



EMOTRIXA: AI Companion Robots for Emotional Support

Rishika. B¹, Dr Kavitha AS²

Department of Artificial Intelligence and Machine Learning, East West Institute of Technology, Bangalore, India^{1,2}

Abstract: Emotional well-being is a concern these days. Many people feel stressed, lonely and anxious. This is because of things like school pressure work demands and not seeing friends and family much. Even when people are struggling they often do not talk about their feelings because they are afraid of what others might think or they do not know where to get help.

This paper is about a robot that uses intelligence to understand how people are feeling. The robot can see how people are feeling by looking at their faces. It uses a kind of computer program to figure out if someone is happy, sad, angry or okay. The robot is trained to do this by looking at a lot of pictures of peoples faces. It can keep watching. See how someones feelings change.

The robot can talk to people without them having to start the conversation. It is like a friend who can see how you are feeling and respond. The robot is pretty good at understanding emotions. It gets it right 80 to 85 percent of the time. It is not meant to replace doctors or therapists. It can help people feel less alone and talk to someone when they need to. This project shows how artificial intelligence can be used in a way to help people feel better. Emotional well-being is important. This robot is designed to support emotional well-being. The robot uses intelligence to support emotional well-being and it can be a helpful tool, for people who need support.

I. INTRODUCTION

In the world we live in today taking care of our emotions has become an issue. With school and work being so demanding and our lives changing fast a lot of people feel stressed and overwhelmed. At the time we are using our phones and computers more and more which means we are not talking to each other in person as much as we used to. This is affecting how we interact with each other and making problems like feeling lonely, anxious and depressed more common.

Even though more people are talking about health it is still hard for a lot of people to talk about how they are feeling. They are afraid of what others will think. They do not want to be judged. Sometimes people do not know where to go for help so they just keep quiet.. This can make them feel even worse over time.

Our faces can show how we are feeling even if we are not saying anything. Just a small change in our eyes or the way we are holding our mouth can give away our emotions. With all the advances in computer technology and artificial intelligence machines can now look at these signs. Figure out how we are feeling.

The Emotion Detection System uses something called Convolutional Neural Networks or CNNs for short to make this happen. These CNNs can look at pictures. Teach themselves what different emotions look like. This paper is proposing a robot that can use this technology to detect emotions and respond in a way that helps.

This robot is different from systems because it does not need us to tell it what to do. It can see how we are feeling. Start talking to us when we need it to. This can be really helpful when we are feeling down and do not know how to start a conversation. The robot just wants to be for us and help us feel less alone.

The robot can help people with support and make them feel better when they are feeling sad or lonely. Emotional support is important, for people. This robot can provide that. The main goal of the robot is to help people with their emotions. It can do that by detecting emotions and responding accordingly.

II. LITERATURE SURVEY

Emotion recognition has gotten much better with machine learning.

Earlier systems used rules. They were not good at handling different facial expressions.

These rule-based methods often gave results in real life.



Deep learning with Convolutional Neural Networks or CNNs has made emotion detection more effective. CNNs can learn from images on their own starting with things like edges and then moving to more complex facial expressions.

Studies have shown that CNNs work well when trained on datasets such, as FER2013.

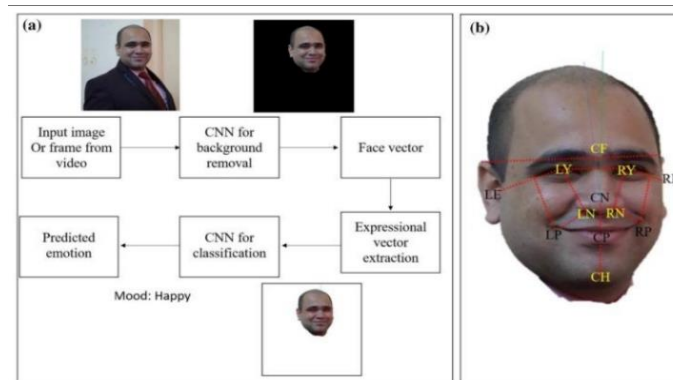


Figure 1: CNN-based Emotion Recognition Pipeline

Conversational AI systems have changed a lot over time. This means that machines can now talk to people in a natural way.. Most chatbots still need people to start the conversation. This makes them not very useful when people do not want to talk.

