Format for

Expression of Interest
For the Collaborative Development and Technology Transfer in respect of the
Project

**"Artificial Intelligence enabled Alternative Augmentative Communication (AAC)
software to provide
Supervised Speech and Language Therapy"**

A research project jointly piloted by

**Mar Baselios College of Engineering and Technology(MBCET)
(Autonomous)
Thiruvananthapuram**

And

**Institute for Communicative and Cognitive Neuro Science(ICCONS)
Thiruvananthapuram**

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous College affiliated to APJ Abdul Kalam Technological University)
Mar Ivanios Vidyanagar, Nalanchira P.O., Thiruvananthapuram-695015

August 2023

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1. Introductory Note

- This form is a suggested format for submitting the Expression of Interest and the supporting information by the individuals/institutions/ industries/ consultancy firms, in collaborating with MBCET and ICCONS for the collaborative development and technology transfer, in respect of the project "Artificial Intelligence enabled Alternative Augmentative Communication (AAC) software to provide Supervised Speech and Language Therapy".
- Interested parties, who are technically competent, financially viable and socially committed and are interested in the collaboration may submit the Expression of Interest in this format. However, parties can provide information in their own format with details. They shall also submit the supporting additional documents as listed in the annexure of this format that are deemed to be relevant to support the claims on the competency of the bidding party.
- Evaluation of the EoI will be conducted by the Committee appointed by MBCET and ICCONS. Decision of the Committee shall be final.
- Late, unsigned and incomplete EoI is liable to be rejected in the first level screening and only the pre-qualified offers will be evaluated further.
- The EoI will be evaluated based on the parameters like expertise, future plans, financial viability, funding offers, collaborations, etc. keeping the success of the collaboration in perspective.

2. INTRODUCTION AND BACKGROUND:

Institute for Communicative and Cognitive Neuro Science(ICCONS) established in 1998 is the first of its kind of institutions in the field of Cognitive Neurosciences in Asian countries. The Institute has a broad perspective of research and development in the field of cognition, communication, human robotics, and navigation(URL:www.iccons.co.in)

Mar Baselios College of Engineering and Technology(MBCET) established in 2002, is an autonomous engineering college, situated in Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram. The College has become autonomous in 2020 and is affiliated to the APJ Abdul Kalam Technological University. College offers undergraduate and postgraduate degree programmes in engineering and technology(URL:www.mbcet.ac.in) College secured the NAAC Accreditation with A Grade and CGPA 3.13 out of 4 in 2016. There are cutting edge programmes and research offered by MBCET.

Institute for Communicative and Cognitive Neuro Science(ICCONS) and Mar Baselios College of Engineering and Technology(MBCET) have entered into a collaboration through a Memorandum of Understanding for jointly developing an Assistive Application software tool (Assistive App) for helping the autistic children under the age of 15 years, in multiple ways. As per the expectations this App would help the autistic kids to communicate through their thoughts and emotions, share ideas, needs and wants and enhance their learning capabilities in a more compassionate and cooperative manner. From the previous studies of ICCONS and others it was noticed that the difficulty in recognizing emotions and intense negative emotions are some of the characteristics of people with Autism Spectrum Disorder(ASD). Due to the communication problems they fail in aptly communicating their emotions. This often leads to increased anxiety levels and occasionally self-destructive behaviour of such persons. In this context it is envisaged that a technology enabled solution that can be developed through the proposed project, in which more advanced techniques can be employed at the therapeutic levels. It is anticipated that an assistive app in a deployable form can personally help the children with Autism Spectrum Disorder (ASD) to improve their understanding of the emotions and would help them to communicate their needs in a more effective manner.

