kolkata may ask the concerned bidder to provide clarifications, if any, on its submitted EOI bid. The request for clarification from C-DAC Kolkata and the response from the bidder/s shall be in writing. No post-submission of EOI bids and/or clarification/s at the initiative of the bidder shall be entertained.
- n) Bidders of the received EOI bids may be called for making a presentation before C-DAC Kolkata's ToT Committee for their business plan.
- o) Representative/s of C-DAC Kolkata may visit bidder's premises, with prior information, to inspect and assess their facilities mentioned in their EOI bids.
- p) After the evaluation process of the received Annexure-I (Part A & Part B), C-DAC Kolkata will evaluate the Financial Bids (Annexure-II) of the selected bidders.
- q) C-DAC Kolkata reserves the right to reject all or any applications without assigning any reason thereof.
- r) Canvassing in any form would summarily disqualify the bidder.

## 5. Who can Apply

Any Indian Company or Start Ups willing to acquire ToT licenses, manufacture, market, sell and deploy 'CT-VIEU system' can apply.

## 6. How to Apply

Interested companies may send hardcopy of expression of interest by filling the template as per Annexure – I (Part A & B) and Annexure –II along with supporting documents to

### **Group Head, AEE Group**

Centre for Development of Advanced Computing

Plot - E-2/1, Block-GP, Sector-V, Salt Lake Electronics Complex

Bidhannagar, Kolkata – 700091, West Bengal (India)

Phone: +91-33-23579846/5989, Fax: +91-33-2357-5141

Email: [alokesh.ghosh@cdac.in](mailto:alokesh.ghosh@cdac.in);

Website: [www.cdac.in](http://www.cdac.in)

Hardcopies of Annexure-I (Part A & B) and Annexure-II need to be sent in separate sealed envelopes only and marked on top as

“Annexure-I (Company Profile and Technical Details)- EOI for ToT of CT-VIEU System” and

“Annexure-II (Financial Bid)- EOI for ToT of CT-VIEU System”

respectively along with the name and address of the bidder.

For any clarifications, may contact to the following emails.

Email: [alokesh.ghosh@cdac.in](mailto:alokesh.ghosh@cdac.in);

Also, mark a copy to the following email ids:

[amitava.akuli@cdac.in](mailto:amitava.akuli@cdac.in); [subrata.sarkar@cdac.in](mailto:subrata.sarkar@cdac.in);

## 7. ToT Agreement

- a) The ToT partner is selected based on the expression of interest submitted by interested companies.
- b) If selected, the company shall pay onetime ToT subscription fee (Upfront price) plus applicable taxes and sign the ToT agreement to become ToT partner of C-DAC. Onetime ToT subscription fee finalised by C-DAC shall be informed to all the bidders who have participated in the EOI.
- c) C-DAC shall sign the technology transfer agreement with the company on receiving the onetime ToT fee.
- d) The ToT will be granted on Non-Exclusive basis.
- e) The “CT-VIEU System” technology shall be transferred only after completing the full ToT payment.

- f) The software product activation license key shall be procured by the company from C-DAC for each unit manufactured and sold to the client on payment of the royalty charges plus applicable taxes in advance. C-DAC will provide a single-user software licence along with ToT.
- g) No ToT partner will be allowed to quote for “CT-VIEU System” or participate in the bid for product selling unless he/she enters into an agreement and pays the full ToT fees. The ToT fees are non-refundable. If any party offers/quotes the rates without an agreement with C-DAC, C-DAC will not be responsible for any such event.
- h) ToT will be done as per CDAC ToT guidelines.

## **8. Validity & Renewal of ToT agreement**

- a) Payment of ToT license fee grants the partner for manufacturing, marketing and selling “CT-VIEU System” for a period of **5 years** from the date of signing of the agreement
- b) For continued support beyond **5 years** the partner shall be required to renew the ToT agreement by paying the renewal charges on a mutually agreed-upon terms before the expiry of valid ToT agreement, which will be valid for a further extended period of **five years**.
- c) If the renewal is initiated after the stipulated period, a fresh ToT agreement needs to be signed by the company based on the EOI conditions prevailing at that time.
- d) If the renewal is initiated before ending the stipulated period (i.e.. five years, from the date of signing the ToT agreement), the ToT agreement will be renewed by C-DAC based on the terms and conditions prevailing at that time.
- e) Any customization requirements of the ToT partner shall be entertained by C-DAC only if a valid ToT subscription exists. Such customizations shall be undertaken by C-DAC at cost basis on mutually agreed terms and conditions.