Companion robots are being used to help people in places like hospitals and homes for people. They provide help and company to people who need it. However many of these robots are not able to change what they say based on how someone's feeling at that moment.

This shows that we need a system that can figure out how someone is feeling and start talking to them at the time. We need a system that combines figuring out emotions in time with starting conversations, on its own. This would make Conversational AI systems and companion robots more helpful.

III. PROBLEM STATEMENT

Lots of people have a time with their emotions but they do not get help right away. The problem, with computers that are supposed to help us is that we have to talk to them which can be hard when we are feeling really bad.

Most of these systems just look at what we type or say. They do not pay attention to our facial expressions, which are a big part of emotions. This means they do not always understand how we are feeling.

So we need a system that can figure out how we are feeling by looking at our face and then give us a response that makes sense without us having to do anything.

IV. PROPOSED SYSTEM

The proposed system, EMOTRIXA, is designed as an AI companion robot is really good at figuring out how people are feeling. It can tell what someone is feeling by looking at their face. The robot does not need anyone to tell it what to do. It just starts talking when it thinks someone needs to talk.

The robot has three parts: one part that takes pictures of peoples faces, one part that figures out what those faces mean and one part that decides what to say back.

* The first part is like a camera that takes pictures of peoples faces all the time.

* The second part looks at those pictures. Tries to understand what they mean.

* The third part decides what to say to the person based on how they're feeling.

When the camera takes a picture of someones face it sends that picture to a computer that makes it easier to understand. This computer makes the picture black and white makes it smaller and makes sure it is like all the other pictures.

Then the computer looks at the picture. Tries to figure out what the person is feeling. It can tell if someone is happy, sad, angry or just okay. The computer is really good at this because it has been taught with a lot of examples.



After the computer figures out how someone is feeling it decides what to say to them. It picks something to say based on how the person's feeling and then says it out loud or writes it down. This robot is special because it does not wait for someone to talk to it. It just starts talking when it thinks someone needs to talk.

The robot keeps doing this over again. It is always. Waiting to see if someone needs to talk. This means it can help people when they need it most. The robot is, like a friend that's always there to listen and talk.

Hardware Component Cost Estimate

S.NO	COMPONENT	COST (INR)
1	Camera (Facial Image Capture)	2500
2	Microphone (Voice Interaction)	1800
3	Raspberry Pi 5 8GB RAM (Processing Unit)	6900
4	Miscellaneous (Wires, Connectors)	800
	TOTAL	12000

V. FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

The AI Companion Robot for Emotional Support needs to be designed well. This means we have to think about what the system should do and how well it should do those things. We need to make sure the system is good at what it does works all the time. Is easy for people to use.

The AI Companion Robot should be able to talk to people in a way. This is the thing the system should be able to do. The system should be able to understand what people are saying whether they are typing or talking. The AI Companion Robot uses techniques to understand what people mean. This helps the system have a conversation with people. The AI Companion Robot should be able to respond in a way that makes sense and keeps the conversation going.

The AI Companion Robot should also be able to tell how people are feeling. It should be able to figure out if people are happy, sad stressed, anxious or angry. The AI Companion Robot should be able to respond in a kind and supportive way when it knows how someone is feeling.

The system should also be able to remember what people said a while ago. This helps the AI Companion Robot respond in a way that makes sense and is consistent. The system should also be able to get to know people over time and respond in a way that's just for them.

The AI Companion Robot should be able to respond and have conversations that go back and forth many times. The system should also be safe. Not say anything that is not okay. Other important things are that the system works well is accurate and keeps peoples information private. The AI Companion Robot for Emotional Support is about the AI Companion Robot being able to help people and the AI Companion Robot being good, at its job.

VI. METHODOLOGY

The system they have come up with does things in an organized way to figure out how people are feeling and answer right away.

First it takes pictures of peoples faces all the time using a camera. Then it makes these pictures look alike and simpler so the computer can handle them. To do this it turns the pictures into black and white makes them all the same size and adjusts the brightness of each dot in the picture.

These pictures are then put into a kind of computer program called a Convolutional Neural Network. This program is really good at figuring out how people are feeling. It has layers that work together. Some layers look for features, in the pictures some layers make the pictures smaller and some layers help decide what the final answer should be. The program uses a math formula to help it learn and it uses another formula to decide which feeling is the most likely.