3. Scope

3.1 Development of AI-enabled AAC Software:
The primary goal of this project is to develop a self-contained, self-correcting ICT tool which will be an Artificial Intelligence (AI) enabled Augmentative and Alternative Communication (AAC) software. The software will facilitate communication for individuals with speech and language disabilities, especially those with Autism Spectrum Disorder ASD. The development involves the following key components:
   a. Emotion Recognition System:
   b. Text-to-Speech Conversion:
   c. Application Integration and Visualization/Alert:

3.2 Comparative Analysis and Outcome Measures:
After developing the AI-enabled AAC software, the next step is to conduct a comparative analysis with existing AAC software to evaluate its effectiveness. The evaluation will focus on three key areas:

a. Quality of Life:
Conduct surveys, interviews, or use standardized quality of life assessment tools to measure the impact of the AI-enabled AAC software on the users' overall quality of life. This assessment will consider factors such as emotional well-being, social interaction, and independence in communication.

b. Language Recovery for Verbal Users:
For individuals who are verbal but have speech difficulties, evaluate how the AI-enabled AAC software aids in language recovery or improvement. Measure the user's language abilities before and after using the software to determine its impact on their communication skills.

c. AAC-Enabled Communication:
Compare the effectiveness of the AI-enabled AAC software with existing AAC tools in facilitating communication for non-verbal or minimally verbal individuals. Assess the ease of use, accuracy, and speed of communication achieved with the AI-enabled software compared to traditional AAC methods.

By conducting a thorough comparative analysis and outcome measures in these three areas, the researchers can gain insights into the efficacy and benefits of the AI-enabled AAC software. The results will help in further refining the software and understanding its potential for positively impacting the lives of individuals with speech and language disabilities.

4. Who can submit the EOI?

The proposal for the development of an AI-enabled AAC software can be submitted by various entities(Startups/industries/consulting firms) or individuals who have the necessary expertise and resources to undertake the project. They are hereinafter referred to as "Consulting Firm" in this format.
Potential proposers include:

a) Academic Institutions: Research groups, departments, or institutions with expertise in artificial intelligence, machine learning, natural language processing, and assistive technologies can submit the proposal. Universities and colleges often have research centres that focus on accessibility and disability-related projects.

b) Nonprofit Organizations: Nonprofit organizations that work in the field of disability support, assistive technologies, or improving the lives of individuals with speech and language disabilities may also submit proposals. These organizations may have a strong understanding of user needs and practical implementation.

c) Technology Companies: Companies specializing in AI, software development, or assistive technology solutions could propose to develop the AI-enabled AAC software. Such companies may have access to relevant technology and skilled development teams.

5. How to submit the EoI?

EoI along with the enclosures complete in all respects, has to be submitted in sealed envelopes super-scribed with the title of the project and the addresses. (***Please see the Annexures for the suggested formats***)

5.1 What is expected from the consultancy firm?

As this is a collaborative project with ICCONS and MBCET, the Consulting firm should be open to working closely with these institutions, engaging in effective communication, and actively participating in the joint development, experimentation and validation processes. The EoI should also include financial offers, indicating the proposed budget and cost estimates for the development and implementation of the AI-enabled AAC software. The Consulting firm should be ready to collaborate with ICCONS and MBCET on the development and technology transfer aspects of the project. This may involve sharing knowledge, expertise, and resources for the successful completion of the project. It's common for revenue sharing arrangements to be tailored to the specific project and the

unique contributions of each party. It's essential for all parties involved to have a clear understanding of these arrangements to ensure a fair and equitable distribution of revenue based on their respective contributions and efforts. The need for revisions can arise due to various factors, such as evolving requirements, unforeseen challenges, or the pursuit of continuous improvement. Providing support for revisions demonstrates a commitment to delivering a high-quality product and ensuring that the final output aligns with the project's objectives. ICCONS and MBCET have jointly studied the technical viability. So, Consulting firm has to support in accelerating the data collection, validation and development of the product which is secure and end to end user-friendly. Data Collection may need survey through interactive media for a longer duration with the end user, which is uncertain at this level.

5.2 **Status of the work done**.

The Dhwani App(**rights reserved**) is an innovative AI-powered app developed by the ICCONS-MBCET Study Group using Flutter and designed using Figma, with a primary focus on helping kids with speech disabilities to communicate effectively. The app incorporates both Text-to-Speech and Speech-to-Text features, making it a comprehensive communication tool. The communication process is facilitated through interactive tiles, where clicking on a tile generates an audio message in either English or Malayalam, conveying the content of that specific tile. Additionally, the app allows users to use a microphone or keyboard to input keywords, which then prompts the corresponding tiles to appear, aiding in easier communication. To enhance user experience, the app features a personalized quick access home page based on each child's preferences and likings. Furthermore, the app utilizes a recommendation system that suggests relevant tiles based on the child's past usage patterns. This personalized approach ensures that the app is tailored to the specific needs and preferences of each individual user. Overall, the Dhwani App serves as a powerful and user-friendly tool for children with speech disabilities, empowering them to express their thoughts and ideas effectively.