## **9. C-DAC Deliverables**

- A. After paying the full ToT fees and signing the ToT agreement, C-DAC shall provide the following items to the ToT partner for production and product marketing.

The deliverables will be

- ToT Partnership certificate
- Technical Documentation of the product (e.g. technical specifications, Mechanical drawings, Schematic and PCB design with Gerber files, Manufacturing know-how, etc)
- Bill of Materials and sourcing details
- Test plan and procedure
- User manual
- Training to the technology recipients (upto 3 days training program) at C-DAC, Kolkata.
- Handholding support following ToT (One year after ToT)
- Single user software licence (Source code of the software will not be provided)

- B. Software licence (To be procured separately for each installation)



- The software product activation licence key shall be procured by the ToT partner from C-DAC for each unit manufactured and sold to the client in advance upon payment of the royalty charges plus applicable taxes. (Single user licence has been included in the upfront fees) (Source code of the software will not be provided)
- Optional: One-unit hardware setup as a demonstration module may be available with an additional payment of Rs. 4,00,000/- (excluding GST as applicable), excluding the cost of PC/ Laptop (With one-year warranty against manufacturing defect)

**For any queries please contact:**

**Dr. Amitava Akuli**

**Scientist - F**

Agri and Environment Electronics Group (AEE)

Centre for Development of Advanced Computing (C-DAC), Kolkata

Plot - E 2/1, Block - GP, Sector - V, Salt Lake Electronics Complex,

Bidhan Nagar, Kolkata – 700091. Mobile: +91 9830560405

Email: [amitava.akuli@cdac.in](mailto:amitava.akuli@cdac.in)

**Dr. Subrata Sarkar**

**Scientist - E**

Agri and Environment Electronics Group (AEE)

Centre for Development of Advanced Computing (C-DAC), Kolkata

Plot - E 2/1, Block - GP, Sector - V, Salt Lake Electronics Complex,

Bidhan Nagar, Kolkata – 700091. Mobile: +91 9433111038

Email: [subrata.sarkar@cdac.in](mailto:subrata.sarkar@cdac.in)

Annexure –I

**(To be submitted in a separate sealed envelope marked on top as “Annexure-I-( Company Profile and Technical Details )-EOI for ToT of CT-VIEU System” and the name and address of the bidder)**

**Annexure –I (Part-A)**

**Company Profile of the bidder**

A.	Company Profile
1.	Name of the Organization: Website:
2.	Name of the Contact Person: Address: Mobile: Landline: Fax: E-Mail:
3.	Year of Incorporation:
4.	Type of Organization <ul style="list-style-type: none"> <li>a. Public Sector/ Limited/Private Limited/ Partnership/Proprietary/ Society/ Any other</li> <li>b. Whether ‘Foreign Equity Participation (Please give name of foreign equity participant and percentage thereof)</li> <li>c. Names of Directors of the Board/ Proprietors</li> <li>d. Name and address of NRI(s), if any</li> </ul>
5.	Category of the firm: Large/Medium/Small scale unit / Others
6.	Address of the Registered Office: (Include Certificate of Registration)
7.	Number of Offices with addresses (Excluding Registered Office): India, ..... Abroad:.....
8.	Certificate of registration as a manufacturing unit
9.	Permanent Account Number
10.	GST Reg. No.
11.	ISO or any equivalent Certification

## Annexure – I (Part B)

### Technical Details of the bidder

1.	The organization must be a reputed firm/company/SME/start-up/R&D company incorporated in India.
2.	The turnover is to be supported by financial statements of accounts/ Annual reports duly certified by a Chartered accountant/ Balance sheets of last 3 years/ Income tax returns for the last 3 years period.
3.	Company profile, giving details of current activities and management/ personnel structure including evidence of incorporation. The company should be registered and ISO or equivalent certified.
4.	Details of absorption of technology for a product/knowhow that has been taken up on production scale in the past may also be given
5.	The manpower strength (Technical: Mechanical, Electrical, Electronics, Software & Nontechnical etc.) at various levels to be furnished Technical: a. B.E./ B.Tech / M.Tech / PhD b. DIPLOMA c. SKILLED TECHNICIANS d. UNSKILLED
6.	The list of machine tools /equipment/software/facilities available related with work to be furnished.
7.	The in-house technological expertise available to be furnished
8.	The list of equipment available for inspection and quality control to be furnished.
9.	The industry should have adequate space for undertaking this work. Available space - Cover & Open and location details to be furnished.
10.	List of products/technologies worked with as regular activity in last three years. Give the list of products/technologies with general specifications and the customers.
11.	List of PSUs/Govt..customers – with contact details (Address, Telephone no., Contact Person)
12.	The details of sales, marketing and maintenance network to be furnished
13.	The list of technical collaborators for various ongoing products may be furnished
14.	The bidder shall provide details of the sub-vendors in case they propose to employ for Part work.
C.	<b>Expression of Interest: Spell out the extent of interest and envisaged market potential</b>

I hereby declare that the above information is true to the best of my knowledge.