The feeling that the program thinks is the likely is the one it chooses. Then it uses this answer to come up with a way to respond, based on things it has learned before. This all happens over and over so the system can see how peoples feelings are changing and respond in a way. The emotion detection system or the system is always. Always looking at the emotions and the Convolutional Neural Network is always detecting emotions.

VII. ALGORITHM AND WORKING PRINCIPLE

The system works like this:

- * First we turn on the camera. Load the trained model.
- * Next we take pictures of faces in time.
- * Then we prepare the images by converting them to grayscale resizing them and normalizing them.
- * After that we put the image into the model.
- * The model then finds the features. Identifies the emotion.
- * We choose the emotion that has the chance of being correct.
- * Based on the detected emotion we create a response.
- * We. Give the response to the person.
- * We keep doing this over for real-time interaction, with the emotion detection system.

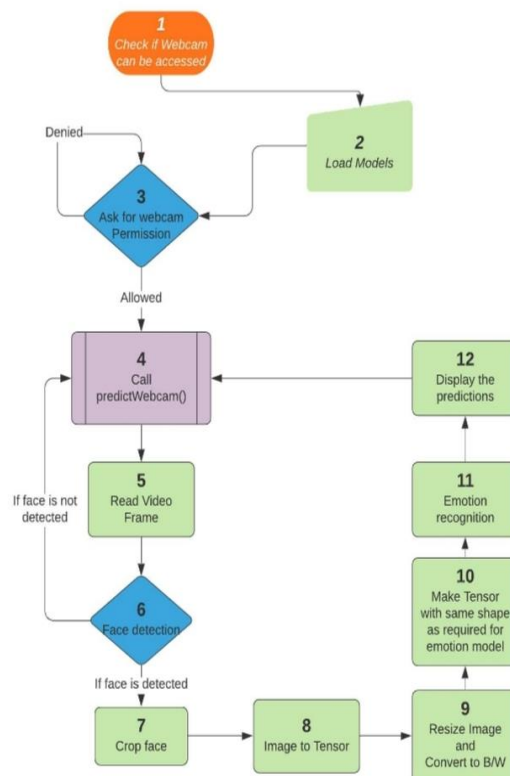


Figure 2: System Algorithm Flowchart

VIII. DATA COLLECTION AND ANALYSIS

The system is using the dataset. This dataset has a lot of grayscale images. These images show emotional expressions. The FER2013 dataset is really helpful because it has many different faces. This helps the model learn about the FER2013 dataset and understand it better.

The FER2013 dataset is split into two parts. One part is for training the model. The other part is for testing the model. When the model is being trained it is looking at the FER2013 dataset to find patterns. These patterns are what help the model tell the difference between the expressions in the FER2013 dataset. The system is also using some techniques to make the model better, at understanding the FER2013 dataset. This helps the model not get too confused and make predictions.



The system is checking how well the model is doing by looking at how correct predictions it makes. This is called accuracy. The model is doing well. It is getting about 80 to 85 percent of the predictions correct when everything is normal.. Sometimes the model does not do as well. This can happen if the lighting is bad or the image is not clear. The FER2013 dataset is still really helpful for the model to learn from.

IX. RESULTS AND DISCUSSION

The system can detect emotions as they happen and reacts in a way. It works fine in lighting and can tell the difference between emotions, like happiness, sadness, anger and being neutral.

* One big. Of the system is that it can start talking to you without you needing to do anything. This makes it helpful when people do not feel like talking about how they feel.

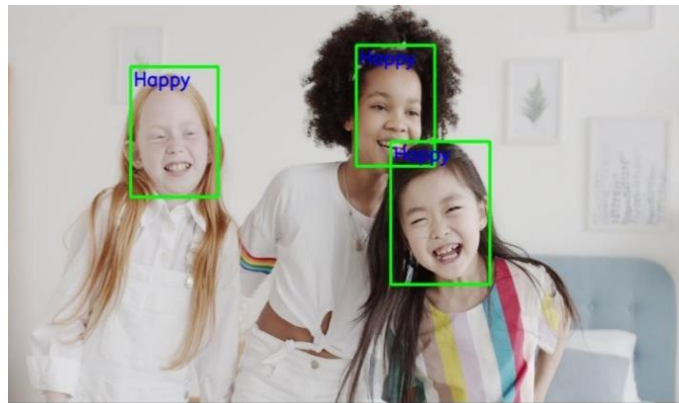


Figure 3: Real-time Emotion Detection Result – Happy

The system has some problems. It does not work well when the light is bad or when something is covering part of the face. The system can only give answers that are already set up. It is not very good at having real conversations.