The Group has successfully implemented some of the features so as to implement in the beginning: such as the picture tiles, recommending them, a personalized quick access library. Group have also added speech to tiles, a feature where, words spoken by the user is converted in the form of tile suggestions that can be recommended to the user. We have implemented keyboard functionality using tiles, such that, users can pick tiles and form sentences and phrases, which then will be spoken out from the device. A library of tiles is created that contains the basic vocabulary tiles that an average user could require in their day-to-day life.

6. **Address to which the EoI has to be sent**:

   The Principal
   Mar Baselios College of Engineering and Technology
   Mar Ivanios Vidyanagar
   Nalanchira P.O.
   Thiruvananthapuram-695 015
   Kerala

7. Last Date: **07 September 2023, 05:00PM**

Note: See the Annexures for further details and the formats

Annexure 1

Form – 1: Technical Experience of Firm

A. Experience of the firm in the field

Experience Details											
Sl. No.	Project Name	Project Period	[1]Contract Identification and Title	Name, address, email, phone, fax and web address of Employer	Total Contract Amount in USD	If partner in a JV, specify participation of total contract amount		Brief Description of the consulting services Executed by the Consulting firm / member(s) of Consulting firm	Role of Consulting firm /member(s) of Consulting firm (Lead/Non-lead)	Country of Project Implementation (in reference to country of constitution of the consultancy firm)	
						Total	Percent of Total			Home	Abroad

Annexure 2

Form 2: Financial Competence of Firm

Financial Strength

Each Consulting firm or member of a JV must fill in this form

	Financial Data for Previous 3 Years [INR]		
	Year 1:	Year 2:	Year 3:
1. Total Assets			
2. Current Assets			
3. Total Liabilities			
4. Current Liabilities			
5. Profits Before Taxes			
6. Profits After Taxes			

7. Net Worth [= 1 − 3]			
8. Working Capital [= 2 - 4]			
•			

Form – 2.1: Average Annual Turnover (Calculated as certified payments received for contract in progress or completed) for last 3 years

Each consulting firm or member of a JV must fill in this form

Annual Turnover Data for the Last 3 Years				
Sl. No.	Year	[1]Certified Payment (in Currency of contract)	Exchange Rate	US$ Equivalent
			Average Annual Turnover:	

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Annexure 3

Form-3: Available professionals

Important: The consulting firm should provide the list of suitably qualified professionals to meet the requirements specified in EOI. The data on their experience need to be supplied using the Form below.:

Brief Description of the professionals of the Consulting firm:

Sl.No.	Description	Total Nos.	[1]Educational Qualification		[2]Professional Experience: No of professionals having experience in related field	
			No. of Postgraduate Degree holders (PhD, MS or equivalent)	No. of graduate degree holders (Bachelor or equivalent)	Less than 5 years	5 years and above
1.						
2.						
3.						
4.						
5.						
6.						
7.						

1. **Please attach CV (Sample can be found at the last page of this form) with photograph and educational certificates (Bachelor and higher degrees) of each key professional [As Annexure-4 (a)]. Please attach experience certificates or letters from previous and current employers as evidence of professional experience**

Annexure 3a

Resume of Proposed Personnel (Sample)

Position			
Personnel information	**Name**		**Date of birth**
	Professional qualifications		
	Educational Qualification with major		
Present employment	**Name of employer**		
	Address of employer		
	Telephone		**Contact (manager / personnel officer)**
	Fax		**E-mail**
	Job title		**Years with present employer**

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company / Project / Position / Relevant technical and management experience

**Please insert as many rows as applicable.

Annexure 4

Form-4: Comments/ Suggestions on the Scope of Service

(Maximum 2000 characters)

Annexure 5

Form-5: Consulting firm's Information Sheet

Information	
Consulting firm's legal name	
In case of JV, legal name of each partner	
Consulting firm's country of constitution	
Consulting firm's year of constitution	
Consulting firm's legal address in country of constitution	
Consulting firm's authorized representative in employer's country (if any) (Name, address, telephone numbers, fax numbers, e-mail address)	