Signature with Name & Seal:

Place:

Date:

**Annexure-II  
Financial Bid Format**

**(To be submitted in a separate sealed envelope marked on top as “Annexure-II-( Financial Bid )-EOI for ToT of CT-VIEU System” and name and address of the bidder)**

**Price bid One Time ToT subscription cost and Royalty**

Sl. No.	Product	Company status	ToT cost for 5 years in Rs. (excluding taxes) (Upfront fees)	Royalty per unit selling with software licence (for 5 years) in Rs. (excluding taxes)
1	CT-VIEU system with software			

**Additional cost:**

I am interested to buy one CT-VIEU system for demonstration purpose? (YES/ NO)

If YES, an additional cost of Rs. 4,00,000/- (excluding GST as applicable), excluding the cost of PC/ Laptop, needs to be paid to C-DAC, Kolkata at the time of ToT.

I hereby agree with the terms and condition of ToT by C-DAC and am submitting the financial offer.

Signature with Name & Seal:

Place:

Date:

## Annexure – III – PRODUCT BROCHURE



# CT-VIEU An AI based Conveyorized Machine Vision Solution for Quality Analysis of Chilli

### Quality Attributes of Chilli(Export Standard):

- ⊙ Colour: Must be bright red
- ⊙ Length: Greater than 5cm (less than 5cm allowed only 5% by weight)
- ⊙ Foreign Matter: Less than 2%
- ⊙ Broken Chillies: Less than 7%
- ⊙ Loose Seeds: Not more than 2%
- ⊙ Damage and Discolored Pods: Allowed up to 6%
- ⊙ Pods without Stalks: Not more than 8%



Different types of dry red chillies

### Problems with present Manual method of Analysis:

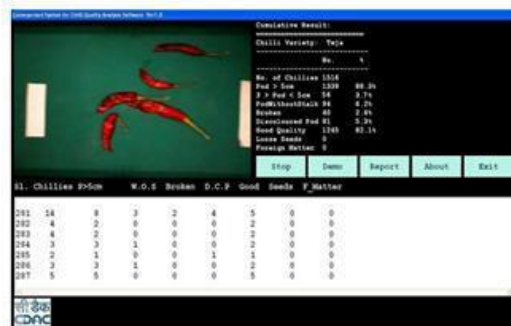
- ⊙ Process involves human perception, which is highly subjective and prone to errors
- ⊙ Time consuming process

## CT-VIEU - Chilli Assaying Machine

An AI and Image Processing based Quality Assaying Solution for Appearance based Quality Attributes



Conveyorized Chilli Quality Assaying Machine



Software Screen Shot for Analysis of Chillies

### System Features:

- ⊙ Conveyorized machine vision system with computer based solution
- ⊙ Automatic sample handling and spreading arrangement
- ⊙ Image acquisition by digital camera with controlled LED based illumination
- ⊙ Online Image analysis with graphical user interface (GUI)
- ⊙ Estimation of quality based on count and correlation with weight
- ⊙ Instant Analysis & Report Generation with email/printing facility
- ⊙ Quantification of Chilli Quality parameters.
- ⊙ Can be customized for other spices, say Cardamom, turmeric, etc

### Target Beneficiaries:

- ⊙ Farmers, Traders and Exporters
- ⊙ APMCs, Mandies and Processing Industries
- ⊙ Commercial Agriculturists
- ⊙ Research and Quality Control Laboratories
- ⊙ Govt. Authorities and Stakeholders of Agri-Marketing at all levels

### Benefits:

- ⊙ Image processing based non-invasive technique.
- ⊙ Fast and reliable
- ⊙ Buyers would be aware of Quality before buying.
- ⊙ Farmers would get better prices.

CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

Plot-E2/1, Block-GP, Sector-V, Salt Lake Electronics Complex, Bidhan Nagar, Kolkata - 700091

Contact: 033-2357- 3581

E-Mail: alokesh.ghosh@cdac.in