The system is good at helping people with their emotions and making it easier for them to interact with it.

X. APPLICATIONS

The system can be used in a lot of areas. It can help students in school feel less stressed by giving them support. It can also help companies take care of their employees and make sure they are not too stressed.

In hospitals the system can talk to patients. Keep them company. It is also good, for people who are lonely and need someone to talk to.

XI. ETHICAL CONSIDERATIONS

The use of emotion recognition systems is something that worries people about their privacy and how safe their information is. To make this better the system works with the data right where it is and does not keep any information about the users.

The people who use the system should know that it is based on intelligence. It is really important to be open with the users so they know what the system can and cannot do. The system is made to help people not to take the place of mental health care.

It is also important to make sure the system is fair and does not have any biases, which can happen by using a lot of kinds of data to train it.

XII. CONCLUSION

This paper is about a robot that uses intelligence to figure out how people are feeling and can respond right away. By using computer vision and deep learning the system shows that it can help people who are having a time with their emotions.



Even though it is not the same as talking to a person the robot can be a tool that makes people feel less alone and improves how they feel.

XIII. FUTURE WORK

In the future we can work on making the system better at recognizing emotions from peoples voices, which can make it more accurate. We can also make the system respond in ways, which can make it more fun for the users to interact with.,

We can also use kinds of data like what people say and how they behave to make the system even better, at figuring out how people are feeling.

REFERENCES

- [1]. A. Goel and S. Farooq wrote about health trends among students in the Journal of Mental Health Studies. They published this in volume 12 number 2 on pages 45 to 52 in the year 2021.
- [2]. R. Kumar, P. Singh and A. Sharma looked at the impact of stress on student well-being. Their work was published in the International Journal of Education and Psychology volume 8 number 1 on pages 23 to 30 in 2019.
- [3]. S. Hosseini worked on facial expression recognition using learning. This was published in the IEEE Transactions on Affective Computing volume 8 number 3 on pages 245 to 256 in 2017.
- [4]. M. Sarikhani, A. Bastani and H. Rafiee talked about barriers to health services. They published this in the Journal of Health Psychology volume 24 number 5 on pages 678 to 685 in 2019.
- [5]. H. Shahsavari and A. Choudhury discussed access to health care in developing regions. Their work was published in the Global Health Review, volume 10 number 1 on pages 15 to 22 in 2025.
- [6]. A. Nama wrote about applications of intelligence in daily life. This was published in the International Journal of Computer Science volume 14 number 3 on pages 112 to 118 in 2022.
- [7]. S. Upadhyay, R. Patel and K. Mehta worked on AI-based systems for interaction. They published this in the Journal of Intelligent Systems volume 18 number 2 on pages 90 to 101 in 2023.
- [8]. I. Liiu, J. Wang and X. Chen looked at deep learning approaches for emotion recognition. Their work was published in IEEE Access on pages 45678 to 45690 in 2023.
- [9]. M. Nour, S. Ali and T. Hassan talked about emotion classification using CNN models. They published this in the International Journal of Machine Learning volume 9 number 4 on pages 201 to 210 in 2020.
- [10]. A. NSAIF M. Rahman and K. Das discussed AI and chatbot technologies. Their work was published in the IEEE Systems Journal, volume 18 number 1 on pages 334 to 342 in 2024.
- [11]. Y. Liu, H. Zhang and L. Chen worked on companion robots in healthcare applications. They published this in Robotics and Autonomous Systems on page 104321 in 2025.
- [12]. Q. Tang, X. Li and Y. Zhou looked at emotion- robotic systems. Their work was published in the IEEE Robotics and Automation Letters, volume 10 number 2 on pages 789 to 796 in 2025.
- [13]. M. Gaya-Morey, J. Torres and R. Lopez talked about cues, in emotion recognition systems. They published this in Pattern Recognition Letters on pages 12 to 20 in 2025.
- [14]. R. Singh wrote about limitations of text-based emotion detection. His work was published in the Journal of AI Research volume 22 number 3 on pages 145 to 153 in 2023.